latter, the former would result only in an addition to the inventor's knowledge of the properties of things, and not in the production of new operative means. Taken together they constitute the complete mental part of the inventive act, creating a new and original idea of means which requires only reduction to practice to make it useful in the arts.

§ 97. Discovery may Relate either to the Force, the Object, or the Mode of Application.

It is further evident that these mental processes are both performed whenever the qualities of either one of the three factors were hitherto unknown to the inventor. The constructive process is the same whether such qualities were originally discovered by the inventor or were communicated to him by others, and is, therefore, present in all efforts either of mechanical or of inventive skill. The process of discovery becomes necessary only when these qualities remain unknown, but is as necessary when those of a single factor are undiscovered as if those of the three were still to be revealed. Thus, where the capabilities of the force are as yet concealed, no conception of an idea of means in which it is united with an object and a mode of application is possible, although the susceptibilites of the object and the availabilities of the mode of application may be fully understood. Equally true is this when the susceptibilities of the object, or the availability of the mode of application are unknown. That which remains unknown must become known before the constructive process can begin; and this can be effected only by the process of discovery, whether its field of exploration cover the whole or merely one of these subordinate factors. Hence the conception of an idea of means may consist in the discovery of the capabilities of the force, and its union with an object whose susceptibilities are known, through a mode of

operation is there; but the inventor, though he knew all about cams and levers and other mechanical arrangements, did not have in advance before him the coveted mechanical operation." [9] Fed. Rep. 429 (432).

That the process of discovery is essential to the inventive act, see Gardner *v.* Herz (1886), 118 U. S. 180; 35 O. G. 999.

application whose availability is also known. Or it may consist in the discovery of the susceptibilities of the object, and its union with a force whose capabilities, and a mode of application whose availabilities, are already familiar to the inventor. Or it may consist in the discovery of the availability of a mode of application and its union with a force whose capabilities, and an object whose susceptibilities, he has long since ascertained. In each of these conceptions the creative faculties are exercised, and the mental part of the inventive act is truly and completely performed. If the field of discovery is wider, embracing the qualities of two or even of all these factors, the essential character of the mental processes involved, and consequently of the inventive act, remains unchanged.

§ 98. Creative Faculties Employed in Discovery on Seven Occasions.

From these considerations it appears that the creative faculties of the inventor may be exercised in the process of discovery on seven different occasions: (1) Where the capabilities of the force are discovered, the qualities of the other two elements being known; (2) Where the susceptibilities of the object are discovered, the qualities of the other two elements being known; (3) Where the availability of the mode of application is discovered, the qualities of the other two elements being known; (4) Where the capabilities of the force and the susceptibilities of the object are discovered, the availability of the mode of application being known; (5) Where the capabilities of the force and the availability of the mode of application are discovered, the susceptibilities of the object being known; (6) Where the susceptibilities of the object and the availability of the mode of application are discovered, the capabilities of the force being known; (7) Where the capabilities of the force, the susceptibilities of the object, and the availability of the mode of application are all the subject of discovery. In each of these cases, if the discovered factor or factors have been united by the discoverer with the known factors, (if any were already known), into an idea of a practically operative means, the mental part of the inventive act

has been performed and the invention is ready for concrete embodiment.

§ 99. Process of Discovery Described: how Evidenced.

The process of discovery consists in finding out what was before unknown. The method in which it is conducted is of no importance. Many discoveries are the result of study and research. Others are reached by experiment based on reasoning or conjecture. Others dawn on the mind apparently by accident, without previous attention to the subject. The fact of discovery can, in the nature of things, be ascertained only through its results. A matter hitherto unknown cannot become known without an act of discovery on the part of the person to whom it is first known; and when the unknown is made known it is, therefore, certain that an act of discovery has been performed. The sole test of discovery, which any science can possess, thus formulates itself in the question: Has the unknown become known? — a question which includes two others: What is the unknown? When does the unknown become known? In answering the first question the law escapes the uncertain speculations of philosophy by the adoption of a rule at once definite and practical. A thing is unknown when it is neither known in itself nor suggested to persons, who are acquainted with that class of things, by what is known. That individuals of unusual ability may reason from the known fact to the other does not make the latter also known; but if the ordinary mind, being already familiar with a class of objects, can pass by an association of ideas from one of these to others not before perceived, the knowledge of the former embraces that of the latter and all alike are thus considered known. The unknown becomes known when its essential characteristics are comprehended by the mind. Hence in any given instance of alleged discovery, if the necessary attributes of some fact or object, heretofore unknown in itself to the alleged discoverer and not suggested to him by any known fact or object, have been brought within his comprehension by his own efforts, the allegation of discovery is true, and a substantial addition to his stock of knowledge has been made. Applying this test to the generation of an idea of means, the process of

discovery consists in the finding out, by the inventor, of some force or capability of a force, or some object or susceptibility of an object, or some mode of application or availability in a mode of application, which was neither known to him before nor could have been suggested to him by anything that was known.[1] Wherever, therefore, either of the factors in the idea of means is new, in the sense of being hitherto wholly unknown to the mind of the inventor, and has not been communicated to him by others, the creative faculties must have been in operation and engaged in the process of discovery.

§ 100. Process of Construction Described: how Evidenced.

The process of construction consists in uniting the discovered force, or object, or mode of application, with the other two factors of the idea of means, in a conception whose embodiment in tangible materials will form a practically operative art or instrument. This process, though of a lower order than the process of discovery, is equally essential to the mental part of the inventive act.[1] The test of its performance is the accomplishment, by the embodied idea of means, of the end it was created to fulfil. For wherever a proper force is directed upon a proper object, by a proper mode of application,

§ 99. [1] In order further to avoid any question as to the degree of personal knowledge possessed by the inventor, and thus the existence of the process of discovery, the law presumes that he has an acquaintance with all matters familiar to those who are skilled in the art to which his invention belongs. This subject is discussed in § 112, and the authorities are collected in its notes. If, therefore, the matter which he claims to have discovered was known to persons skilled in the art before the date of his alleged discovery, it is conclusively presumed that it was known to him, and hence that his assertion of discovery is false. On the contrary, if it were not known in the art until he made it known, its intrinsic novelty is strong but not conclusive evidence that the act by which it became known to him was an act of true discovery. This position is the foundation of the theory that novelty indicates the exercise of inventive skill, a theory which is correct if the actual or intrinsic newness of the discovery be taken as the guide, but incorrect if the legal novelty (or patentable novelty, if it may be so called), of the concrete invention is regarded.

§ 100. [1] That the discovery of hitherto unknown qualities or capabilities is not, by itself, invention, see Ansonia Brass & Copper Co. *v.* Electrical Supply Co. (1887), 32 Fed. Rep. 81; 42 O. G. 1168.

the result intended by the inventor must inevitably follow; and any failure in the result thus proves either that his discovered factor has not been joined with suitable associates, or that their union is still incomplete.

§ 101. Essence of Idea of Means Depends on which of these Factors is the Subject of Discovery: Three Groups of Means: "A Force Applied:" "A Mode of Application:" "A Specific Treatment of Specific Objects."

The idea of means being thus composed of three factors, at least one of which possesses attributes unknown to the inventor until discovered by his efforts, and all of which have been united by his constructive thought into a conception ready for practical and efficient expression in the arts, the ultimate and essential character of this idea must depend upon the factor in reference to which the process of discovery has been performed. The discovery of a new force or new capability of a known force, and its union with a mode of application through which it can act upon such objects as are naturally susceptible to its influence, constitutes an idea of *a force applied*.[1] The discovery of a new mode of application, or of a new availability in a mode already known, and its adaptation to employment as a method of connecting forces with their objects, constitutes an idea of *a mode of application*.[2] The discovery of a new object or of new susceptibilities in a known object, and its union, through an available mode of application, with a force capable of operating upon these susceptibilities with useful results, constitutes an idea of *subjecting a specific object to specific treatment*, thereby producing in the object certain definite effects.[3] To one of these three groups all ideas of means necessarily belong; and in determining any question con-

§ 101. [1] That the practical application of a newly discovered force or property of matter to any object, and by any mode of application, constitutes a new means and hence a new invention, see Poillon *v.* Schmidt (1869), 6 Blatch. 299; 3 Fisher, 476; Smith *v.* Ely (1849), 5 McLean, 76; Parker *v.* Hulme (1849), 1 Fisher, 44.

[2] That a new mode of applying a well-known force to its objects is a new means and a new invention, see Hills *v.* London Gas Light Co. (1860), 5 H. & N. 312.

[3] That to discover new susceptibilities in an object and to render them available by subjecting it to well-known forces, applied in well-known methods,

cerning the essence of a concrete art or instrument, or its identity with any other art or instrument, the analysis of the idea of means, therein embodied, into its component factors, and its relegation to its proper group as indicated by the factor which has been the subject of discovery, affords the only scientific and reliable method of investigation.

§ 102. Essence of "A Force Applied."

The essence of an invention, in which is embodied the idea of a force applied, consists of the new force or capability acting through the selected mode of application. The process of discovery, it is true, has been employed only upon the force, but a force alone is not an operative means. To it must be added the intermediate agency, by which it is brought in contact with its object and so directed thereupon as to produce the end desired. The object, however, forms no part of the invention. It is, indeed, the substance upon which the means must act and in which it must accomplish its effects. Its presence is, therefore, indispensable to the useful operation of the means, and must have been contemplated by the inventor while selecting the mode of application by which his new force could be beneficially applied; but the existence of the means itself is independent of the object upon which it may be employed.

§ 103. Essence of "A Mode of Application."

The essence of an invention, in which is embodied the idea of a mode of application, consists of the new intermediate agency which the inventor has discovered, whereby a force may be united with its object. In discovering and comprehending such an agency, the mind must apprehend the force and object, and the relations which the new mode of application can establish between them; but when completely

is a new means and a new invention, see Cary *v.* Wolff (1885), 23 Blatch. 92; 32 O. G. 257; 24 Fed. Rep. 139; Spill *v.* Celluloid Mfg. Co. (1880), 5 Bann. & A. 405; 18 Blatch. 190; Dalton *v.* Nelson (1876), 2 Bann. & A. 225; 13 Blatch. 357; 9 O. G. 1112; Union Paper Collar Co. *v.* White (1875), 2 Bann. & A. 60; 7 O. G. 698, 877; Young *v.* Fernie (1864), 4 Giff. 577; Steiner *v.* Heald (1851), 6 Exch. 607; Walton *v.* Potter (1841), 1 Web. 597.

conceived and understood by the inventor, the mode of application stands alone, as a perfect and independent means, available for use with any force and any object to which it may be suitable, and reducible to practice in any form which establishes between them the connection necessary to the operation of the one upon the other in the mode proposed.

§ 104. Essence of "A Specific Treatment of Specific Objects."

The essence of an invention, in which is embodied the idea of treating a specific object in a specific manner in order to produce particular results, comprises the three factors of the idea, — the susceptibility of the object, the capability of the force, and the availability of the mode of application.[1] The susceptibility of the object is the only subject of discovery, but this is not a means. The capacity to receive impressions from external forces is a condition precedent to the operation of such forces, but is not a method by which those impressions may be produced. Yet the force, united with the mode of application, does not constitute the entire essence of the invention, since in reference to these factors there has been no process of discovery; and without that process exercised upon the object the specific treatment which results in the desired effect could not have been invented. Hence in inventions of this character, the three factors are inseparable, both in mental contemplation and in actual practice; the substitution of a different object or susceptibility, or of a different force or capability, or of a different mode of application or availability,

§ 104. [1] This group of inventions is of comparatively late recognition in the law. The employment of an old force through an old mode of application upon a new object was long confounded with the "double use" of the old invention; and the proposition that an inventive act might consist in discovering new objects or new susceptibilities in an old object, and utilizing these by applying to them old forces through old modes of application, has been established only after long delay and much controversy. It is now, however, a settled doctrine. Its gradual growth may be traced in the following cases: Walton *v.* Potter (1841), 1 Web. 597; Steiner *v.* Heald (1851), 6 Exch. 607; Young *v.* Fernie (1864), 4 Giff. 577; Union Paper Collar Co. *v.* White (1875), 2 Bann. & A. 60; 7 O. G. 698, 877; Dalton *v.* Nelson (1876), 2 Bann. & A. 225; 13 Blatch. 357; 9 O. G. 1112; Spill *v.* Celluloid Mfg. Co. (1880), 18 Blatch. 190; 5 Bann. & A. 405; Cary *v.* Wolff (1885), 23 Blatch. 92; 32 O. G. 257; 24 Fed. Rep. 139.

See also cases cited under § 266.

changing either the object treated or the method of treatment, and forming, therefore, a distinct invention.

§ 103. Essence of any Concrete Invention Ascertained by Relegating it to its Proper Group.

The concrete inventions falling within these fundamental groups do not necessarily belong to the same classes in the arts. Many processes, possibly some machines and manufactures, and probably all compositions of matter, are of the first group, representing the idea of a force applied. Processes which consist merely in the direction of known forces upon known objects, as well as most if not all machines and manufactures, are of the second group, embodying the idea of a mode of application. Processes which consist in the subjection of specific objects to specific modes of treatment, based upon the discovery of new susceptibilities in the objects treated, constitute the third group. The test, in any case of doubt, resides in the subject of discovery. Where the force alone has been discovered by the inventor, the other factors being known, the invention falls within the first group. Where only the mode of application has been discovered, the force and object being known, the invention belongs to the second group. Where the object furnished the sole field of discovery, the invention is embraced within the third group. The relegation of an invention to its proper group thus at once discloses its essential character, and renders its comparison with other inventions, for the purpose of determining their identity, accurate and practicable.

§ 106. Essence of Idea of Means not Changed though other Factors are Subjects of Discovery.

Were the process of discovery in all inventions confined to a single factor of the idea of means, the classification thus attained would need no further explanation. But it may occur that an inventor, having discovered one new factor, finds none within his knowledge which can be united with it into an operative means, and is compelled to prosecute his efforts of discovery until one or both of the remaining factors are obtained. Whether this method of achieving his results

changes the mental part of the inventive act, and the consequent character of the idea conceived, is a question of serious importance. That the constructive process of the mind is not varied by the necessity for additional discovery is evident, since the organization of factors into an operative whole involves the same mental energies whether or not the factors were hitherto unknown. The difference, if it exists, resides in the process of discovery and in the relation of the thing discovered to the idea of means. The process of discovery is the same except as to the field with which it has been occupied, involving the same faculties and proceeding by the same methods to the accomplishment of its results. The relation of the factors to each other and to the entire idea must, therefore, determine whether the discovery of more than one affects in any manner the nature of the inventive act and the idea of means which it evolves. But where an inventor has discovered a new force or a new object or a new mode of application, and either one of the remaining factors is unknown, it is obvious that the process of construction cannot be commenced and that no inventive act has been performed. And when he discovers the needed factor, and completes the idea of means through the constructive process, it is equally obvious that, so far as this idea of means is concerned, he has performed no more than the inventive act requires. Hence it is true that the essential character of the inventive act, which results in the production of any given idea of means, is not affected by the number of the factors which become the subjects of discovery. The discovery of the inventor in relation to the second or third factors may, however, have been more extensive than was necessary to complete this given idea of means. Thus, if the factor first discovered were the force or object, and the missing factor were the mode of application, that mode which he discovers may be available as the connecting agency between many other forces and their objects. Here it is evident, that while the idea of means into which the discovered force or object enters as a factor does not exhaust the availabilities of the discovered mode of application, yet neither the nature of the force applied, nor that of the object treated, nor that of the idea in which they are united,

is varied by the excess existing in the mode of application. The means is still the same means, operating on the same objects and accomplishing the same results, although one of its factors might have been employed for other independent purposes. The discovery of this additional availability may serve the inventor as a basis for constructing other ideas of means by uniting it with other forces or other objects, but cannot enlarge the scope or change the nature of the means of which the new discovered force or object is an essential factor. On the same principle, if the first discovery related to the mode of application, and the additional discovery to the force or object, the fact that in the mode of application availabilities reside, which are not required in the direction of this force upon its object, cannot extend the scope of the idea of that invention beyond the availabilities therein employed, although the additional availabilities may enter as essential factors into other means, whenever objects or forces which can be connected by them are discovered. The conclusion, therefore, seems inevitable that in a given invention it is immaterial whether one or more factors are the subject of discovery; that in all cases the same mental faculties are employed, the same processes are followed, and the same results attained; and that every invention, however conceived and constructed, must be either a force applied, a mode of application, or the subjection of a specific object to specific treatment for the purpose of producing in the object certain definite effects.

§ 107. Identity of Two Ideas Determined by Comparing their Essential Factors.

The identity or diversity of two ideas of means may be determined by resolving each idea into its component factors, and comparing those of one idea with the corresponding factors of the other. Where the force, the object, and the mode of application are the same in both ideas, the ideas are essentially identical. Where the force, the object, and the mode of application in one idea all differ from the corresponding factors of the other, the ideas are essentially diverse. Where one or two of the factors are the same in each idea, but the

remaining factor or factors are different, the ideas may be totally distinct, or they may be identical, or one may be included in the other. In such cases, to ascertain their true relation, each must be referred to its appropriate group, according to the factor which has been the subject of discovery. If the ideas fall into different groups they cannot be identical, though one may be included in the other. Thus an idea of means consisting in a mode of application may be embraced in an idea of a force applied, and both may be involved in that of treating a specific object in a specific manner, but neither of these ideas is identical with any of the others. But when the mode of application which constitutes the essence of one idea is not the same mode which the force applied employs, these two ideas have no common attribute, since the force in the first case, and the object in both cases forms no part of the essence of the means. In like manner, when one of the ideas is a mode of application or a force applied, and the other is a specific object subjected to specific treatment, the ideas must be wholly different, unless the force and mode of application in the latter are identical with those which constitute the former. If the two ideas fall within the same group, their identity or diversity depends upon the identity of their essential factors. When each is a force applied, the force and mode of application in each must be the same or they are totally diverse. When each is a mode of application, the availability employed by each must be the same or no identity of means exists. When each is the treatment of an object, the object, the mode of application, and the force in each must be identical, or the ideas are essentially distinct. In making these comparisons, accurate results would be impossible were the physical identity or diversity of forces, objects, and modes of application the facts to be decided, since for the most part these lie beyond the sphere of human knowledge. The law, therefore, being compelled to furnish some test of identity or leave these problems utterly unsolved, declares that, for its purposes, two forces, objects, or modes of application shall be regarded as the same, whenever, in connection with the other factors of the idea of means, they could be used as perfect substitutes for one another, and were

known as such in the arts when the idea of means was first conceived.[1] This rule rests on sound reason as well as on authority. No matter what their actual differences may be, two things must be the same, in reference to an invention, when, as employed in the invention, each would perform the functions of the other. If this interchangeability is known when the idea of means is conceived by the inventor, or is made known by his generation of the idea, his inventive act, in its processes of discovery and construction, embrace all alike, although in his concrete invention he may have chosen to employ but one. On the other hand if, after his idea has been completed, a new factor is discovered capable of filling the same place in the invention, and relations are established between it and the other factors of his idea, a new inventive act has been performed, including both the processes of discovery and construction, the results of which are not in law regarded as identical with his, however certain it may be that physically and industrially they are the same.

§ 108. General Statement of the Nature and Factors of the Idea Generated by the Mental Part of the Inventive Act.

The conclusions to which this examination of the nature and elements of the idea generated by the mental part of the

§ 107. [1] The principle here involved is the same as that which, in reference to the concrete embodiment of the idea of means, finds expression in the doctrine of Equivalents. Whether in dealing with the art or instrument as practically employed, or with the ideas which form the essence of the invention, the law is compelled to furnish some standard by which, in the incurable deficiency of scientific knowledge, the identity of conceptions, as well as substances, may be determined. The one adopted serves all necessary purposes in either field, and though usually found, in its verbal statement, predicated of embodiment alone, is evidently as true and serviceable in ascertaining the identity of those factors upon whose correspondence the identity of the concrete art or instrument depends.

Sec. iii., chap. iii., §§ 245–258 on Equivalents, with its notes, affords a wider and clearer discussion of the subject. Caution is requisite not to attribute to the identity of ideas the rule governing the date when equivalents in embodiment must have been known. An equivalent in embodiment must have been known when the act of embodiment was performed, which is *prima facie* at the date of the patent. An equivalent in idea must have been known when the idea was conceived by the inventor, which is at the date of his complete comprehension of his idea as an operative means.

inventive act conducts us, may be stated in the following propositions: —

I. The idea generated is an idea of means as distinguished from an idea of end;

II. The idea of means is composed of three factors, an idea of force; an idea of object; and an idea of a mode of application;

III. The generation of the idea consists not in the creation of either of these factors, but in the discovery that they are capable of union, and in uniting them in one idea of means;

IV. The idea of means is generated, and the mental part of the inventive act performed, whenever a new force, or new capability of a force, is discovered and applied to proper objects by some proper mode of application; or whenever a new object, or new susceptibility of an object, is discovered and is subjected to the action of any force through any suitable mode of application; or whenever a new mode of application, or new availability of a mode of application, is discovered and employed as the connecting agent between forces and their objects;

V. The ideas of means thus generated are divisible, according to the method of their generation and their essential attributes, into three classes: (1) A force applied, in which the force has been the subject of discovery, and the force and mode of application constitute the essence of the means; (2) A mode of application, in which the mode of application is the subject of discovery and the essence of the means; (3) A subjection of specific objects to specific treatment, in which the object is the subject of discovery but all the factors enter into the essence of the means;

VI. Whether the process of discovery extends to other factors than the one which characterizes an idea of means is unimportant; the idea itself is still the same, whatever other ideas may be constructed on the basis of the additional discovery;

VII. The identity or diversity of ideas of means is ascertained by resolving each into its component factors, and comparing every factor in one with the corresponding factor in the other;

VIII. Judged by this standard, ideas of means are iden-

tical where all the factors in each are identical with the corresponding factors in the other, or where both the inventions belong to the same group and the essential factors of each are the same as the essential factors of the other; they are diverse when all their corresponding factors are unlike, or when, belonging to different groups, the more complex does not embrace the essential factors of the other; one idea includes another when they belong to different groups and all the essential factors of the simpler means enter into the essence of the other.

The importance of these propositions, and of the principles upon which they rest, cannot be overestimated. They form the tests which, in the last resort, are decisive of every question relating to the exercise of inventive skill, or to the novelty or utility of its results. To them may be reduced most of those rules which, before the nature of the mental part of the inventive act was clearly understood, had obtained titles of their own, as if they were the ultimate verities of Patent Law. As we go forward they will solve for us all our apparent difficulties, and furnish us a basis for the classification of those decisions through which the courts have gradually wrought their way toward these essential and imperishable truths.

SECTION III.

OF THE FACTS WHICH INDICATE THAT THE MENTAL PART OF THE INVENTIVE ACT HAS BEEN PERFORMED.

§ 109. Whether an Inventive Act has been Performed is to be Determined from the Invention itself, not from the Assertions of the Inventor.

Whether or not the mental part of the inventive act has been performed is a question of fact, to be determined by the evidence presented.[1] For obvious reasons, this question is one of the most difficult of those arising in the administration

§ 109. [1] That the existence of inventive skill is a question of fact, see Butler *v.* Bainbridge (1886), 29 Fed. Rep. 142; Stimpson *v.* Woodman (1869), 10 Wall. 117.

of Patent Law; and hence, wherever reasonable doubt exists, the same liberal spirit which characterizes both the enactment and the application of the law awards the benefit of the doubt to the inventor.[2] In the investigation of this question, the actual operations which have taken place in the mind of the inventor are not open to inquiry. Concerning these he alone has any personal knowledge, and even his impressions are often vague and unreliable. Of themselves they are of no importance to the public, provided the process of discovery and the process of construction have both been completed, and of these the nature and the elements of the idea embodied in the invention afford the only evidence. The invention must, therefore, speak for itself. As contemplated by the observer, apart from any claims of the inventor, it must present those indications which the law deems sufficient proof that it originated in an exercise of the inventive powers. If these exist, there is no occasion to determine by what intellectual operations the result was reached. If these are wanting, no allegations by the inventor can supply their place.

§ 110. Inventive Act Performed when the Generated Idea is an Idea of Means, and either of its Factors has been Discovered by the Inventor.

This question, when fairly apprehended, resolves itself into two subordinate inquiries: Whether the idea conceived by the

[2] In Kirby *v.* Beardsley (1867), 3 Fisher, 265, Shipman, J.: (278) "I am well aware that it is often no easy task to draw the true line of distinction between invention, the product of original thought, and mere obvious manual changes following the beaten track of mechanical experience. This difficulty, in connection with the general merit of inventors, as contributors to the material interest of society, has inclined courts to give a liberal construction to the law, so as to protect every contrivance that can be called new, which proves at all useful. Care has been taken to give the benefit of doubt, as to originality or creative thought, to the inventor, so as to nourish inventive enterprise by lending encouragement to every degree of merit. This is the more important, as simple contrivances, the offspring of simple, even involuntary thoughts, often produce great and beneficial results, while complex and elaborate ones, the product of long and profound cogitation, not unfrequently prove comparatively or wholly abortive. But it is obvious that there is a limit beyond which mere changes cannot and ought not to receive this protection." 5 Blatch. 438 (453). See also Butler *v.* Bainbridge (1886), 29 Fed. Rep. 142.

alleged inventor is that of a practically operative means? and Whether either of the factors of the means conceived was previously unknown to the inventor? If the idea conceived is that of an operative means, it is at least certain that the constructive process has been performed, and that a force, an object, and a mode of application have been united in such a manner as to produce useful results. If, in addition to this, the inventor had no prior knowledge of that capability of the force, or that susceptibility of the object, or that availability of the mode of application, which renders possible their union in this idea of means, it is apparent that the process of discovery has taken place, and, therefore, that the mental part of the inventive act has been complete. The first inquiry is answered without difficulty by the tangible embodiment of the idea and its practical application in the arts, since if it there proves useful it is evidently an operative means. The second is the field of doubt and obscurity, in which the most exhaustive research sometimes fails to obtain a satisfactory reply.

§ 111. Discovery Present when either Factor of the Idea was before Unknown in the Arts.

Upon the subject of this second inquiry the inventor alone, of course, can speak with perfect accuracy. The conclusions of the law, however, are not allowed to rest on his unaided testimony, except when every other source of information fails. It has its own methods of ascertaining the state of his prior knowledge, and only when it has applied these, and has found them insufficient, does it permit his assertions to control its judgment. The fundamental test which it applies is the condition of human knowledge in general, in reference to those factors of the idea of means which the inventor claims to have discovered for himself. If these were utterly unknown before the date of their employment by the alleged inventor; in other words, if they were new in themselves; they must have been presented to his mind by the process of discovery. The actual novelty of any factor in the idea of means thus establishes beyond dispute the want of prior knowledge on the part of the producer of the means, and proves his exercise of his inventive powers.

§ 112. Discovery Absent when every Factor of the Idea was Already Known in the Arts.

The knowledge of mankind in general concerning any of the factors of the idea of means does not, however, demonstrate that the inventor shared such knowledge. Whatever information others may have possessed, the attributes of these factors may be new to him and have been ascertained by a true process of discovery. But the uncertainties attending the investigation of this fact are so great that the law cannot, with safety, give it serious attention. Except in cases where it could be proved that the inventor had derived his knowledge from external sources, his own assertion would be the only evidence obtainable, and though he were surrounded by those who were familiar with the factors he employed, his undisputed claim of personal ignorance would secure to him the credit of an inventive act. If the purpose of the law were to do honor or bestow rewards on all conceivers of ideas of means, this fact would be the proper point of inquiry. But as its only object is to confer exclusive privileges on the first inventor, it consistently refuses to regard any exhibition of inventive skill, the result of which could have been attained by applying the constructive process to the discoveries of others, and thus establishes the rule that every alleged inventor shall be conclusively presumed to have known, at the time of his conception of the idea of means, whatever was then generally known concerning any of its factors to persons skilled in the art to which the idea belongs.[1] Under this rule, the secret knowl-

§ 112. [1] In Crompton *v.* Knowles (1881), 7 Fed. Rep. 199, Lowell, J.: (203) "It is a presumption of law that all mechanics interested in upholding or defeating a patent were fully acquainted with the state of their art when they took out their patent, or when they built their machine. This presumption is founded upon a policy like that which imputes to all persons charged with crime a knowledge of the law. It is necessary to the safe administration of justice. Each party may then be assumed to have borrowed from the other whatever was actually first invented and used by that other."

In Walton *v.* Potter (1841), 1 Web. 585, Tindal, C. J.: (592) "The party is not entitled to his patent . . . unless he is the first and true inventor; therefore, if the subject-matter of the patent has been discovered — has been published in a dictionary, for example — though it has not been reduced into practice, if a man merely adopts it, the merit is so small that his patent for it would be worth nothing."

In a note to this case Mr. Webster

edge of single individuals is not considered. Such knowledge is not incompatible with general ignorance, and when it has been demonstrated that the knowledge was concealed, the want of knowledge on the part of other persons and the public is established. Wherever, therefore, an alleged inventor employs, in his idea of means, a factor whose attributes were unknown before his idea was conceived, or were known only to individuals who concealed their knowledge, his perception of those attributes must have resulted from his own process of discovery. On the other hand, whatever may have been the state of his own knowledge, if these attributes were already generally known to persons familiar with the art, it is presumed that he derived his information from external sources and that no inventive act has been performed.

§ 113. Discovery Indicated by the Intrinsic Novelty or Utility of the Concrete Invention.

When the performance of the process of discovery can be affirmed or contradicted in the foregoing manner, no further inquiry is necessary. But investigations of the attributes of forces, objects, or modes of application are not always satisfactory in the present state of scientific knowledge, and other methods of solving this question must, therefore, be employed.

says: (1 Web. 592) "The two issues of novelty, viz., whether the plaintiff is the true and first inventor, within the meaning of the statute, and whether the invention at the time of the grant be new as to public use and exercise, are, as in this case, generally involved together, because, if the latter be established in the negative, the former is involved in it; but they are, in point of law and of fact, distinct issues, for it may well be that the invention was never in public use and exercise, and yet that the grantee of the letters-patent is not the true and first inventor."

(1 Web. 44 n.) "If an account of an invention be contained in any published book in general circulation, the presumption is that the patentee learnt it from such source, and in that case he would not be the true and first inventor."

Further, that an inventor is always presumed to have known all prior inventions that were identical with his, unless they had become "lost arts," see Sinclair *v.* Backus (1880), 5 Bann. & A. 81; 4 Fed. Rep. 539; 17 O. G. 1503.

That a matter of common knowledge and experience is not patentable, see Preston *v.* Manard (1886), 116 U. S. 661; 34 O. G. 1507.

That patents are public records, and a knowledge of them is presumed, see Bate Refrigerating Co. *v.* Gillette (1887), 40 O. G. 1029; 31 Fed. Rep. 809.

Among these the intrinsic novelty and utility of the concrete invention are the most important. In the concrete invention the idea of means is made practically operative by embodiment in tangible materials. An art or instrument is thereby produced which is capable of employment for a useful purpose. This art or instrument may possess legal novelty without intrinsic novelty. Legal novelty is a prerequisite to patentability, and exists whenever the invention has never been in use in the United States, nor patented nor described in a printed publication either here or abroad. Intrinsic novelty is predicable of the invention itself, and exists wherever the art or instrument was hitherto unknown in the arts, and was not suggested by anything already known. The latter novelty is very strong, and often conclusive, evidence that the alleged inventor of the art or instrument has discovered one or more of the factors of his idea of means, and consequently has performed the entire inventive act.[1] It may indeed be true that the constructive process, working upon factors all whose attributes are known, sometimes evolves concrete inventions which cannot be recognized as previously existing, and, therefore, are accepted as results of an inventive act, although no process of discovery has really occurred. The capability of the force, the susceptibility of the object, the availability of the mode of application, never before perceived and acted on by any one, may, nevertheless, have been suggested to the inventor's mind by other qualities of the same factor, and might have been suggested to the mind of any other person familiar with the art, provided his attention had been thereto directed. Where the suggestiveness of the known attribute is evident, and hence the process of discovery is excluded, the intrinsic novelty of the concrete invention cannot overcome the inevitable inference that no inventive act has been performed. But where the suggestiveness of the known

§ 113. [1] That intrinsic novelty in the concrete invention indicates discovery, see Celluloid Mfg. Co. *v.* Comstock & Cheney Co. (1886), 27 Fed. Rep. 358 ; 36 O. G. 1356 ; Hoe *v.* Cottrell (1880), 17 Blatch. 546 ; 18 O. G. 59 ; 1 Fed. Rep. 597 ; 5 Bann. & A. 256.

That the novelty of the concrete invention is not conclusive evidence of discovery, see Adams *v.* Bellaire Stamping Co. (1886), 28 Fed. Rep. 360 ; 36 O. G. 567.

attribute is not apparent, and the inventor may thus have developed his idea through the process of discovery, the intrinsic novelty of the concrete invention is sufficient to remove the doubt and affirm the claim of the inventor to the merit of an entire inventive act. The intrinsic utility of the concrete invention is of similar significance.[2] Wherever any practically operative means proves itself singularly beneficial to mankind, the inference is almost inevitable that the idea which it embodies would long before have been perceived, had the constructive faculties of the human mind alone been able to produce it, and, therefore, that the process of dis-

[2] In Hill *v.* Biddle (1886), 27 Fed. Rep. 560, Butler, J.: (561) "While it is true that the utility of a machine, instrument, or contrivance, as shown by the general public demand for it when made known, is not conclusive evidence of novelty and invention, it is nevertheless highly persuasive in that direction, and, in the absence of pretty conclusive evidence to the contrary, will generally exercise controlling influence."

In Asmus *v.* Alden (1886), 27 Fed. Rep. 684, Butler, J.: (687) "What constitutes invention, in the legal sense, is difficult of exact definition, in terms. Where, however, an old device or machine in general use, with acknowledged serious defects, which have been long endured because no one has previously discovered a means of obviating them, is taken in hand, and, by changing its form or structure, they are removed, and a different and improved result obtained, it may safely be affirmed that the change required invention. Where the improvement, and consequent public benefit, is great, very little evidence of invention is required." 36 O. G. 231 (232).

That utility is evidence of the exercise of inventive skill, see Sax *v.* Taylor Iron Works (1887), 40 O. G. 118; Wallace *v.* Noyes (1882), 21 Blatch. 83; 23 O. G. 435; 13 Fed. Rep. 172; Western Electric Light Co. *v.* Chicago Electric Light Mfg. Co. (1882), 11 Bissell, 427; 14 Fed. Rep. 691; Gottfried *v.* Crescent Brewing Co. (1882), 22 O. G. 1447; 13 Fed. Rep. 479; Bruce *v.* Marder (1882), 22 O. G. 1039; 20 Blatch. 355; 10 Fed. Rep. 750.

That simplicity and evident fitness are no sign of an absence of inventive skill, see McFarland *v.* Spencer (1885), 23 Fed. Rep. 150; 32 O. G. 893; 23 Blatch. 155.

That a new arrangement and better result are not conclusive evidence of discovery, see Calkins *v.* Oshkosh Carriage Co. (1886), 27 Fed. Rep. 296; 36 O. G. 1149.

That cheapness may indicate inventive skill, see Cornish *v.* Keene (1835), 1 Web. 501.

That simplicity and cheapness do not necessarily indicate inventive skill, see Evory *v.* Burt (1883), 23 O. G. 2121; 15 Fed. Rep. 112; Waterous *v.* Bishop (1867), 20 Can. C. P. 29.

That merely overcoming former prejudices does not indicate discovery, see Butler *v.* Steckel (1886), 27 Fed. Rep. 219; 36 O. G. 455.

That when serious defects are remedied inventive skill is indicated, see Osborn *v.* Glazier (1887), 40 O. G. 1137.

See also § 344 and notes, *post.*

covery has been performed in reference to some one of the factors of which it is composed.

§ 114. Intrinsic Novelty of a Concrete Invention how Evidenced.

In examining an invention, for the purpose of determining its intrinsic novelty, it may be considered either directly in its own nature as an operative means, or indirectly through the end which it accomplishes. In many cases the former inquiry alone is necessary, its intrinsic novelty being apparent on the face of the invention, when contemplated in connection with the other processes or instruments heretofore employed in the same art. But in by far the greater number recourse must be had also to the nature of the end attained, to the concrete results whose character is definite and comprehensible, however recondite may be the agencies by which they are achieved. Whenever the direct evidence of novelty is wanting or is insufficient, the courts, therefore, accept the indirect as ample ground for their conclusions, provided it conforms to certain well-established rules.

§ 115. Intrinsic Novelty of a Concrete Invention Evidenced by the Novelty of its Essential Factors.

The indications of intrinsic novelty afforded by an invention itself must be sought in its essential factors. If the invention is a force applied, whatever novelty the invention may possess resides in the force, or in the method of its application; no variation in the object, upon which the force may be directed, constituting any variation in the means employed. If the invention is a mode of application, the changes which may have been effected in the force and object are to be excluded, and novelty be sought in the intermediate agency through which they are connected with each other.[1] If the invention is the specific treatment of an object, all factors are essential, and novelty either in the object, the mode of application, or the force will make the whole invention intrinsically new.

§ 115. [1] That a machine may itself show invention, see Enterprise Mfg. Co. *v.* Sargent (1886), 23 Fed. Rep. 185; 37 O. G. 891.

§ 116. Intrinsic Novelty of a Concrete Invention Evidenced by the Novelty of its Mode of Operation: this Shown by its Comparative Utility.

Further indications of the intrinsic novelty of the concrete invention are afforded by its operation while effecting its results. Although the essential factors of the idea of means remain the same, so far as human observation can detect, yet in the mode in which the operative means accomplishes its end such differences may exist as prove beyond all controversy that one or more of these essential factors has been changed, and, consequently, that the means itself is new. The question of utility, as indicating novelty, here becomes most important. The actual utility of an alleged invention sometimes, as we have seen, affords strong and direct evidence of inventive skill. But its comparative utility, the superiority of its operation over all existing methods of accomplishing the same result, may be so great as to furnish conclusive proof that the invention is radically different from all preceding arts or instruments, and that, though itself imperceptible, some new force, or new application, or new object must have been discovered by the inventor.[1] If, therefore, in

§ 116. [1] In Washburn & Moen Mfg. Co. *v.* Haish (1880), 19 O. G. 173, Drummond and Blodgett, JJ.: (174) "There is no doubt that a device, in order to be patentable, must be the result of invention. The mere mechanical adaptation of old things to new uses is not usually invention, unless in combination; and yet it is extremely difficult in many cases to say just where the inventive faculty asserts itself as the controlling force. And the authorities furnish us no satisfactory test to apply and determine this question. . . . (175) In the absence of any other test, the courts have seemed to assume that the fact of the acceptance of a new device or combination by the public and putting it into extensive use was evidence that it was the product of invention; or, as one of the counsel for plaintiff expressed it, 'utility is suggestive of originality.' In Smith *v.* Goodyear Dental Vulcanite Company (3 Otto, 486), Mr. Justice Strong said: 'Undoubtedly the result or consequences of a process or manufacture may in some cases be regarded as of importance when the inquiry is whether the process or manufacture exhibits invention, thought, and ingenuity.' Webster on the subject of patents, page 30, says: 'The utility of the change as ascertained by its consequences is the real practical test of the sufficiency of an invention, and since the one cannot exist without the other, the existence of the one may be presumed on proof of the existence of the other. Where the utility is proved to exist in any degree a sufficiency of invention to support the patent must be presumed.' We do not say the single fact that a device has gone into general use and has displaced other devices

its operation the concrete invention attains the desired end with greater economy of time, material, or labor; if it avoids

which had previously been employed for analogous uses establishes in all cases that the later device involves a patentable invention. It may, however, always be considered, and when the other facts in the case leave the question in doubt it is sufficient to turn the scale. So in Eppinger *v.* Richey (14 Blatchford, 307), Judge Shipman said: 'Two facts exist in this case. One is, that an important improvement has been attained. The second is, that the improvement is in a staple article which has been manufactured in this country for a long series of years. . . . The utility of the patented article has been evinced by its large sales. . . . The inventor evidently gave to the public an article which it wanted, and which it had not previously known. Without giving to the general use of the invention, as a test of its patentability, any greater importance than the Supreme Court in the case of Smith *v.* Goodyear Dental Vulcanite Company (above quoted) indicate should be given to this circumstance, I am of the opinion that the facts in the case fully establish the conclusions: (1) That however simple the change in the method of manufacture apparently may have been, yet it was a change which required invention for its accomplishment; (2) That the improvement resulting from the changed method of manufacture has been so great that the article which is produced is, within the meaning of the patent acts, a new and useful article of manufacture.' Mr. Justice Shepley said, in the case of Isaacs *v.* Abrams, 14 O. G. 862: 'A change in the form of a machine or instrument, though slight, if it works a successful result not before accomplished in a similar way in the art to which it is applied or in any other, is patentable.' Judge Shipman said, in Stanley Works *v.* Sargent (8 Blatchford, 346): 'Utility is not an infallible test of originality. The patent law requires a thing to be new as well as useful in order to entitle it to the protection of the statute. To be new in the sense of the act it must be the product of original thought or inventive skill, and not a mere formal or mechanical change of what was old and well known; but the effect produced by the change is often an appropriate, though not a controlling, consideration in determining the character of the change itself.'" 4 Fed. Rep. 900 (906).

In Roberts *v.* Dickey (1871), 4 Fisher, 532, Strong, J.: (538) "There are many cases in which the materiality of an invention, whether it be a machine or a process, can be judged of only by its effect on the result, and this effect is tested by the actual improvement in the process of producing an article, or in the article itself introduced by the alleged invention. Curtis on Pat., § 9. 'In these cases,' says that author (§ 10), 'the subject of the invention is not the particular machinery, or apparatus by which the new application is made to be available, but it is the new application itself of certain known substances or agents, to produce a particular result, differing either in the process, or in the article produced from the former methods of producing the same thing, and thereby producing a better article, or producing it by superior and cheaper processes. It is obvious that the results in such cases furnish a complete test of the sufficiency of the inventions, because the importance of the result shows that, whether actually exercised or not, the possibility of the exercise of thought, design, ingenuity, and skill is not excluded.'" 1 O. G. 4 (5); 4 Brews. 260 (264).

In Judson *v.* Cope (1860), 1 Bond,

difficulties hitherto encountered, and thus becomes an agency more valuable and effective than any previously known, — the

327, Leavitt, J. : (337) "It will be obvious that, where there is doubt upon the question of novelty, and where the evidence of the witnesses leaves it uncertain whether the principle of the valves was identical, that evidence of the superior performance and utility of the patented improvement would have a direct bearing upon the question of novelty. In other words, if the jury are satisfied that the invention patented produces a result decidedly and clearly different from any which had been produced by the action of any prior valve, and that it was decidedly superior to any other in its operation, it would certainly afford a ground for the presumption that the thing itself had not been known before." 1 Fisher, 615 (624).

In Many *v.* Sizer (1849), 1 Fisher, 17, Sprague, J. : (24) "If the changes made by the defendant have rendered his wheel one of greater utility than the plaintiff's, such utility is evidence that some new principle, or mechanical power, or new mode of operation, producing a new kind of result, has been introduced. And the greater such utility, the stronger is such evidence. And if a manifest and very high degree of utility is obtained by such changes, it becomes full proof and conclusive, that a new principle, or mechanical power, or new mode of operation, producing a new kind or result, has been introduced. . . . (27) If the effect is a wheel of greater utility, that is evidence tending to show that some new principle, or mechanical power, or mode of operation, producing a new kind of result, has been introduced; and the higher the degree of utility, the stronger is such evidence. And it may arise to so high a degree as to become conclusive. From our inability to penetrate the secrets of nature, we may not be able to detect the new principle, or power, otherwise than by its effects. But this utility must be derived from the changes introduced — not from the use of better material, or greater skill or care in the manufacture."

In Household Co. *v.* Neilson (1843), 1 Web. 673, Hope, J. : (690) "Great utility is an important element in the question of novelty. For if the process is of great, manifest, striking, and immediate utility, that is of the utmost importance to the point. Could this have been previously in public use and exercise without clear and abundant proof?"

In nearly all the foregoing extracts, the subject of *actual* utility, as indicating discovery or inventive skill, is confused with that of *comparative* utility, as indicating the intrinsic novelty of the concrete invention. Actual utility directly and immediately bears upon the question of inventive skill, because it may be safely assumed that an invention of great actual utility would be at once produced if mechanical skill were sufficient for its creation, and, therefore, that where a want has long existed unsupplied, and has at last been satisfied, inventive skill must have been employed. This evidence is as available and as conclusive where the invention is the first of its kind, as if it had found inferior competitors already in the field. Comparative utility bears only upon the question of intrinsic novelty, though through this question it indirectly influences the conclusion as to the existence of inventive skill. Comparative utility (that is, an increase in utility over that of any invention of the kind heretofore known) may show that a substantial difference must exist between the present and all prior inventions, and thus that the new art or instrument

degree of this increase in value and effectiveness may be, though it not always is, sufficient to demonstrate that the

could have originated only in some new discovery.

See § 344 and notes, *post.*

Further, that superior utility in the invention indicates intrinsic novelty in the invention and hence the exercise of inventive skill, see Celluloid Mfg. Co. *v.* Comstock & Cheney Co. (1886), 27 Fed. Rep. 358; 36 O. G. 1356; Miller *v.* Pickering (1883), 16 Fed. Rep. 540; 25 O. G. 89; Hoe *v.* Cottrell (1880), 17 Blatch. 546; 18 O. G. 59; 1 Fed. Rep. 597; 5 Bann. & A. 256; U. S. Stamping Co. *v.* King (1879), 17 Blatch. 55; 7 Fed. Rep. 860; 17 O. G. 1399; 4 Bann. & A. 469; Dunbar *v.* Albert Field Tack Co. (1879), 4 Fed. Rep. 543; 4 Bann. & A. 518; Stilwell & Bierce Mfg. Co. *v.* Cincinnati Gas Light & Coke Co. (1875), 1 Bann. & A. 610; 7 O. G. 829; Monce *v.* Adams (1874), 7 O. G. 177; 12 Blatch. 1; 1 Bann. & A. 126; Birdsall *v.* McDonald (1874), 1 Bann. & A. 165; 6 O. G. 682; Smith *v.* Woodruff (1873), 4 O. G. 635; 1 MacArthur, 459; 6 Fisher, 476; Hitchcock *v.* Tremaine (1872), 1 O. G. 633; Sayles *v.* Chicago & Northwestern R. R. Co. (1871), 3 Bissell, 52; 4 Fisher, 584; Carter *v.* Baker (1871), 1 Sawyer, 512; 4 Fisher, 404; Woodman *v.* Stimpson (1866), 3 Fisher, 98; Singer *v.* Walmsley (1860), 1 Fisher, 558; Judson *v.* Moore (1859), 1 Bond, 285; 1 Fisher, 544; Morton *v.* Middleton (1863), 1 Cr. S. 3d Series, 722; Stevens *v.* Keating (1847), 2 Web. 181.

That this superiority may manifest itself in rapidity or economy of action, or in the simplicity or efficiency of the invention, see McFarland *v.* Spencer (1885), 23 Blatch. 155; 23 Fed. Rep. 150; 32 O. G. 893; Gottfried *v.* The Philip Best Brewing Co. (1879), 17 O. G. 675; 5 Bann. & A. 4; Dalton *v.* Nelson (1876), 9 O. G. 1112; 13 Blatch. 357; 2 Bann. & A. 225; Goodyear Dental Vulcanite Co. *v.* Willis (1874), 7 O. G. 41; 1 Flippin, 388; 1 Bann. & A. 569; Gallahue *v.* Butterfield (1872), 2 O. G. 645; 10 Blatch. 232; 6 Fisher, 203; Lister *v.* Leather (1858), 8 El. & B. 1004; Muntz's Patent (1846), 2 Web. 113.

That success is evidence of novelty, see Consolidated Valve Co. *v.* Crosby Valve Co. (1885), 113 U. S. 157; 30 O. G. 991; Wilson Packing Co. *v.* Chicago Packing & Provision Co. (1881), 21 O. G. 411; 10 Bissell, 559; 9 Fed. Rep. 547.

That immediate general use indicates intrinsic novelty, see Adams & Westlake Mfg. Co. *v.* Rathbone (1886), 26 Fed. Rep. 262; New York Belting & Packing Co. *v.* Magowan (1886), 27 Fed. Rep. 362.

That success is not conclusive evidence of the existence of intrinsic novelty, see Consolidated Fruit Jar Co. *v.* Bellaire Stamping Co. (1886), 28 Fed. Rep. 91; 36 O. G. 121.

That superior utility is not conclusive evidence of novelty, see Adams *v.* Bellaire Stamping Co. (1886), 28 Fed. Rep. 360; 36 O. G. 567; Wilson Packing Co. *v.* Chicago Packing & Provision Co. (1881), 10 Bissell, 559; 21 O. G. 411; 9 Fed. Rep. 547; Phillips *v.* Detroit (1879), 4 Bann. & A. 347; 17 O. G. 191; Monce *v.* Adams (1875), 7 O. G. 177; 12 Blatch. 1; 1 Bann. & A. 126.

And that where the entire invention is clearly old in its essential character, no increase in the degree of its speed, economy, or efficiency, will indicate the exercise of inventive skill, see Evory *v.* Burt (1883), 15 Fed. Rep. 112; 23 O. G. 2121; Guidet *v.* Brooklyn (1882), 105 U. S. 550; 21 O. G. 1692; Odiorne *v.* Denney (1878), 13 O. G. 965; *Ex parte* Greeley (1873), 4 O. G. 612; 6 Fisher, 575; Holmes, 284; Pitts *v.* Wemple (1855), 2 Fisher, 10; 1 Bissell,

invention is new, and hence that some new factor must have been discovered, and the creative powers have been employed.

§ 117. Intrinsic Novelty of a Concrete Invention Evidenced by the Novelty of the End Accomplished.

The intrinsic novelty of an invention is also sometimes indicated by the nature of the end which it accomplishes, when practically employed in the arts. In all departments of physical science, a given end is usually attainable through many different means. Seldom, if ever, in the material world does any effect rest so exclusively upon a single cause that no other operation of natural or artificial forces could produce the same results. Identity of end is, therefore, no proof of identity of means. Though an alleged invention achieves no other ends than have already been obtained by using other arts or instruments, the idea of means which it embodies may still be new, and a true product of creative skill.[1] The converse

87; Tatham *v.* Le Roy (1852), 2 Blatch. 474; Hotchkiss *v.* Greenwood (1848), 4 McLean, 456; 2 Robb, 730; Alden *v.* Dewey (1840), 1 Story, 336; 2 Robb, 17.

See for this whole subject of utility as bearing on novelty &c., § 344, *post*.

§ 117. [1] In Pitts *v.* Wemple (1855), 2 Fisher, 10, Drummond, J.: (19) "After a patent has been obtained for a particular thing by one person, another person without appropriating that patent may invent a new mode of accomplishing the same or a similar object, and the latter will be entitled to a patent for his discovery." 1 Bissell, 87 (97).

See, to the same point, Coes *v.* Collins Co. (1882), 9 Fed. Rep. 905; 20 Blatch. 221; 22 O. G. 417; Toohey *v.* Harding (1880), 1 Fed. Rep. 174; 4 Hughes, 253; Buerk *v.* Valentine (1872), 2 O. G. 295; 9 Blatch. 479; 5 Fisher, 366; Burden *v.* Corning (1864), 2 Fisher, 477; O'Reilly *v.* Morse (1853), 15 How. 62.

In Curtis *v.* Platt (1863), cited in note to Adie *v.* Clark (1876), L. R. 3 Ch. 134, Wood, V. C.: (136) "In all discoveries of course there are two things — there is an object to be achieved, and a means of achieving that object. Now the object to be achieved may be very old. Of course hundreds of patents have been taken out for achieving objects which in the history of mankind have been achieved by some means or other. No novelty is required as to the object, the novelty may be in the means for effecting the object whether old or new. . . . (139) If the invention be . . . nothing more than a particular means to attain to a given result which is perfectly well known, then you can no more say that the invention of one distinct set of means interferes with the invention of another than you could say originally that there ought not to be patents for the inventions of distinct means to an end. . . . They are the roads and means of attaining the end, and unless you can prove that one is a colorable imitation of the other, or bodily incorporates the other with merely an addition, it is impossible to

of this proposition, however, cannot be maintained. Diversity of ends never results from uniformity of means. In every cause perpetually resides every effect which it is able to produce, and as the nature of the effect depends entirely on the nature of the cause, no change can ever take place in the one without a corresponding alteration of the other. Thus, while identity of end is no proof of identity of means, diversity of end cannot exist without diversity of means, and every really new result furnishes in itself conclusive evidence that the cause by which it is produced is also new. Any invention, therefore, which accomplishes an end never before attained must be intrinsically new, and unless evidently a mere constructive union of known factors must, likewise, have originated in a new inventive act.[2] Caution is necessary, in this

say that they shall not be co-existent subjects of contemporaneous patents."

In Walton v. Potter (1841), 1 Web. 585, Tindal, C. J.: (590) "Now there can be no doubt whatever that, although one man has obtained a patent for a given object, there are many modes still open for other men of ingenuity to obtain a patent for the same object; there may be many roads leading to one place, and if a man has, by dint of his own genius and discovery after a patent has been obtained, been able to give to the public, without reference to the former one, or borrowing from the former one, a new and superior mode of arriving at the same end, there can be no objection to his taking out a patent for that purpose."

In Huddart *v.* Grimshaw (1803), 1 Web. 85, Ellenborough, C. J.: (92) "Now the object of this patent, and to be sure the objects of the two patents are substantially the same, . . . but it does not follow, that because the ends are materially the same, it is thereon open to the public. It has happened to me in the same morning to give, as far as I was concerned, my consent to the granting of three different patents for the same thing; but the modes of attaining it were all different." 1 Abb. P. C. 128 (153).

In a note to this case Webster says: (86) "It is important in this and similar cases, that the end or result, and the means by which such end or result is attained, should be carefully distinguished from each other; these means may, to all appearance, be trifling and insignificant, such as it would appear might have suggested themselves to any person. In all such cases the novelty or importance of the end attained may become a test as to the novelty of the means."

That there may be various patentable means to the same end, see also Russell *v.* Cowley (1835), 1 Web. 465.

[2] In Stanley Works *v.* Sargent & Co. (1871), 8 Blatch. 344, Shipman, J.: (346) "Utility is not an infallible test of originality. The patent law requires a thing to be new as well as useful, in order to entitle it to the protection of the statute. To be new, in the sense of the Act, it must be the product of original thought or inventive skill, and not a mere formal and mechanical change of what was old and well-known. But the effect produced by a change is often an appropriate, though not a con-

investigation of the end, not to confound ends never before perceived with ends which never before had been attained. A single means may accomplish many ends, and certain of

trolling, consideration in determining the character of the change itself." 4 Fisher, 443 (445).

In Waterbury Brass Co. *v.* New York and Brooklyn Brass Co. (1858), 3 Fisher, 43, Ingersoll, J.: (50) "It is a safe source of testimony, which can be relied upon with some degree of certainty, in order to ascertain whether the same means are used, to look at the result produced by the means used. Like means, provided the machine is in perfect order, will, in a measure, produce like results. And if like results cannot be produced by two separate devices, it is good evidence for the jury to consider, in coming to a conclusion as to whether like means were used; because, as a general rule, like results are produced by like means; and if like results are not produced by two separate devices, it is fair for the jury to infer that the means may not be alike in kind or character."

In Furbush *v.* Cook (1857), 2 Fisher, 668, Curtis, J.: (672) "And it is decisive evidence, though not the only evidence, that a new mode of operation has been introduced, if the practical effect of the new combination is either a new effect or a materially better effect; or as good an effect more economically attained by means of the change made in the combination of the patentee. A new or improved, or more economical effect, attributable to the change made by the patentee in the mode of operation of existing machinery, proves that the change has introduced a new mode of operation, which is the subject-matter of a patent; and when this is ascertained, it is not a legitimate subject of inquiry, at what cost to the patentee it was made, nor does the validity of the patent depend on an opinion formed after the event respecting the ease or difficulty of attaining it."

That novelty in the end indicates novelty of means, see Enterprise Co. *v.* Sargent (1886), 28 Fed. Rep. 185; 37 O. G. 891; Sewing Mach. Co. *v.* Frame (1884), 24 Fed. Rep. 596; 28 O. G. 96; Reay *v.* Berlin & Jones Envelope Co. (1884), 28 O. G. 370; 20 Fed. Rep. 506; Barber *v.* Hallet (1879), 20 O. G. 449; 10 Fed. Rep. 130; Stewart *v.* Mahoney (1879), 5 Fed. Rep. 302; 4 Bann. & A. 84; Willimantic Linen Co. *v.* Clark Thread Co. (1879), 4 Bann. & A. 133; Pearl *v.* Ocean Mills Co. (1877), 2 Bann. & A. 469; 11 O. G. 2; Cornell *v.* Downer & Bemis Brewing Co. (1877), 7 Bissell, 346; 11 O. G. 331; 2 Bann. & A. 514; Stanley Works *v.* Sargent & Co. (1871), 8 Blatch. 344; 4 Fisher, 443; Turrill *v.* Illinois Central R. R. Co. (1867), 3 Bissell, 66; 3 Fisher, 330; Johnson *v.* Root (1858), 1 Fisher, 351; Sloat *v.* Patton (1852), 1 Fisher, 154; Hall *v.* Wiles (1851), 2 Blatch. 194.

That an improvement in the result does not prove novelty in the means, see Sax *v.* Taylor Iron Works (1887), 40 O. G. 118.

That a change in existing devices causing them to produce new results indicates new means, see Sewing Mach. Co. *v.* Frame (1884), 24 Fed. Rep. 596; 28 O. G. 96.

That if the result is the same *in kind* it does not prove novelty in the means, however different it may be in mere degree, see *Ex parte* Greeley (1873), 4 O. G. 612; Holmes, 284; 6 Fisher, 575.

That an invention saves labor and expense, or produces better results, does not alone prove inventive skill, see North *v.* Williams (1870), 17 Grant Ch. (Can.) 179.

these ends may easily remain unknown until extensive application of the means develops and exhibits all its capabilities. Rarely does the most thoughtful of inventors discern the entire results of his discovery or understand the various uses to which, in the incessant progress of the arts, it may eventually be applied. But the perception of these ends does not produce them. It does not change their character nor indicate an alteration in the means by which they are attained. All owe their origin to that creative act which generated the idea of means and, whether known or unknown, they have existed ever since that act was first performed. This is the reason of the rule, already noticed, that all the uses of an idea of means belong to its conceiver, whether or not he at the time perceives them, while those who simply recognize them and apply to their attainment the means which he devised, are practising his invention, not their own, as truly as if all these ends had been discovered and disclosed by him. The ends which indicate a novelty of means must be themselves actually new; not the long dormant ends unconsciously achieved by prior arts or instruments, but new results produced for the first time by that invention concerning whose intrinsic novelty the inquiry is made.

§ 118. Novelty of End, how Evidenced.

Novelty of end is ascertained by an examination of its nature, and by a comparison of its utility with that of other ends. The end to be accomplished is the satisfaction of a public want. The satisfaction of this want consists in a changed condition of affairs, in which the want entirely disappears. This changed condition is the effect produced by the invention, and is the ultimate end to which the means embodied in the invention tends. Novelty of end is thus a new condition of the things or persons upon which the action of the means embraced in the invention terminates, and when in their condition novelty appears, a novelty of means may safely be presumed. This novelty of end exists whenever the change in the condition of affairs is a substantial, as distinguished from a formal, change; and the change is substantial when it removes a want hitherto wholly unsupplied or satisfies it by a change essentially distinct from any previously known.

§ 119. Novelty of End is Evident whenever any Want is for the First Time Supplied.

In cases where a change in the condition of affairs removes a want hitherto unsupplied, the character of the change itself becomes of little moment. No want, however trifling, is for the first time satisfied without the existence of a state of things which never has occurred before; and the production of this state of things requires the operation of a cause which, in itself or in its mode of operation, must be also new. This test of novelty of end is at once the simplest and the most reliable. Given a pre-existing want, and its removal, and the condition of affairs, on whose production the want ceases, must be new.[1]

§ 120. Novelty of End is Evident whenever any Want is Supplied by a New Form of Satisfaction.

Where the same want may be removed by several different changes of condition, and one or more such changes have already been produced, the novelty of the present change is ascertained by a comparison between it and those previous changes of condition. Here the character of the change itself is of the greatest consequence. If the condition now developed so far departs from all the former as to become not merely a satisfaction or a better satisfaction of the want, but an essentially different satisfaction, it is a new condition, and not otherwise.[1] This can be true only where the distinc-

§ 119. [1] That the satisfaction of a want hitherto unsatisfied requires new means, see Judson *v.* Moore (1859), 1 Fisher, 544; 1 Bond, 285.

That inventive skill is indicated when the new art or article satisfies a long-felt want and is accepted as such satisfaction by the public, see Eames *v.* Andrews (1887), 122 U. S. 40; 39 O. G. 1319; Butler *v.* Bainbridge (1886), 29 Fed. Rep. 142; Consolidated Valve Co. *v.* Crosby Valve Co. (1885), 113 U. S. 157; 30 O. G. 991; United Nickel Co. *v.* California Electrical Works (1885), 25 Fed. Rep. 475; 11 Sawyer, 250; Washburn & Moen Mfg. Co. *v.* Grinnell Wire Co. (1885), 24 Fed. Rep. 23; Hicks *v.* Otto (1884), 29 O. G. 365; 22 Blatch. 94; 19 Fed. Rep. 749; Brown Mfg. Co. *v.* Deere (1884), 28 O. G. 1187; 21 Fed. Rep. 709; Shuter *v.* Davis (1883), 24 O. G. 303; 16 Fed. Rep. 564; Lindsay *v.* Stein (1882), 21 O. G. 1613, 10 Fed. Rep. 907; 20 Blatch. 370; Bruce *v.* Marder (1881), 22 O. G. 1039; 20 Blatch. 355; 10 Fed. Rep. 750.

§ 120. [1] That difference in the character of the result may indicate a difference in means, see Smith *v.* Woodruff (1874), 6 Fisher, 476; 4 O. G. 635; 1 MacArthur, 459; Singer *v.* Walmsley (1860), 1 Fisher, 558.

tion in conditions is one of kind, not simply of degree. Though a condition be more perfectly attained, its character is still the same, and its increase in perfection may have been secured by a more careful or persistent application of the same means.[2] But when the last condition is distinct in kind, the end accomplished is a different end, affording a new form of satisfaction to the ancient want, and proceeding from the operation of a different means.

§ 121. Novelty of Form of Satisfaction is Indicated by its Comparative Utility.

When this difference between the old and new conditions is not evident upon their face, it may be inferred from their comparative utility.[1] Wherever any want, already partially

[2] That an improved operation and better result, if of the *same kind*, do not indicate a difference in means, see *Ex parte* Greely (1873), 4 O. G. 612; Holmes, 284; 6 Fisher, 575.

§ 121. [1] In *Ex parte* Pennock (1874), 1 MacArthur, 531, MacArthur, J.: (537) "Inventions, like all other matters of inquiry, are subject to be judged of by practical results. A combination is not less an invention, although all the parts are well known, if the effect is a new or a better result, and it is the highest evidence possible of a patentable combination that it produces an article with a great economy of time and labor. In Furbush *v.* Cook (2 Fisher, 672), Judge Curtis remarked: 'And it is decisive evidence, though not the only evidence, that a new mode of operation has been introduced if the practical effect of the new combination is either a new effect or a materially better effect, or as good an effect more economically attained by means of the change made. A new improved or more economical effect attributable to the change made by the patentee in the mode of operating existing machinery proves that the change has introduced a new mode of operation which is the subject-matter of a patent; and when this is ascertained, it is not a legitimate subject of inquiry at what cost to the patentee it was made, nor does the validity of the patent depend on an opinion formed after the event, respecting the ease or difficulty of attaining it.' . . . (539) Whether the inventive faculty has been exercised, is mostly a question of evidence, and is always to be considered in reference to the condition of the art, and the results accomplished, and where the combination is confessedly new and the benefit great, the presumption is strongly in its favor. It is not always safe to consider that there has been no invention because it appears obvious and simple, for simplicity is often the chief merit of a patent. . . . If the thought was original and can be employed with substantial advantage, it becomes a meritorious invention within the meaning of the patent law." 5 O. G. 668 (668, 669).

In Smith *v.* Nichols (1872), 2 O. G. 649, Lowell, J.: (650) "The fact that an article is better and more useful in the trade is evidence of novelty; but if the superiority is attained by the application of known means in a known way to produce a known result, though a

supplied, after some further change in the condition of affairs is fully satisfied and ceases to exist, the difference in the usefulness of the two forms of satisfaction is often treated as sufficient evidence of substantial difference in the conditions. On the same principle a form of satisfaction, whose superiority to others is established by the fact that in its practical enjoyment by the public it has superseded every other, is usually regarded as a new condition, unless upon its face the contrary appears. If, on account of cheapness or any other greater ease of access by the public, it shows itself more useful than the old, this also, though of little consequence when other indications of novelty or similarity are present, may be sufficient to denote such a substantial variation as requires an actual difference in means.

§ 122. Discovery also Indicated by Prior Unsuccessful Efforts of Other Inventors.

Besides the evidence afforded by the nature of the end accomplished and its comparative utility, there is another fact

better one, the novelty required by the patent law is wanting." Holmes, 172, (175); 6 Fisher, 61 (64).

In Roberts *v.* Dickey (1872), 1 O. G. 4, Strong, J.: (5) "There are many cases in which the materiality of an invention, whether it be a machine or a process, can be judged of only by its effect on the result, and this effect is tested by the actual improvement in the process of producing an article, or in the article itself introduced by the alleged invention. Curtis, on Pat. § 9. 'In these cases,' says our author, (§ 10,) 'the subject of the invention is not the particular machinery or apparatus by which the new application is made to be available, but it is the new application itself of certain known substances or agents to produce a particular result, differing either in the process or in the article produced from the former methods of producing the same thing, and thereby producing a better article or producing it by superior and cheaper processes. It is obvious that the results in such cases furnish a complete test of the sufficiency of the inventions, because the importance of the result shows that, whether actually exercised or not, the possibility of the exercise of thought, design, ingenuity, and skill is not excluded.' Similar observations may be found in Webster on the subject-matter of patents, page 30, where it is said: 'The utility, then, of the change, as ascertained by its consequences, is the real practical test of the sufficiency of an invention, and since the one cannot exist without the other, the existence of the one may be presumed on proof of the existence of the other. Whenever the utility is proved to exist in any great degree, a sufficiency of invention to support the patent must be presumed.' These remarks are very pertinent to the present case and they are obviously founded in good sense." 4 Fisher, 532 (538); 4 Brews. 260 (264).

Further, that an increase of utility in

which indicates not only the novelty of the end, but the necessity for inventive skill in the creation of the means whereby it is attained. This fact consists in the unsuccessful attempts of others to produce the same results.[1] The

the effect produced by an invention is evidence of novelty in such effect, and so of novelty and inventive skill in the invention itself, see Roberts *v.* Schreiber (1880), 5 Bann. & A. 491; 18 O. G. 125; 2 Fed. Rep. 855; Hoe *v.* Cottrell (1880), 18 O. G. 59; 17 Blatch. 546; 1 Fed. Rep. 597; 5 Bann. & A. 256; Williams *v.* The Rome, Watertown, & Ogdensburgh R. R. Co. (1878), 15 Blatch. 200; 15 O. G. 653; 3 Bann. & A. 413; Eppinger *v.* Richey (1877), 12 O. G. 714; 14 Blatch. 307; 3 Bann. & A. 69; Smith *v.* Woodruff (1873), 6 Fisher, 476; 4 O. G. 635; 1 MacArthur, 459; Hitchcock *v.* Tremaine (1872), 1 O. G. 633; 5 Fisher, 537; 9 Blatch. 550; Howe *v.* Morton (1860), 1 Fisher, 586; Judson *v.* Moore (1859), 1 Bond. 285; 1 Fisher, 544.

But that no improvement in the effect can show inventive skill in the means, when the means and effect remain substantially the same, see Imlay *v.* Norwich & Worcester R. R. Co. (1858), 4 Blatch. 227; 1 Fisher, 340.

That the success of the result of a process tends to show the novelty of the process, but is not conclusive, see Wilson Packing Co. *v.* Chicago Packing & Provision Co. (1881), 21 O. G. 411; 10 Bissell, 559; 9 Fed. Rep. 547.

See §§ 113, 116, *ante*, 344, *post*.

§ 122. [1] In Pearl *v.* Ocean Mills (1877), 2 Bann. & A. 469, Shepley, J.: (476) "No more difficult task is imposed upon the court in patent causes than that of determining what constitutes invention, and of drawing the line of distinction between the work of the inventor and the constructor. The change from the old structure to the new may be one which one inventor but little thought and labor, and another would fail to accomplish after long and patient effort. It may be one, which one whose mind is fertile in invention will suggest almost instantaneously, when the skilled hand of the constructor will fail to reach the apparently simple result by the long and toilsome process of experiment. It may be one which, viewed in the light of the accomplished result, may seem so simple as to be obvious almost to an unskilled operative, and yet the proof may show that this apparently simple and obvious change has produced a result which has for years baffled the skill of the mechanical expert, eluded the search of the discoverer, and set at defiance the speculations of inventive genius." 11 O. G. 2 (4).

That the unsuccessful efforts of others to accomplish the same result indicates that the means by which the present inventor accomplishes it are the fruit of inventive skill, see Wilcox *v.* Bookwalter (1887), 31 Fed. Rep. 224; Celluloid Mfg. Co. *v.* American Zylonite Co. (1886), 28 Fed. Rep. 195; 36 O. G. 1043; Dudgeon *v.* Watson (1886), 29 Fed. Rep. 248; Davis *v.* Fredericks (1884), 21 Blatch. 556; 19 Fed. Rep. 99; Sewing Mach. Co. *v.* Frame (1884), 24 Fed. Rep. 596; 28 O. G. 96; Ward *v.* Grand Detour Plow Co. (1883), 14 Fed. Rep. 696; Bruce *v.* Marder (1882), 20 Blatch. 355; 10 Fed. Rep. 750; 22 O. G. 1039; Lindsay *v.* Stein (1882), 20 Blatch. 370; 10 Fed. Rep. 907; 21 O. G. 1613; Western Electric Light Co. *v.* Chicago Electric Light Mfg. Co. (1882), 11 Bissell, 427; 14 Fed. Rep. 691; Wallace *v.* Noyes (1882), 18

courts assume that no such efforts would be made unless the want existed and were felt, while from the failure of all previous endeavors to supply it they draw the inference that nothing then existed in the arts from which the imitative faculties alone could have constructed a method of attaining to the satisfaction now enjoyed.

§ 123. Discovery Evidenced by Oath of Inventor and his Personal Experiments unless the Concrete Invention is Devoid of Legal Novelty.

Upon this question of the intrinsic novelty of the invention, its legal novelty has no especial bearing, since any art or instrument may be well known in some parts of the world and still have never been in use in the United States, nor have been patented, nor described in any printed publication. Legal novelty, however, is a proper matter for consideration, in certain cases, upon the question whether the invention, though not intrinsically new, could have been new to the inventor and thus the actual product of his own creative skill. Intrinsic novelty in an invention is not essential to its patentability, and hence, although such novelty affords the

Fed. Rep. 172; 21 Blatch. 83; 23 O. G. 435; Mallory Mfg. Co. *v.* Marks (1881), 20 Blatch. 32; 11 Fed. Rep. 887; 20 O. G. 1521; Yale Lock Mfg. Co. *v.* Norwich Nat. Bank (1881), 6 Fed. Rep. 377; 19 Blatch. 123; Washburn & Moen Mfg. Co. *v.* Haish (1880), 4 Fed. Rep. 900; 10 Bissell, 65; 19 O. G. 173; Hoe *v.* Cottrell (1880), 1 Fed. Rep. 597; 17 Blatch. 546; 18 O. G. 59; 5 Bann. & A. 256; Eastman *v.* Hinkel (1879), 5 Bann. & A. 1; Terry Clock Co. *v.* New Haven Clock Co. (1879), 4 Bann. & A. 121; 17 O. G. 909; Campbell *v.* James (1879), 18 O. G. 979; 17 Blatch. 42; 4 Bann. & A. 456; Williams *v.* The Rome, Watertown, & Ogdensburgh R. R. Co. (1878), 15 Blatch. 200; 15 O. G. 653; 3 Bann. & A. 412; Eppinger *v.* Richey (1877), 14 Blatch. 307; 12 O. G. 714; 3 Bann. & A. 69; Goodyear Dental Vulcanite Co. *v.* Willis (1874), 1 Bann. & A. 569; 7 O. G. 41; 1 Flippin, 388; Many *v.* Jagger (1848), 1 Blatch. 372.

That prior unsuccessful efforts of others indicate discovery of new factors by the successful inventor, see Adams & Westlake Mfg. Co. *v.* Rathbone (1886), 26 Fed. Rep. 262; Niles Tool Works *v.* Betts Mach. Co. (1886), 27 Fed. Rep. 301; Enterprise Mfg. Co. *v.* Sargent (1886), 28 Fed. Rep. 185; 37 O. G. 891; Celluloid Mfg. Co. *v.* Chrolithion Collar & Cuff Co. (1885), 23 Blatch. 205; 23 Fed. Rep. 397; 31 O. G. 519; Bogart *v.* Hinds (1885), 26 Fed. Rep. 149; 34 O. G. 1510.

That the mere fact that others failed where the present inventor succeeded is not conclusive evidence of discovery, see Butler *v.* Steckel (1886), 27 Fed. Rep. 219; 36 O. G. 455.

strongest evidence of the existence of the inventive act, its absence is not conclusive proof that no inventive act has been performed. The law contemplates the possibility that an inventor in this country may generate an idea of means by processes of discovery and construction, notwithstanding the conception of the same idea and its embodiment in operative arts or instruments abroad, and it intends to secure and does secure to such inventors the fruits of their creative skill. Thus while legal novelty raises no presumption of intrinsic novelty, nor of the generation of the idea of means by the alleged inventor, it is an essential condition of that recognition which the law concedes to the inventor's efforts, and in its absence no claim of the inventor that the idea of means is due to his discovery and construction can be entertained. But where legal novelty is present the law permits the alleged inventor to prove, if he can do so, that the invention has originated in his own inventive skill. For this his individual statement under oath, if not opposed by other evidence, may be sufficient. His long research and repeated trials may confirm, or his opportunity to imitate the arts or instruments of others may contradict, his statement.[1] The whole question is here open for the exhibition of any competent testimony; his own oath constituting *prima facie* proof, and in a case of doubt the presumption always being in his favor.[2]

§ 124. General Statement of Facts which Indicate that the Mental Part of the Inventive Act has been Performed.

The principles which govern the sufficiency and application of the evidence concerning the performance of the mental part of the inventive act, may be summed up as follows: —

I. To prove the mental part of the inventive act the evi-

§ 123. [1] That an invention was reached by many steps and trials on the part of the inventor is evidence that it involved inventive skill, see Campbell *v.* James (1879), 18 O. G. 979; 17 Blatch. 42; 4 Bann. & A. 456; Williams *v.* Rome, Watertown, & Ogdensburgh R. R. Co. (1878), 15 Blatch. 200; 15 O. G. 653; 3 Bann. & A. 412.

[2] That discovery must be shown by independent evidence although legal novelty exists, see Celluloid Mfg. Co. *v.* Comstock & Cheney Co. (1886), 27 Fed. Rep. 358; 36 O. G. 1356.

dence must show that both the process of discovery and the process of construction have been performed by the alleged inventor;

II. Where the idea conceived is an idea of means it is certain that the constructive process was performed;

III. The performance of the process of discovery is demonstrated if either factor of the idea of means were hitherto unknown; it is rendered in the highest degree probable when the concrete invention is intrinsically new and is of great utility; it may be inferred from the unsuccessful efforts of others to achieve the same results; it may be proved by the oath of the inventor or other competent testimony when legal novelty exists in the invention; it is conclusively presumed against when legal novelty is wanting;

IV. Intrinsic novelty in the invention may manifest itself in its new essential attributes, or in its new mode of operation, or in its new effects; and novelty in mode of operation or effects may be inferred from their superior utility;

V. The legal novelty of the concrete invention does not prove its intrinsic novelty, nor the performance of the process of discovery by the alleged inventor;

VI. The inventor is presumed to have known all inventions and all factors which were familiar to persons skilled in the art to which his invention belongs; and none of these can he ever be permitted to claim as the result of his discoveries.

SECTION IV.

OF THE PHYSICAL PART OF THE INVENTIVE ACT: REDUCTION OF THE IDEA OF MEANS TO PRACTICE.

§ 125. Reduction to Practice Necessary to Complete the Inventive Act.

No mental operation, however definite and valuable may be its result, is a complete inventive act. That which rests in thought only, as a mere theory or intellectual conception, can never be a means producing physical effects. It is not "a

manufacture," in any sense in which that word has been applied in the industrial arts. It is neither "a thing made," nor "a manner of making." It improves no trade, confers no public benefit, and can be subject to no protection which the law is able to afford. An invention, therefore, does not exist until the generated idea has been reduced to practice.[1] It is not enough that as it lies in the inventor's mind, or can be explained to others, it is possible or even practicable. "Its possibility must become actuality." "Its practicability must be demonstrated by experience." The means which has been conceived must be made operative and useful in the arts. The spirit that has been created must be clothed with a body by which it is brought into contact with the exterior world, and through which its energies can act upon material substance.[2] In a word, the invention must be put into the

§ 125. [1] In Sawyer *v.* Edison (1883), 25 O. G. 597, Marble, Com. : (601) "An invention is complete when the thought conceived is embodied in some practical and operative form."

In Draper *v.* The Potomska Mills Co. (1878), 13 O. G. 276, Shepley, J. : (276) "An imperfect and incomplete invention, resting in mere theory, or in intellectual motion, or in uncertain experiments, and not actually reduced to practice and embodied in some distinct machinery, apparatus, manufacture, or composition of matter, is not, and indeed cannot be, patentable under our patent acts, since it is impossible, under such circumstances, to comply with the fundamental requisites of those acts." 3 Bann. & A. 214 (215).

In Andrews *v.* Carman (1876), 9 O. G. 1011, Benedict, J. : (1013) "There can be no patent for a principle ; but 'for a principle so far embodied and connected with corporeal substances as to be in a condition to act and produce effects in any trade, mystery, or manual occupation there may be a patent.' The idea or principle of forcing water from the earth into a well-pit by the use of artificial power is new, but is not by itself patentable. The idea, when made available by method whereby it is put to practical use, is patentable as a process, and is thus secured to the person who has conceived the idea and invented the method." 13 Blatch. 307 (312) ; 2 Bann. & A. 277 (281).

In McComb *v.* Brodie (1872), 2 O. G. 117, Woods, J. : (119) "A patent cannot be granted for a principle or an idea, or for any abstraction whatever ; for instance, for the naked idea of a slit, slot, or aperture, disconnected from any application. But when the idea is applied to a material thing, so as to produce a new and useful effect or result, it ceases to be abstract, and becomes a proper subject to be covered by a patent." 5 Fisher, 384 (391) ; 1 Woods, 153 (158).

[2] In Morton *v.* The New York Eye Infirmary (1862), 5 Blatch. 116, Shipman, J. : (121) "In its naked, ordinary sense, a discovery is not patentable. A discovery of a new principle, force, or law, operating, or which can be made to operate, on matter, will not entitle

hands of the public in a condition for immediate use, requiring no further speculation or experiment, but fitted, as it is, for the accomplishment of its intended ends.

the discoverer to a patent. It is only where the explorer has gone beyond the mere domain of discovery, and has laid hold of the new principle, force, or law, and connected it with some particular medium or mechanical contrivance, by which, or through which, it acts on the material world, that he can secure the exclusive control of it under the Patent Act. He then controls his discovery through the means by which he has brought it into practical action, or their equivalent, and only through them. It is then an invention, although it embraces a discovery. Sever the force or principle discovered from the means or mechanism through which he has brought it into the domain of invention, and it immediately falls out of that domain and eludes his grasp. It is then a naked discovery, and not an invention. . . . Every invention may, in a certain sense, embrace more or less of discovery, for it must always include something that is new; but it by no means follows that every discovery is an invention. It may be the *soul* of an invention, but it cannot be the subject of the exclusive control of the patentee, or of the patent law, until it inhabits a *body*, any more than a disembodied spirit can be subjected to the control of human laws." 2 Fisher, 320 (323).

In Wintermute *v.* Redington (1856), 1 Fisher, 239, Willson, J. : (247) "It is true that a patent cannot be sustained for a mere principle. For instance, Sir Isaac Newton's discovery of the principle of gravitation could not be the subject of a patent. But it is equally true, that a principle may be embodied and applied, so as to afford some result of practical utility in the arts and manufactures, and that under such circumstances a principle may be the subject of a patent. It is, however, *the embodiment and the application of the principle which constitute the grant of the patent.* And it has been justly said 'that the principle so embodied and applied, and the principle of *such* embodiment and application, are essentially distinct; the former being a truth of exact science, or a law of natural science, or a rule of practice; the latter a practice founded upon such truth, law, or rule.'"

In Detmold *v.* Reeves (1851), 1 Fisher, 127, Kane, J. : (130) "There is no doubt, that he who has discovered some new element or property of matter, may secure to himself the ownership of his discovery, so soon as he has been able to illustrate it practically, and to demonstrate its value. His patent, in such a case, will be commensurate with the principles, which it announces to the world, and may be so broad as the mental conception itself. But, then, the mental conception must have been susceptible of embodiment, and must have been, in fact, embodied in some mechanical device, or some process of art. The abstract must have been resolved into the concrete. The patent must be for a thing — not for an idea merely."

In Whitney *v.* Emmett (1831), Baldwin, 303, Baldwin, J. : (311) "Nor is a discovery of some new principle, theory, elementary truth, or an improvement upon it, abstracted from its application, a new invention. But when such discovery is applied to any practical purpose, in the new construction, operation or effects of machinery or composition of matter, producing a new substance, or an old one in a new way, by new machinery, or a new com-

§ 126. Reduction to Practice Requires the Practice of an Art or the Construction of an Instrument.

This requirement of the law is satisfied by nothing less than the actual practice of some art, or the construction of some article of manufacture.[1] A written description of the pro-

bination of the parts of an old one, operating in a peculiar, better, cheaper, or quicker method, a new mechanical employment of principle already known, the organization of a machine embodied and reduced to practice on something visible, tangible, vendible, and capable of enjoyment, some new mode of practically employing human art or skill. It is a 'discovery,' 'invention' or 'improvement,' within the acts of congress, and a 'new manufacture' by the statute of James." 1 Robb, 567 (579).

That reduction to practice is essential, also see Judson *v.* Bradford (1878), 16 O. G. 171; 3 Bann. & A. 539; Burke *v.* Partridge (1878), 58 N. H. 349; Graham *v.* Gammon (1877), 7 Bissell, 490; 3 Bann. & A. 7; Smith *v.* Prior (1873), 2 Sawyer, 461; 6 Fisher, 469; Jones *v.* Sewall (1873), 3 Clifford, 563; 6 Fisher, 343; 3 O. G. 630; Webb *v.* Quintard (1872), 9 Blatch. 352; 5 Fisher, 276; 1 O. G. 525; Seymour *v.* Osborne (1870), 11 Wall. 516; Roberts *v.* Reed Torpedo Co. (1869), 3 Fisher, 629; Whitely *v.* Swayne (1868), 7 Wall. 685; Union Sugar Refinery *v.* Matthiesson (1865), 3 Clifford, 639; 2 Fisher, 600; White *v.* Allen (1863), 2 Clifford, 224; 2 Fisher, 440; Union Mfg. Co. *v.* Lounsbury (1863), 2 Fisher, 389; Johnson *v.* Root (1862), 2 Clifford, 108; 2 Fisher, 291; Cox *v.* Griggs (1861), 1 Bissell, 362; 2 Fisher, 174; Potter *v.* Wilson (1860), 2 Fisher, 102; Matthews *v.* Skates (1860), 1 Fisher, 602; Le Roy *v.* Tatham (1859), 22 How. 132; Ellithorp *v.* Robertson (1859), 4 Blatch. 307; 2 Fisher, 83; Poppenhusen *v.* N. Y. Gutta Percha Comb Co. (1858), 2 Fisher, 62; Sickels *v.* Borden (1856), 3 Blatch. 535; Parkhurst *v.* Kinsman (1849), 1 Blatch. 488; Many *v.* Jagger (1848), 1 Blatch. 372; Allen *v.* Blunt (1846), 2 W. & M. 121; 2 Robb, 530; Reed *v.* Cutter (1841), 1 Story, 590; 2 Robb, 81.

§ 126. [1] In White *v.* Allen, (1863), 2 Clifford, 224, Clifford, J.: (230) "While the suggested improvement, however, rests merely in the mind of the originator of the idea, the invention is not completed, within the meaning of the patent law, nor are crude and imperfect experiments sufficient to confer a right to a patent; but in order to constitute an invention, in the sense in which that word is employed in the Patent Act, the party alleged to have produced it, must have proceeded so far as to have reduced his idea to practice, and embodied it in some distinct form. Gayler *v.* Wilder, 10 How. 498; Parkhurst *v.* Kinsman, 1 Blatch. 494; Curt. on Pat. § 43. Mere discovery of an improvement does not constitute it the subject-matter of a patent, although the ideas which it involves may be new, but the new set of ideas, in order to become patentable, must be embodied into working machinery and adapted to practical use. Sickels *v.* Borden, Law's Dig. 423, per Nelson, J." 2 Fisher, 440 (446).

In 11 Am Law Reg. N. S. 612, 665, (1872), an able writer, after discussing the cases on the subject, arrives at the following result: (679) "Before an invention can be considered as having been so reduced to practice as to give its author, without further effort on his part, an irrefragable title to it, if duly

posed invention, even when so fully illustrated by drawings that any person skilled in the art could carry out the ideas of the inventor, is not sufficient.[2] A model exhibiting the article in all its parts, disclosing its mode of operation and clearly showing its feasibility, is equally objectionable.[3] An application for a patent, in which description, drawings, and model are combined, comes no nearer to a compliance with the law;[4] nor does the granting of a patent, after due examination

asserted, it must have been embodied in a practical working machine, capable of being operated to perform its intended functions for business purposes. If not capable of such embodiment, it must have been brought to an equivalent state of perfection in some other way. Upon this point there is no conflict in our judicial tribunals."

[2] In Draper *v.* Potomska Mills Co. (1878), 13 O. G. 276, Shepley, J.: (276) "Illustrated drawings of conceived ideas do not constitute an invention, and unless they are followed up by a seasonable observance of the requirements of the patent laws, they can have no effect upon a subsequently granted patent to another." 3 Bann. & A. 214 (215).

In the Northwestern Fire Extinguisher Co. *v.* The Philadelphia Fire Extinguisher Co. (1874), 6 O. G. 34, McKennan, J.: (36) "A written description of a machine, although illustrated by drawings, which has not been given to the public, does not constitute an invention, within the meaning of the patent laws. It may be so full and precise as to enable any one, skilled in the art to which it appertains, to construct the machine described, but until it has been embodied in a form capable of useful operation, it has not attained the proportions or the character of a complete invention." 10 Phila. 227 (231); 1 Bann. & A. 177 (185).

See further Lyman Ventilating & Refrigerator Co. *v.* Lalor (1874), 6 O. G. 642; 12 Blatch. 303; 1 Bann. & A. 403; Reeves *v.* Keystone Bridge Co. (1872), 1 O. G. 466; 5 Fisher, 456; 9 Phila. 368; Ellithorp *v.* Robertson (1859), 4 Blatch. 307; 2 Fisher, 83; also cases cited to same point in § 318, n. 2.

That drawings may show conception but are not reduction to practice, see Odell *v.* Stout (1884), 22 Fed. Rep. 159; 29 O. G. 862.

[3] That a model is not reduction to practice, see Stilwell & Bierce Mfg. Co. *v.* Cincinnati Gaslight & Coke Co. (1875), 7 O. G. 829; 1 Bann. & A. 610; Johnson *v.* McCullough (1870), 4 Fisher, 170; and cases cited to same point in § 318, n. 2.

[4] That an application for a patent is not reduction to practice, see Howes *v.* McNeal (1878), 15 Blatch. 103; 15 O. G. 608; 3 Bann. & A. 376; Barker *v.* Stow (1878), 15 Blatch. 49; 14 O. G. 559; 3 Bann. & A. 337; Herring *v.* Nelson (1877), 14 Blatch. 293; 12 O. G. 753; 3 Bann. & A. 55; and cases cited to same point in § 318, n. 2.

That the filing of the application does not prove reduction to practice, though it may establish the fact of the conception of the idea, see Huntley *v.* Smith (1880), 18 O. G. 795.

That diligence in making his application shows that the inventor has faith in the practicability of his invention and may thus supply in some cases the necessity of reducing to practice, see Huntley *v.* Smith (1880), 18 O. G. 795.

by the proper officers, prove that this requisite has been fulfilled or relieve the inventor from its obligations.[6]

§ 127. Reduction to Practice must Demonstrate that the Idea of Means is Practically Useful.

Moreover, the law demands, for the completion of the inventive act, that the art shall be so practised, or the article of manufacture be so tested, that its efficacy and utility are fully demonstrated. "Reduction to practice" means "reduction to successful practice."[1] Experiments in the direction of the desired result are not such reduction, no matter how nearly they approximate that end. The work of the inventor must be finished, physically as well as mentally. Nothing must be left for the inventive genius of the public; and his invention must show this for itself before he is entitled to a patent. If his invention be an art, he must not only have practised it according to its theory, but in the same manner which the public must employ in order to render it of use to them. If it be an article, it must appear,

[6] That the granting of a patent does not prove reduction to practice, see Hitchcock *v.* Tremaine (1871), 8 Blatch. 440; 4 Fisher. 508; Whitely *v.* Swayne (1868), 7 Wall. 685.

That the granting of a patent, in which the invention is so clearly set forth by language and drawings, etc., that it shows itself to be practicable, is sufficient evidence of reduction to practice, see Starr *v.* Farmer (1883), 23 O. G. 2325, 2327.

See also Wheeler *v.* Mower & Reaper Co. (1872), 2 O. G. 442; 6 Fisher, 1; 10 Blatch. 181.

§ 127. [1] That "reduction to practice" means successful practice, see Lyman Ventilating & Refrigerator Co. *v.* Lalor (1874), 12 Blatch. 303; 6 O. G. 642; 1 Bann. & A. 403; Whitely *v.* Swayne (1868), 7 Wall. 685; Agawam Co. *v.* Jordan (1868), 7 Wall. 583; Cahoon *v.* Ring (1859), 1 Clifford, 592; 1 Fisher, 397.

That an invention is operative if it can be made so by mere mechanical skill, see Royer *v.* Coupe (1886), 39 O. G. 239.

The doctrine of this and the preceding paragraph is similar to that involved in Prior Use, so far as the latter requires the prior existence of a practically operative invention identical with the one whose novelty is questioned on the ground of such prior use. As to what constitutes a complete invention, as distinguished from a mere description or representation of the inventor's theory on one hand and from an unsuccessful experiment on the other, the principles discussed and the cases cited are the same. As their legal significance is more apparent in the latter connection than in the present one, the authorities are collected principally under the title Prior Use, in §§ 318, 319, etc., *post*, which see for further references.

either upon its face or through the tests to which it is subjected, that it is able to accomplish the purpose for which it was designed.

§ 128. Reduction to Practice does not in all Cases Require the Practical Use of the Invention.

Whether the art or article must have been practically used for business purposes seems to have been disputed. Cases of eminent authority are found in which this is regarded as indispensable.[1] In other cases of equal value it has been decided that if evidently capable of practical application in the arts the invention need not have been actually employed.[2] These propositions may be both correct, each governing a distinct class of inventions. Where the availability of an invention for immediate use is apparent from an inspection of the invention itself, as often may be true of a machine or manufacture, its actual employment in the arts is not essential to the establishment of its utility and efficacy. And, on the other hand, when nothing less than such employment can afford this evidence, as in the case of an art or chemical composition, and sometimes of machines and manufactures, such tests must be applied as will determine that the end which it purports to serve can be accomplished.[3] In either of these methods the object of the law will be attained; the invention itself manifesting that the inventive genius of the inventor

§ 128. [1] That unless an invention is actually used for the purpose designed the reduction to practice is incomplete, and the whole remains in experiment, see Cahoon *v.* Ring (1859), 1 Clifford, 592; 1 Fisher, 397. See also 11 Am. Law Reg. N. S. 665.

[2] That if the invention be so far completed as to be capable of practical use, and this is apparent from the construction of the invention itself, no actual use in the arts is required, see Broadmax *v.* Stock Yard & Transit Co. (1880), 4 Fed. Rep. 214; 5 Bann. & A. 609; Knox *v.* Loweree (1874), 6 O. G. 802; 1 Bann. & A. 589; Wheeler *v.* Clipper Mower & Reaper Co. (1872), 10 Blatch. 181; 6 Fisher, 1; 2 O. G. 442; Coffin *v.* Ogden (1869), 7 Blatch. 61; 3 Fisher, 640; Hayden *v.* Suffolk Mfg. Co. (1862), 4 Fisher, 86; Pitts *v.* Wemple (1855), 2 Fisher, 10; 1 Bissell, 87.

[3] That the invention must either be used or capable of useful operation, see Moore *v.* Thomas (1877), 3 Bann. & A. 13; 14 O. G. 1.

That successful practical use is evidence that the invention is complete, see Northwestern Fire Extinguisher Co. *v.* Philadelphia Fire Extinguisher Co. (1874), 1 Bann. & A. 177; 6 O. G. 34; 10 Phila. 227; Coffin *v.* Ogden (1869), 7 Blatch. 61; 3 Fisher, 640.

has occupied the whole field of the invention, and that for its entire appropriation to the public use no further exercise of the creative faculties will be required.

§ 129. Reduction to Practice does not Require Mechanical Perfection or Incapability of Improvement.

But while this practical embodiment of the idea of the inventor must contain and represent his whole invention, it is not necessary that the art or article should be mechanically perfect.[1] Mechanical perfection is the achievement of the artisan rather than the inventor, and does nothing to develop or to illustrate the idea of the invention. Possibilities of greater excellence in shape, location, arrangement, material, or adjustment do not affect the fact that the inventor has produced a practically operative means, and all such possibilities are legally embraced in what the inventor already has accomplished. Nor is it necessary that the invention, as a means, should be incapable of further improvement by the exercise of additional inventive skill. If it accomplishes the end desired it is a perfected invention, although some newly generated idea, or some better mode of application, may reach

§ 129. [1] In Seymour *v.* Marsh (1872), 2 O. G. 675, McKennan, J.: (676) "That a machine when first applied in practice does not perfectly accomplish the work for which it was designed, or does not accomplish all that its inventor supposed it would, is not enough to secure its rejection as a patentable invention. . . . Taken as a whole, in its construction and operation, if it is an advance upon the state of the art to which it appertains, furnishing a better though still imperfect method of performing a useful function than was before available, it is not to be discarded as destitute of patentable merit." 6 Fisher, 115 (120); 9 Phila. 380 (382).

In The American Hide & Leather Splitting & Dressing Machine Co. *v.* The American Tool & Machine Co. (1870), Holmes, 503, Shepley, J.: (513) "A perfect machine, in that sense of the word 'perfect,' means a perfected invention; not a perfectly constructed machine, but a machine so constructed as to embody all the essential elements of the invention, in a form that would make them practical and operative so as to accomplish the result. But it is not necessary that it should accomplish that result in the most perfect manner and be in a condition where it was not susceptible of a higher degree of perfection in its mere mechanical construction." 4 Fisher, 284 (299).

See also Dolbear *v.* American Bell Telephone Co. (1888), 43 O. G. 377.

That if mechanical skill can remedy the defects in an invention the patent may be valid, see Temple Pump Co. *v.* Goss Pump & Rubber Bucket Mfg. Co. (1887), 39 O. G. 467.

the same end in a more perfect manner. It is enough that the inventor has devised a means, has put his thought into a practical and useful form, and placed it where the public can at once employ it.

§ 130. Reduction to Practice does not Affect the Essence of the Invention, nor the Scope of the Patent Privilege.

Finally, it is to be remembered that although an idea of means not yet reduced to practice is not an invention, still it is the idea, and not the practical embodiment, which constitutes the essence of the invention and to which the protection of the patent is awarded.[1] If an idea is capable of tangible

§ 130. [1] In American Bell Telephone Co. *v.* Dolbear (1883), 15 Fed. Rep. 418, Gray, J.: (449) "There can be no patent for a mere principle. The discoverer of a natural force or a scientific fact cannot have a patent for that. But if he invents for the first time a process by which a certain effect of one of the forces of nature is made useful to mankind, and fully describes and claims that process, and also describes a mode or apparatus by which it may be usefully applied, he is, within the meaning and the very words of the patent law, 'a person who has invented or discovered any new and useful art;' and he is entitled to a patent for the process of which he is the first inventor, and is not restricted to the particular form of mechanism or apparatus by which he carries out that process. Another person, who afterwards invents an improved form of apparatus, embodying the same process, may indeed obtain a patent for his improvement, but he has no right to use the process, in his own or any other form of apparatus, without the consent of the first inventor of the process. . . . (453) If that art or process is . . . the only way by which [that effect of the natural force can be produced] that fact does not lessen the merit of his invention, or the protection which the law will give to it." 23 O. G. 535 (535, 537).

In Sewall *v.* Jones (1875), 91 U. S. 171, Hunt, J.: (184) "When a party has invented some mode of carrying into effect a law of natural science or a rule of practice, it is the application of that law or rule which constitutes the peculiar feature of the invention. He is entitled to protect himself from all other modes of making the same application; and every question of infringement will present the question, whether the different mode, be it better or worse, is in substance an application of the same principle." 9 O. G. 47 (49).

In Wintermute *v.* Redington (1856), 1 Fisher, 239, Willson, J.: (250) "We have already stated that when a person has invented some mode of carrying into effect a law of natural science, or a rule of practice, which constitutes the peculiar feature of his invention, such discovery may be secured to him by a patent. Hence it follows that he is entitled to protect himself from all other modes of making the same application. The substantial *identity*, therefore, that is to be looked to, respects that which constitutes the essence of the invention, namely, *the application of the principle*. If the mode of carrying the same principle into effect, adopted by the defend-

expression under different forms, the difference in these forms is merely formal, not substantial; and the concrete inventions, however varied in appearance, or arrangement, or capacity, are nevertheless identical.[2] If the idea can be embodied in but ant, still shows that the principle admits of the same application in a variety of forms, or by a variety of apparatus, the jury will be authorized to treat such mode as a piracy of the invention. But if the defendant has adopted variations which show that the application of the principle is varied, that some other law, or rule of practice or science, is made to take the place of that which the patentee claims as the essence of his invention, then there is no infringement."

See also discussion of same doctrine and citations in §§ 134–143, 161, etc., and notes, *post*.

[2] In Jupe *v.* Pratt (1837), 1 Web. 145, Alderson, B.; (146) "You cannot take out a patent for a principle; you may take out a patent for a principle coupled with the mode of carrying the principle into effect, provided you have not only discovered the principle, but invented some mode of carrying it into effect. But then you must start with having invented some mode of carrying the principle into effect; if you have done that, then you are entitled to protect yourself from all other modes of carrying the same principle into effect." 2 Abb. P. C. 464 (467). The entire argument of Sir F. Pollock and Richards in this case is valuable as drawing clear distinctions between the principle or spirit of an invention and its form or embodiment, and exhibiting the relation which each occupies toward the other. The following extracts are especially worthy of attention: (145) "The fair mode of looking at a patent and the specification is, to inquire what is the spirit of the invention, or the principle; and this must be embodied in some mode or method, because it is admitted on all hands you cannot take out a patent for a principle. But although the law says, undoubtedly and correctly enough, that you cannot take out a patent for a principle, that is, for a barren principle, when you have clothed it with a form, and given it body and substance, in which the principle may live and produce the benefit which you claim to result from it, why then in many cases (and it is a consolation to every just and honest feeling one has on the subject of invention), although you cannot have a patent for a principle in substance, you can have a patent for the spirit of your invention; for if any other person comes and clothes the spirit of your invention with a different body, and puts that principle in use in any other shape or fashion, it is always a question for a jury, whether, however different in appearance, in shape, in form, in method — whether the article or the practice, if it be matter connected with the arts and manufactures, be or be not substantially an adaptation of the principle, applied with the same view, to answer the same end, and merely imitated in substance, whatever difference there may be in point of form." Again, (148) "However plain the principle may be, and however obvious when so given to the public, still the patentee must take care to lay it before the public in a practical shape, though he assumes to himself nothing in respect of that shape." Again, (148) "Is it to be said, if a man has discovered a principle, and goes to a mechanic and says — 'This is my view of an invention, just give me a little mechanical assistance in bringing that into effect;' and the man says, 'I think you might do it thus, and thus;' — is it

one art or article, no other art or article can be the application of the same idea, or constitute the same invention. In deciding conflicts between one invention and another, as well as in construing claims and specifications, the law draws this line of distinction very sharply; securing, in the one class of inventions, the original idea of means under whatever visible expression the subsequent development of the industrial arts may have led other persons to employ; confining, in the other class, the right of the inventor to the precise art or article in which his idea may have found its only practical embodiment.

§ 131. Reduction to Practice Effected by Mechanical Skill: Inventor may Employ Others for that Purpose.

The act of reducing to practice may be performed either by the inventor himself or by others working under his direction. The idea of means, in which resides the essence of the invention, must be his own; but having conceived this, its practical embodiment must often, in the ordinary course of events, be left to those skilled in the art to which the means belongs.[1] The inventor has the right thus to employ "an adroit hand to carry into effect the conceptions of his own original head;" and during this proceeding he may avail

to be said that person, who had merely supplied, you might say, the tools or the materials, has a right to claim such invention?" 2 Abb. P. C. 464 (466, 470, 470).

§ 131. [1] In Blandy *v.* Griffith, (1869), 3 Fisher, 609, Swayne, J.: (616) "Invention is the work of the brain, and not of the hands. If the conception be practically complete, the artisan who gives it reflex and embodiment in a machine is no more the inventor than the tools with which he wrought. Both are instruments in the hands of him who sets them in motion and prescribes the work to be done. Mere mechanical skill can never rise to the sphere of invention. The latter involves higher thought, and brings into activity a different faculty. Their domains are distinct. The line which separates them is sometimes difficult to trace; nevertheless, in the eye of the law, it always subsists. The mechanic may greatly aid the inventor, but he cannot usurp his place. As long as the root of the original conception remains in its completeness, the outgrowth — whatever shape it may take — belongs to him with whom the conception originated."

Says Mr. Webster in a note: (1 Web. 126) "If a person be employed to perfect the details of or carry out into execution the original idea of the patentee, that which he suggests or invents while so employed, and subsidiary to such idea, is in law the invention of the patentee."

See also Allen *v.* Rawson (1845), 1 C. B. 551; Minter *v.* Wells (1834), 1 Web. 127: 2 Abb. P. C. 26; and §§ 393-395, *post*.

himself of any assistance or suggestions which do not change the essential character of the means he has created.

§ 132. Reduction to Practice fixes the Date of the Completion of the Inventive Act.

The date of the completion of the inventive act is thus the date when the idea of the inventor is embodied in a practically operative article or art. Up to that moment there is nothing which the law considers an invention, nothing of which either use or proprietorship can be predicated, or to which the protection of a patent can be extended.[1] For certain purposes, however, the law takes notice of the existence of the idea apart from its reduction to a physical form. Where there are rival claimants of the same invention, the one who first conceived the idea of means as now embodied in the invention is regarded as the first inventor, unless by his own negligence in reducing the idea to practice he has forfeited his right to such preferment; and, therefore, as between two, the first of whom has used due diligence, the date of the invention is the date of the conception of the complete idea.[2] When the inventor's previous knowledge of the invention is asserted on the ground of prior use or publication, the date of his inventive act is that of the development of his idea of means, not of its reduction to practical use.[3] But when the legal novelty

§ 132. [1] That the date of a patented invention is *prima facie* the date of the application for a patent, see Dane *v.* Chicago Mfg. Co. (1872), 3 Bissell, 380; 2. O. G. 677; 6 Fisher, 130.

That the actual date is that of reduction to practice, see §§ 126, 127 and notes, *ante.*

[2] That as between rival inventors the date is that of the complete conception of the idea of means, provided the inventor used due diligence in reducing to practice, see Kneeland *v.* Sheriff (1880), 5 Bann. & A. 482; 2 Fed. Rep. 901; 18 O. G. 242; National Filtering Oil Co. *v.* Arctic Oil Co. (1871), 8 Blatch. 416; 4 Fisher, 514; Colt *v.* Massachusetts Arms Co. (1851), 1 Fisher, 108. See also §§ 370–391, *post.*

[3] That when the question is whether the inventor drew his information from prior use, prior patent, or prior publication, the date of his invention is the date when he first clearly conceived the idea of means, see Woodman *v.* Stimpson (1866), 3 Fisher, 98.

That the date when the inventor conceived his idea of means may be shown by his drawings, statements, or any other relevant evidence, see Loom Co. *v.* Higgins (1881), 105 U. S. 580; 21 O. G. 2031; Kneeland *v.* Sheriff (1880), 18 O. G. 242; 5 Bann. & A. 482; 2 Fed. Rep. 901; Reeves *v.* Keystone Bridge Co. (1872,) 1 O. G. 466; 9 Phila. 368; 5 Fisher, 456; Philadelphia & Trenton R. R.

of the invention is attacked on the ground of prior use in this country or a prior patent or publication, the date of reduction to practice is regarded as the *prima facie* date of the invention;[4] although the inventor is still allowed to carry the date of his inventive act back to his conception of the idea of means in order to establish his own priority.

SECTION V.

OF THE NATURE OF THE COMPLETE RESULT OF THE INVENTIVE ACT.

§ 133. Concrete Invention an Art or Instrument: Not a Principle or Force, a Function, or an Effect.

From this analysis of the inventive act it is evident that its complete result must be either an art or an instrument. Every effect in the material world is produced by some force which, being applied through certain corporeal agents or in a certain method, accomplishes the end desired. The operative means is not the force alone, but the force acting through the specific agent, or in the specific manner; and the inventive faculties are exercised, not simply to supply the force, but also to devise the art or instrument by which the force can be directed to that end. A concrete invention is thus either a mode of practically applying force, or an instrument through which force is practically applied; and must, therefore, be distinguished alike from the principle or force which it employs, from the function which it performs, and from the effect which it produces.

§ 134. "Principle," a Term of Two Meanings.

No proposition has been more frequently or positively stated by the courts than that a principle is not a patentable inven-

Co. *v.* Stimpson (1840), 14 Peters, 448; 2 Robb, 46.

[4] That on the question of the legal novelty of an invention the date is that of reduction to practice, see National Spring Co. *v.* Union Car Spring Mfg. Co. (1874), 6 O. G. 224; 12 Blatch. 80; Webb *v.* Quintard (1872), 1 O. G. 525; 9 Blatch. 352; 5 Fisher, 276; but see § 321 and note 1, *post*.

tion,[1] and yet with almost equal positiveness and frequency they have declared that the subject-matter covered by a patent is the principle of the invention.[2] This apparent contradic-

§ 134. [1] In American Bell Telephone Co. *v.* Dolbear (1883), 15 Fed. Rep. 448, Gray, J.: (449) "There can be no patent for a mere principle. The discoverer of a natural force or a scientific fact cannot have a patent for that." 23 O. G. 535 (535).

In McComb *v.* Brodie (1872), 2 O. G. 117, Woods, J.: (119) "A patent cannot be granted for a principle or an idea, or for any abstraction whatever." 1 Woods, 153 (158); 5 Fisher, 384 (391).

In Morton *v.* N. Y. Eye Infirmary (1862), 5 Blatch. 116, Shipman, J.: (121) "In its naked, ordinary sense, a discovery is not patentable. A discovery of a new principle, force, or law, operating, or which can be made to operate, on matter, will not entitle the discoverer to a patent." 2 Fisher, 320 (323).

See also Boyd *v.* Cherry (1883), 4 McCrary, 70; Roberts *v.* Dickey (1872), 4 Fisher, 532; 1 O. G. 4; 4 Brews. 260; Burr *v.* Duryee (1863), 1 Wall. 531; Tilghman *v.* Werk (1862), 1 Bond, 511; 2 Fisher, 229; Le Roy *v.* Tatham (1859), 22 How. 132; Bell *v.* Daniels (1858), 1 Bond, 212; 1 Fisher, 372; Wintermute *v.* Redington (1856), 1 Fisher, 239; Rich *v.* Lippincott (1853), 2 Fisher, 1; O'Reilly *v.* Morse (1853), 15 How. 62; Detmold *v.* Reeves (1851), 1 Fisher, 127; Smith *v.* Downing (1850), 1 Fisher, 64; Smith *v.* Ely (1849), 5 McLean, 76; Wyeth *v.* Stone (1840), 1 Story, 273; 2 Robb, 23; Stone *v.* Sprague (1840), 1 Story, 270; 2 Robb, 10; Whitney *v.* Emmett (1831), Baldwin, 303; 1 Robb, 567; Evans *v.* Eaton (1816), 1 Peters C. C. 322; 1 Robb, 68; Crossley *v.* Potter (1853), Macrory's P. C. 240; Household Co. *v.* Neilson (1843), 1 Web. 673; Neilson *v.* Harford (1841), 1 Web. 331; Jupe *v.* Pratt (1837), 1 Web. 145; 2 Abb. P. C. 464; Hornblower *v.* Boulton (1799), 8 T. R. 95; 1 Abb. P. C. 98; Boulton *v.* Bull (1795), 2 H. Bl. 463; 1 Abb. P. C. 59.

That neither principles, nor abstract ideas, nor natural functions of matter, animate or inanimate, are patentable, see opinion Atty. Gen. (1856), 8 Op. At. Gen. 269.

[2] That the principle of the invention is the subject-matter of the patent, see Knapp *v.* Joubert (1881), 19 Blatch. 148; 7 Fed. Rep. 219; Boston Elastic Fabrics Co. *v.* East Hampton Rubber Thread Co. (1874), Holmes, 372; 5 O. G. 696; 1 Bann. & A. 222; Seymour *v.* Marsh (1872), 6 Fisher, 115; 9 Phila. 380; 2 O. G. 675; McComb *v.* Brodie (1872), 2 O. G. 117; 1 Woods, 153; 5 Fisher, 384; Bailey Washing & Wringing Mach. Co. *v.* Lincoln (1871), 4 Fisher, 379; Blanchard *v.* Puttman (1867), 2 Bond, 84; 3 Fisher, 186; Stainthorp *v.* Humiston (1864), 4 Fisher, 107; Burr *v.* Duryee (1863), 1 Wall. 531; Smith *v.* Higgins (1859), 1 Fisher, 537; Cahoon *v.* Ring (1859), 1 Fisher, 397; 1 Clifford, 592; Latta *v.* Shawk (1859), 1 Fisher, 465; 1 Bond, 259; Foss *v.* Herbert (1856), 1 Bissell, 121; 2 Fisher, 31; Sickels *v.* Borden (1856), 3 Blatch. 535; Blanchard *v.* Beers (1852), 2 Blatch. 411; Parker *v.* Stiles (1849), 5 McLean, 44; Roberts *v.* Ward (1849), 4 McLean, 565; 2 Robb, 746; Brooks *v.* Jenkins (1844), 3 McLean, 432; Brooks *v.* Bicknell (1843), 3 McLean, 250; 2 Robb, 118; Smith *v.* Pearce (1840), 2 McLean, 176; 2 Robb, 13; Evans *v.* Eaton (1822), 7 Wheaton, 356; 1 Robb, 336; Barrett *v.* Hall (1818), 1 Mason, 447; 1 Robb, 207; Evans *v.* Eaton (1818), 3 Wash.

tion has arisen from the use of the word "principle" to denote two entirely distinct entities, which have nothing in common except that both require corporeal expression in order to become serviceable in the arts. In the discussion of this common requisite, the word has sometimes been employed in its two different senses in the same connection, the peculiar attributes of one erroneously predicated also of the other, to the confusion of a subject which, in its fundamental truth, presents no special difficulty.[3] In this, as in most other cases, to properly distinguish is to comprehend.

443; 1 Robb, 193; Odiorne *v.* Winkley (1814), 2 Gallison, 51; 1 Robb, 52; Whittemore *v.* Cutter (1813), 1 Gallison, 478; 1 Robb, 40.

[3] In Detmold *v.* Reeves (1851), 1 Fisher, 127, Kane, J.: (130) "There is no doubt, that he who has discovered some new element or property of matter, may secure to himself the ownership of his discovery, so soon as he has been able to illustrate it practically, and to demonstrate its value. His patent, in such a case, will be commensurate with the principles, which it announces to the world, and may be so broad as the mental conception itself. But, then, the mental conception must have been susceptible of embodiment, and must have been, in fact, embodied in some mechanical device, or some process of art. The abstract must have been resolved into the concrete. The patent must be for a thing — not for an idea merely." This extract illustrates the method by which the real doctrine concerning a principle has been obscured by faulty language. The learned judge starts out with the idea of natural force, expressed in the terms "element" and "property of matter," and alleges that the discoverer of these can protect his discovery by a patent when he has practically illustrated it and demonstrated its value. This is, of course, untrue, no element or property of matter being under any circumstances patentable. In the second sentence his ground changes, and the scope of the patent is declared to be commensurate with the "mental conception" of the inventor. Now the mental conception of the inventor cannot be the same thing as the element or property of matter which he has discovered, nor can it be synonymous with the act of discovery, which is transient and already past. Obviously the only mental conception of an inventor which can, as the third sentence requires, be embodied, is his idea of a means in which the element or property of matter can be applied to some physical object with a beneficial result. But when this embodiment has taken place, it is not the abstract element or property of matter that has now become concrete, but the abstract idea of its application to an object; and this is the true and only principle protected by the patent.

Similar ambiguity occurs in the dissenting opinion of Judge Nelson in Le Roy *v.* Tatham (1852), 14 Howard, 156. Speaking of the patentability of a principle in the light of Forsyth's Case (1 Web. 94, 97, n.) he says: (185) "This case is founded upon a doctrine which has been recognized in several subsequent cases in England, namely, that where a person discovers a principle or property of nature, or where he conceives of a new application of a well-known principle or property of nature, and also, of some mode of carrying it out

§ 135. "Principle," in one sense, Means Force.

In one sense, the word "principle" denotes the physical force employed by an invention. The other appellations given to

into practice, so as to produce or attain a a principle, or element of nature. The new and useful effect or result, he is entitled to protection against all other modes of carrying the same principle or property into practice for obtaining the same effect or result." Here that which is true only of a principle in the sense of the mental conception of the inventor, is predicated of the principle or force for whose useful employment the inventor has devised or adopted a means. Then citing Neilson's Case (1 Web. 310, 342, 371), hereafter discussed in a note to § 143, he proceeds: (186) "The settled doctrine to be deduced from them, I think, is, that a person having discovered the application for the first time of a well-known law of nature, or well-known property of matter, by means of which a new result in the arts or in manufactures is produced, and has pointed out a mode by which it is produced, is entitled to a patent; and, if he has not tied himself down in the specification to the particular mode described, he is entitled to be protected against all modes by which the same result is produced, by an application of the same law of nature or property of matter. And *a fortiori*, if he has discovered the law of nature or property of matter, and applied it, is he entitled to the patent, and aforesaid protection. And why should not this be the law? The original conception — the novel idea in the one case, is the new application of the principle or property of matter, and the new product in the arts or manufactures — in the other, in the discovery of the principle or property, and application, with like result. The mode or means are but incidental, and flowing naturally from the original conception; and hence of inconsiderable merit. But, it is said, this is patenting authorities to which I have referred, answer the objection. . . . And what if the principle is incorporated in the invention, and the inventor protected in the enjoyment for the fourteen years. He is protected only in the enjoyment of the application for the special purpose and object to which it has been newly applied by his genius and skill. For every other purpose and end, the principle is free for all mankind to use."

In considering the weight to be attached to the positions taken in this dissenting opinion, it is well to remember that there is one class of inventions to which the general doctrine here announced is truly applicable. Where the discovery relates to new susceptibilities in the object, and consists in the perception that it may be affected in a new way by the application to it of a force not hitherto known as capable of producing this effect upon it, the direction of such force upon this object is a new and substantive invention, and may be patented as a process, or mode of treatment of the object, without reference to the particular instruments employed. Of such an invention it could be truly said that one who had, for the first time, applied this force to this specific object might be protected against any other application of the same force to the same object in order to produce the same effect. It should also be remembered that the invention in the case at bar, as well as in the principal case cited by Judge Nelson, was apparently of this description. In Le Roy *v.* Tatham, the discovery had been made that lead possessed such properties that being subjected to certain forces certain results would follow; and hence it was true

this force are very numerous, and most of them are wholly inappropriate. It has been called "an elementary truth," "a principle of science," "a property of matter," "an element of matter," "a law of nature," the "root and ground of science;" but the idea which underlies these phrases is sufficiently apparent, and is neither less nor more than that of some natural power or energy, which operates with uniformity under given circumstances, and may thus be contemplated as obedient to law.[1] A principle, in this sense, is a necessary

that one, who had reduced this mode of treating lead to practice, was entitled to protection against all other methods of subjecting lead to the influence of the same force for the same purpose. In the Neilson patent the inventor had discovered that the charge in a smelting-furnace was susceptible to strong currents of hot air, and if so treated yielded peculiar results; and having put his discovery to practical use by proper apparatus he was entitled to regard all persons, who treated the same objects with currents of hot air for the same purpose, as infringing upon his invention. In the struggle of the judges, in both these cases, to support inventions which they saw to be meritorious and patentable, but whose real nature and scope were not then understood, on grounds applicable only to different classes of inventions, they were led into the use of language inappropriate to the discussion, and into the apparent declaration that when the novelty resides in the force or in the use of the force for a given purpose, all other uses of the force for the same purpose are covered by the patent; a declaration which is not correct unless the purpose is new, and can be accomplished only by applying to a certain object the force adopted and applied by the inventor. Conceding this to have been the doctrine they were endeavoring to elaborate, no criticism can be made upon the legal propositions stated. But the ambiguity of language resulting from the varied use of the word "principle" only becomes more evident when it is seen that in the discussion of this class of inventions it cannot be employed at all, except in its second sense of an idea of means.

An additional example of the confusion introduced into this subject by the equivocal use of the word "principle" may be found in the discussion between the court and counsel in Neilson *v.* Harford, 1 Web. 342, 343, and notes; where Alderson, B., uses the term to denote the force employed, and Sir F. Pollock employs it to describe the idea of means or spirit of the invention. The reader will never wonder at the difficulties which have arisen in so simple a subject, after examining this discussion, and remembering that neither the judge nor the lawyer were engaged in a mere contest of words, but were honestly endeavoring to understand each other.

§ 135. [1] Of the numerous phrases used as synonymous with "principle" in the sense of a physical force, those cited in the text may serve as fair examples. The real meaning intended is generally indicated by the explanations and illustrations given by the judges. Thus in Barrett *v.* Hall (1818), 1 Mason, 447, Story, J., having stated that the word "principle" is sometimes used to denote an "elementary truth or power," continues: (470) "So that [in that sense] all machines, which perform their appropriate functions by motion, in whatever

factor in every means which produces physical effects, whether such means be natural or artificial, and it is generally this which makes the chief impression on the senses of the observer; but it is in itself no true invention, nor can it be protected by a patent. And this for the three following reasons: —

§ 136. "Principle," as a Force, not the Result of Inventive Skill.

Firstly, a principle, considered as a natural physical force, is not the product of inventive skill. It exists in nature independently of human effort, and can neither be diminished nor increased by human power. Man can discover and employ it, but his employment of it in the modes or through the instruments by which it is applied in nature are mere imitations of what every man is able to perceive and reproduce as well as he. Not until some new instrument or method is

way produced, are alike in principle since motion is the element employed." In Le Roy *v.* Tatham (1852), 14 How. 156, McLean, J., after remarking that want of precision in the use of this term has led to much confusion, says: (175) "A principle . . . is a fundamental truth; an original cause; a motive;" and exemplifies the non-patentability of principles by reference to steam-power and electricity as principles. In O'Reilly *v.* Morse (1853), 15 How. 62, Grier, J., uses the phrase, (132) "element, or law, or principle of nature," as conveying the idea of some electrical, mechanical, or chemical force. A writer on this subject in 7 Am. Law Reg. N. S. 129 (1868), employs as synonymous the names "law of nature," "property of matter," and "mathematical principle." In the earlier English cases the same meaning is apparent, though the expressions used in defining a principle were somewhat more extraordinary. Thus in Boulton *v.* Bull (1795), 2 H. Bl. 463, Buller, J., describes it as "the first ground and rule for arts and sciences, or in other words the elements and rudiments of them." What this means he indicates by saying: "A patent must be for some new production from those elements, and not for the elements themselves . . . all machines which are worked by steam are worked on the same principle." In the same case Rooke, J.: "The term principle . . . may denote either the radical elementary truths of a science, or those consequential axioms which are founded on radical truths. . . . The radical principles, on which all steam-engines are founded, are the natural properties of steam, its expansiveness and condensibility." 1 Abb. P. C. 59 (80, etc.). These citations are sufficient to show that what is thus variously called a "truth," a "principle," a "law," an "axiom," a "ground and rule," etc., is really a natural force or energy manifesting itself through the properties of matter, and operating to produce physical effects.

That an invention is an application of principles or elementary powers, see Holden *v.* Curtis (1819), 2 N. H. 61.

contrived for its direction toward ends which it cannot naturally accomplish, does his creative genius manifest itself; but even these new instruments and methods effect no change within the force itself, nor do they render it in any manner the result of his inventive act.

§ 137. "Principle," as a Force, the Common Property of Mankind.

Secondly, a principle, considered as a natural physical force, is the common property of all mankind. It lacks the one essential attribute of private property, — the capability of exclusive appropriation by an individual to his own use.[1] In its degree, in its location, in the times and methods of its manifestations, it is wholly beyond his control. He must take it as he finds it, and having studied its phenomena and ascertained its laws, he must accommodate himself to its requirements, and be content with such advantages as he is thus enabled to secure. But all endeavors to confine it to himself are at once futile and unjust. It exists for all men, as well after his discovery as before; and if their artificial methods of employing it are unlike his, their use takes from

§ 137. [1] In Le Roy *v.* Tatham (1852), 14 How. 156, McLean, J.: (175) "A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right. Nor can an exclusive right exist to a new power, should one be discovered in addition to those already known. Through the agency of machinery a new steam power may be said to have been generated. But no one can appropriate this power exclusively to himself, under the patent laws. The same may be said of electricity, and of any other power in nature, which is alike open to all, and may be applied to useful purposes by the use of machinery."

In Detmold *v.* Reeves (1851), 1 Fisher, 127, Kane, J.: (131) "The more comprehensive truths of all philosophy, whatever specific name we give to them, cannot be specially appropriated by any one. They are almost elements of our being. We have not reasoned them out, perhaps, and may be even unconscious of their action; yet they are about us, and within us, entering into and influencing our habitual thoughts, and pursuits, and modes of life — contributing to our safety and happiness. And they belong to us as effectively as any of the gifts of Heaven. If we could search the laws of nature, they would be, like water and the air, the common property of mankind; and those theories of the learned which we dignify with this title, partake, just so far as they are true, of the same universally diffused ownership. It is their application to practical use, which brings them within the domain of individuals; and it is the novelty of such an application that constitutes it the proper subject of a patent."

him nothing which he can in any manner call his own. The law necessarily recognizes and protects this universal right. It does not suffer any man to debar others from the use of that which nature has bestowed on all, simply because he was the first one to discover it. Nor even when he has, by his inventive skill, devised a new mode of applying it to the attainment of a certain end, does the protection of the law extend beyond the scope of his invention, or prohibit the employment of the same force by others for the same purpose, provided their artificial instruments and methods are not identical with his.

§ 138. "Principle," as a Force, not an Operative Means.

Thirdly, a principle, considered as a natural physical force, is not a complete and operative means.[1] Before it can pro-

§ 138. [1] In Morton *v.* N. Y. Eye Infirmary (1862), 5 Blatch. 116, Shipman, J.: (121) "In its naked, ordinary sense, a discovery is not patentable. . . . It is only where the explorer has gone beyond the mere domain of discovery, and has laid hold of the new principle, force, or law, and connected it with some particular medium or mechanical contrivance, by which, or through which, it acts on the material world, that he can secure the exclusive control of it under the Patent Act. He then controls his discovery through the means by which he has brought it into practical action, or their equivalent, and only through them. It is then an invention, although it embraces a discovery." 2 Fisher, 320 (323). This is another instance of defective phraseology. Is the principle here spoken of a natural force, or the spirit of the invention, i. e., the idea of means? If it be the former, the patentee does *not* "secure the exclusive control of it under the Patent Act." If it be the latter, why is it treated as a *force* to be discovered? True, each is an abstraction, and must be connected with "some particular medium or mechanical contrivance" before it can come within the scope of patentable inventions, either as a new idea of means or a subordinate element in a new idea of means; but this common attribute does not make them identical in nature nor bring them into the same relation with the complete invention or with the patent by which it is protected.

In Winternute *v.* Redington (1856), 1 Fisher, 239, Willson, J.: (247) "It is true that a patent cannot be sustained for a mere principle. For instance, Sir Isaac Newton's discovery of the principle of gravitation could not be the subject of a patent. But it is equally true, that a principle may be embodied and applied, so as to afford some result of practical utility in the arts and manufactures, and that under such circumstances a principle may be the subject of a patent." In this opinion, the judge subsequently explains that by "principle," in this last sentence, he does not mean a force or property of matter, but the mode devised by the inventor for applying the force or property.

In O'Reilly *v.* Morse (1853), 15 How.

duce effects it must be brought in contact with its object, either through some substance which thereby becomes its instrument, or through some mode of operation in which its object is subjected to its influence. Until this is accomplished, although the force is material in itself, it remains in reference to its object practically a mere abstraction, and is of no more value to mankind, and has no higher right to the protection of a patent, than any other unapplied idea.

§ 139. "Principle," in the other sense, Signifies the Idea of Means.

In its second sense, the word "principle" denotes the spirit of the invention, that characteristic thought which is embodied in the operative means devised by the inventor. In reference to a machine, it is defined as its "*modus operandi*," its "structure and constituent parts;" in reference to all inventions, as "the mode of applying powers to produce results," the "operative cause by which a certain result is produced," "the manner of producing the effect."[1] All

62, Grier, J.: (132) "The mere discovery of a new element, or law, or principle of nature, without any valuable application of it to the arts, is not the subject of a patent. But he who takes this new element or power, as yet useless, from the laboratory of the philosopher, and makes it the servant of man; who applies it to the perfecting of a new and useful art, or to the improvement of one already known, is the benefactor to whom the patent law tenders its protection."

That the capacity of a chemical agent to produce a result is not an invention, see opinion Atty. Gen. (1856), 8 Op. At. Gen. 269.

That a patent cannot be granted for the discovery that certain natural substances will produce certain effects on the human body, see opinion Atty. Gen. (1856), 8 Op. At. Gen. 269.

That the production of insensibility, or suggestions of the ability to perform surgical operations while the patient is insensible, are not patentable, see opinion Atty. Gen. (1856), 8 Op. At. Gen. 269.

That a medicament, whose administration must depend on professional skill, is not patentable, see opinion Atty. Gen. (1856), 8 Op. At. Gen. 269.

§ 139. [1] For cases where the word "principle" is used in reference to a machine as synonymous with "*modus operandi*," or "mode of operation," see Latta *v.* Shawk (1859), 1 Fisher, 465; 1 Bond, 259; Smith *v.* Pearce (1840), 2 McLean, 176; 2 Robb, 13; Whittemore *v.* Cutter (1813), 1 Gallison, 478; 1 Robb, 40: as synonymous with "structure and constituent parts," see Barrett *v.* Hall (1818), 1 Mason, 447; 1 Robb, 207: as synonymous with "the mode of applying powers to produce results," see Smith *v.* Pearce (1840), 2 McLean, 176; 2 Robb, 13: as synonymous with "the operative cause by which a certain effect is produced," see Brooks *v.* Jenkins (1844), 3 McLean, 432: as synon-

these phrases evidently refer to the idea of means, the intellectual essence of that artificial method by which the inventor has applied, to some determinate end, the natural force described by the word "principle," as employed in its more general signification.[2] A principle, in this sense, thus differs *toto cælo*

ymous with "the mode of effecting a result," see Pitts *v.* Wemple (1855), 2 Fisher, 10; 1 Bissell, 87: as synonymous with "the spirit or substance of the invention," see Lund, 7.

[2] Concurrently with all the involved and perplexing discussions concerning the status of a principle before the law, such explanations have been given, both from the bench and bar, of the true distinction between these two senses of the term "principle," as ought long ago to have removed all difficulties from the subject, and have placed this second meaning of the word in the clearest light as expressing the very essence of every patentable invention. In Boulton *v.* Bull (1795), 2 H. Bl. 463, a case pregnant with mischief, on account of the loose and almost meaningless language used by some of the judges, Lord Chief Justice Eyre remarked: (495) "Undoubtedly there can be no patent for a mere principle; but for a principle so far embodied and connected with corporeal substances, as to be in a condition to act, and to produce effects in any art, trade, mystery, or manual occupation, I think there may be a patent. Now this is, in my judgment, the thing for which the patent stated in the case was granted, and this is what the specification describes, though it miscalls it a principle. It is not that the patentee has conceived an abstract notion, that the consumption of steam in fire-engines may be lessened, but he has discovered a practical manner of doing it; and for that practical manner of doing it he has taken this patent. Surely this is a very different thing from taking a patent for a principle." 1 Abb. P. C. 59 (91). Thus, at a very early period, this sagacious and learned judge had perceived that the real thing protected by a patent was the method conceived by the inventor and reduced to practice; that it was not the force employed, on the one hand, nor the mere corporeal substance through which the idea of the inventor was expressed upon the other; but embraced the principle or abstract essence of the invention in whatever form it might be embodied.

Again, in the argument of counsel in the case of Jupe *v.* Pratt (1837), 1 Web. 145, the following remarks occur: (145) "The fair mode of looking at a patent and the specification is, to inquire what is the spirit of the invention, or the principle; and this must be embodied in some mode or method, because it is admitted on all hands you cannot take out a patent for a principle. But although the law says . . . that you cannot take out a patent for a principle, . . . you can have a patent for the spirit of your invention; for if any other person comes and clothes the spirit of your invention with a different body, and puts that principle in use in any other shape or fashion, it is always a question for a jury, whether . . . the article or the practice . . . be not substantially an adaptation of the principle, applied with the same view, to answer the same end, and merely imitated in substance, whatever difference there may be in point of form." 2 Abb. P. C. 464 (466).

In this country Judge Willson, in Wintermute *v.* Redington (1856), 1 Fisher, 239, after asserting the non-patentability of a property of matter, and the patentability of an embodied principle

from a principle considered as a force. The latter is the operative energy; the former is the means in which the latter operates. One is created by the author of the universe; the other owes its origin to human ingenuity. One belongs equally to all mankind; the other is the exclusive property of him who has devised it, until it pleases him to give it to the world.

§ 140. "Principle," as an Idea of Means, not an Operative Means.

The principle or essence of an invention, however, when taken by itself, is no more patentable than the principle or force which it proposes to employ.[1] Like that, it is but an abstraction, resting in theory alone, and not an operative means. Until reduced to practice it is not a complete invention, nor does it stand on any higher ground of legal merit than the discovery of an existing natural power. It must become "a principle, put in practice and applied," a "practice

continues: (247) "It is, however, *the embodiment and the application of the principle which constitute the grant of the patent.* And it has been justly said 'that the principle so embodied and applied, and the principle of *such* embodiment and application, are essentially distinct; the former being a truth of exact science, or a law of natural science, or a rule of practice; the latter, a practice founded upon such truth, law, or rule.'"

Many of the cases arising on machine-patents also discuss this same proposition, uniformly holding that the subject-matter of the patent is the principle, or idea of means, embodied in the machine, and that no change in the embodiment, as distinguished from the principle, can affect the identity of the invention.

See §§ 178, 179, and notes, *post.*

§ 140. [1] In Andrews *v.* Carman (1876), 9 O. G. 1011, Benedict, J.: (1013) "There can be no patent for a principle; but 'for a principle so far embodied and connected with corporeal substances as to be in a condition to act and to produce effects in any trade, mystery, or manual occupation there may be a patent.' The idea or principle of forcing water from the earth into a well-pit by the use of artificial power is new, but is not by itself patentable. The idea, when made available by a method whereby it is put to practical use, is patentable as a process, and is thus secured to the person who has conceived the idea and invented the method." 13 Blatch. 307 (312); 2 Bann. & A. 277 (281).

In McComb *v.* Brodie (1872), 2 O. G. 117, Woods, J.: (119) "A patent cannot be granted for a principle or an idea, or for any abstraction whatever; for instance, for the naked idea of a slit, slot, or aperture, disconnected from any application. But when the idea is applied to a material thing, so as to produce a new and useful effect or result, it ceases to be abstract, and becomes a proper subject to be covered by a patent." 1 Woods, 153 (158); 5 Fisher, 384 (391).

See also cases cited under Reduction to Practice, §§ 125–130, *ante.*

founded on principle," before it passes from the shadowy regions of mere intellectual apprehension into the domain of the industrial arts.[2]

§ 141. "Principle," as an Idea of Means, the Essence of the Concrete Invention.

Yet when once embodied in an operative means, this principle is the true subject-matter of the patented invention. Whatever forms of tangible expression it receives through the varied skill and industry of the mechanic, this idea and essence still remain unchanged. The exclusive right of the inventor is co-extensive with the limits of the original conception, and though its spirit may be clothed with many different bodies the individuality of the invention is not disturbed nor its identity destroyed.[1] One who has thus devised a principle,

[2] In Boulton *v.* Bull (1795), 2 H. Bl. 463, Buller, J.: (486) "I think it impossible to support a patent for a method only, without having carried it into effect and produced some new substance. But here it is necessary to enquire, what is meant by a principle reduced into practice. It can only mean a practice founded on principle, and that practice is the thing done or made." 1 Abb. P. C. 59 (81).

That an abstract principle or idea is not patentable, see Worswick Mfg. Co. *v.* City of Buffalo (1884), 20 Fed. Rep. 126; 27 O. G. 1239.

That a principle is not patentable except in connection with a mode of application, see Burke *v.* Partridge (1878), 58 N. H. 349.

§ 141. [1] In American Bell Telephone Co. *v.* Dolbear (1883), 15 Fed. Rep. 448, Gray, J.: (449) "There can be no patent for a mere principle. The discoverer of a natural force or a scientific fact cannot have a patent for that. But if he invents for the first time a process by which a certain effect of one of the forces of nature is made useful to mankind, and fully describes and claims that process, and also describes a mode or apparatus by which it may be usefully applied, he is, within the meaning and the very words of the patent law, 'a person who has invented or discovered any new and useful art;' and he is entitled to a patent for the process of which he is the first inventor, and is not restricted to the particular form of mechanism or apparatus by which he carries out that process. Another person, who afterwards invents an improved form of apparatus, embodying the same process, may indeed obtain a patent for his improvement, but he has no right to use the process, in his own or any other form of apparatus, without the consent of the first inventor of the process. . . . (453) If that art or process is the only way by which [that effect of the natural force can be produced] that fact does not lessen the merit of his invention, or the protection which the law will give to it." 23 O. G. 535 (535).

See also cases cited under § 130, *ante*.

In a brief, but able, discussion of this subject, in 7 Am. Law Reg. N. S. 129 (1868), after considering the leading

or mode of operation, in which a force is applied to the production of a given result, becomes thereby the inventor, not merely of the instrument he uses or the method he describes, but of all other instruments and methods embodying the same principle or mode of operation, however different in form or structure or arrangement such instruments or methods may appear.

§ 142. "Application of Principle" a phrase of Two Meanings.

This subject is still more confused by the use of the word "application," and of the phrase "application of a principle," in different significations. "Application," as predicated of a principle when considered as a force, is the specific artificial method in which that force is directed to the accomplishment of a given result. In other words, it is the idea of means, the principle of the invention in which the force is actually employed. In this sense, the "application of the principle" is the essence of the invention, the entire subject-matter of the patent, and any other application of the same principle or force, even for the same purpose, is a different invention. But "application," as predicated of a principle when considered as the spirit of an invention, is the embodiment of that spirit in some instrument or operation, or in other words, it is reduction to practice. In this sense, the "application of the principle" is not the essence of the invention nor the en-

American and English cases, the writer reaches the following conclusions : (143)

"1. Every discoverer of a new and useful application of any law of nature, any quality of matter, or any mathematical principle, is entitled to a patent for it [i. e. for the new application].

"2. It is not necessary to entitle him to a patent, that he should have been the first to search out and make known the law, quality, or principle which he has thus applied. And his having been the first to bring it to light adds nothing to his claims.

"3. He will be protected in his right by holding as infringements of his patent all mechanical equivalents for the devices for carrying his discovery into effect, which he has described and designated in his specification as his invention. And he can have no other protection, even though the principle he has applied was first discovered by him.

"4. No one can legally specify as his invention, and take out a patent for the exclusive use of any such law, quality, or principle when employed for the same purpose as his. No instance can be found where any such patent has been sustained, and they have been repeatedly pronounced invalid by the courts."

tire subject-matter of the patent. Here the essence of the invention and the subject-matter of the patent is the principle itself, and every other application of this principle, whatever be its purpose, belongs to the original inventor of the principle and can neither be used nor patented by others.

§ 143. Propositions Embracing these Phrases and Terms Interpreted.

When, therefore, courts lay down the doctrine that a principle cannot be patented, the proposition which they undertake to state is either that a natural force cannot be appropriated for any purpose to the exclusive use of any one, not even of its discoverer, or that an idea of means is not entitled to a patent until it is embodied in a practical and useful form. When they declare that a patent for the application of a principle covers only that specific mode of application, they refer solely to the application of a natural force in some peculiar manner in an artificial means.[1] When they assert that one who has discovered and applied a prin-

§ 143. [1] In Steam Gauge & Lantern Co. *v.* St. Louis Railway Supplies Mfg. Co. (1885), 25 Fed. Rep. 491, Treat, J.: (492) "The party supposes he has discovered a principle, and he thinks that any sort of device which covers that principle is within the terms of his patent. This court does not admit that. It is the device by which he may avail himself of the beneficial influence of his principle, and this court always restricts a party to his device. I think that is the meaning of all the rulings of the Supreme Court."

In Sewall *v.* Jones (1875), 91 U. S. 171, Hunt, J.: (184) "When a party has invented some mode of carrying into effect a law of natural science or a rule of practice, it is the application of that law or rule which constitutes the peculiar feature of the invention. He is entitled to protect himself from all other modes of making the same application." 9 O. G. 47 (49).

In Wintermute *v.* Redington (1856), 1 Fisher, 239, Willson, J.: (250) "We have already stated that when a person has invented some mode of carrying into effect a law of natural science, or a rule of practice, which constitutes the peculiar feature of his invention, such discovery may be secured to him by a patent. Hence it follows that he is entitled to protect himself from all other modes of making the same application. The substantial *identity*, therefore, that is to be looked to, respects that which constitutes the essence of the invention, namely, *the application of the principle*. If the mode of carrying the same principle into effect, adopted by the defendant, still shows that the principle admits of the same application in a variety of forms, or by a variety of apparatus, the jury will be authorized to treat such mode as a piracy of the invention."

ciple is entitled to all methods of applying it, they speak of an idea of means, capable of being applied or reduced to practice in different instruments or operations, each of which is the tangible embodiment of the same idea, and all of which are only formal variations of the same substantial means.[2]

[2] One of the leading cases in which the patentability of a principle has been discussed, and the doctrine announced that a patent for the application of a principle covers all modes of applying it, is Household Co. *v.* Neilson (1843), 1 Web. 673. As this case has been cited, criticised, and explored for additional light in almost every subsequent cause involving the same propositions, it deserves more than a passing reference. Before Neilson's invention only cold air had been employed for the blast in iron and similar furnaces. He discovered that to blow with hot air was better than to blow with cold. His method consisted in blowing the air through a heated receptacle into the furnace. In his specification he declared that the materials, size, &c., of the receptacle, as well as the mode of heating it, were immaterial, provided the air were heated between the bellows and the furnace. Practically, no other method of blowing with hot air is possible, and as a consequence his mode of heating the air covered all applications of hot air in blast. An analysis of this invention leads to the following results: (1) That a strong current of hot air directed into the furnace will produce certain effects upon the substances contained in the furnace is a fact in nature, open to discovery and use by all men; (2) By the discovery of this fact, Neilson invented nothing; the forces and susceptibilities discovered remained abstract and unapplied; (3) When he devised a method of producing such a current by blowing the air through a heated receptacle into the furnace his idea of means became complete; the three subordinate ideas of force, object, and mode of application were united into one idea and needed only practical embodiment to become an operative means; (4) He reduced this idea to practice by actually blowing the air through the heated receptacle into the furnace, and was, therefore, entitled to a patent for the process he had invented, whether the receptacle, the bellows, or other apparatus he employed were new or old.

Now three different views may be taken of the character of this inventive act, depending on which of the three subordinate ideas were evolved by its exercise. If the inventive act were directed toward the force said to be discovered in the heated air, the invention was a process of treating substances with air heated while in blast, and the character of the instruments used or the objects treated was immaterial, provided the force discovered were applied and effective. If the mode of application were the discovery, then the arrangement of bellows, receptacle, and furnace for that purpose was the invention, and any other arrangement by which hot air could be blown into the furnace would be a different invention. If the inventive act related to the object — the materials in the furnace — and consisted in discovering their susceptibility to a hot blast, and in applying to them a current of hot air, then the process of treating these materials with hot air was the invention, and any other application of a current of hot air to these materials, by any method or by any apparatus, would be covered by his patent. The two former views were both taken during the discussion and decision of the case. Those who adhered to the second view argued that

§ 144. "Function" Defined.

The distinction between a practically operative means and the function it performs is somewhat more obscure. When-

the specification was defective because it did not specifically describe the apparatus claimed to be invented. Those who adopted the first view regarded this as of less consequence, since the invention was a process of blowing with hot air, and as a general form of apparatus for that purpose was pointed out that was sufficient reduction to practice to warrant the issue of a patent. The court accepted this view, holding that the specification was sufficient, that the principle of the invention consisted in the use of air heated while in blast, and that all modes of embodying this principle, or idea of means, were covered by the patent. This is the view taken of the invention by text-writers and judges in more recent cases. See Curtis, § 133; O'Reilly *v.* Morse (1853), 15 How. 62; Le Roy *v.* Tatham (1852), 14 How. 156, &c.

But is not the third view more nearly in accordance with the truth, and more commensurate with the real merit of the inventor? Did his discovery relate to the properties of hot air in motion? Did he not rather discover the susceptibility of the materials contained in the furnace to the action of a strong current of heated air? And having discovered this did not his real invention consist in treating these materials with hot air instead of cold, and thus include every manner in which the hot air could be brought in contact with this new object? If his method of heating the air had been previously employed, as, for instance, to warm buildings or dry clothes, would the merit or originality or patentability of his invention have been any less; and was he not entitled to consider this part of the invention as a mere form of embodiment and claim protection for the process of subjecting the materials in the furnace to the action of a hot blast, in whatever manner the hot blast could be practically applied? I throw out this suggestion because not only in this case but in many others doubt has arisen in my mind whether by failing to recognize that discovery may relate to the object as well as the agent, and that the inventive act may consist in bringing a new object into relation with old forces as well as in bringing new forces into relation with old objects, much of the real merit of the invention has been lost sight of, and the rules of law have been incorrectly applied.

To return, however, to the case as it was regarded by the court, viz., as a process of blowing with hot air, in which the form and arrangement of the apparatus is of no consequence, provided the process can be carried out through them, the following extract from the decision, if carefully followed, will be found to contain an accurate and instructive dissertation on the relation of a principle to an invention. Hope, J., says: (683) "It is quite true that a patent cannot be taken out solely for an abstract philosophical principle — for instance, for any law of nature, or any property of matter, apart from any mode of turning it to account in the practical operations of manufacture, or the business, and arts, and utilities of life. The mere discovery of such a principle is not an invention, in the patent law sense of the term. Stating such a principle in a patent may be a promulgation of the principle, but it is no application of the principle to any practical purpose. And without that application of the principle to a practical object and end, and without the application of it to human industry, or to the purposes of human enjoyment, a person cannot in the abstract appropriate a principle to him-

ever any means, whether it be an instrument or operation, is employed for the attainment of an end, three facts become

self. But a patent will be good, though the subject of the patent consists in the discovery of a great, general, and most comprehensive principle in science or law of nature, if that principle is by the specification applied to any special purpose, so as thereby to effectuate a practical result and benefit not previously attained. The main merit, the most important part of the invention, may consist in the conception of the original idea — in the discovery of the principle in science, or of the law of nature, stated in the patent, and little or no pains may have been taken in working out the best manner and mode of the application of the principle to the purpose set forth in the patent. But still, if the principle is stated to be applicable to any special purpose, so as to produce any result previously unknown, in the way and for the objects described, the patent is good. It is no longer an abstract principle. It comes to be a principle turned to account, to a practical object, and applied to a special result. It becomes, then, not an abstract principle, which means a principle considered apart from any special purpose or practical operation, but the discovery and statement of a principle for a special purpose, that is, a practical invention, a mode of carrying a principle into effect. That such is the law, if a well-known principle is applied for the first time to produce a practical result for a special purpose, has never been disputed. It would be very strange and unjust to refuse the same legal effect, when the inventor has the additional merit of discovering the principle as well as its application to a practical object. The instant that the principle, although discovered for the first time, is stated, in actual application to, and as the agent of, producing a certain specified effect, it is no longer an abstract principle, it is then clothed with the language of practical application, and receives the impress of tangible direction to the actual business of human life. . . . (684) Is it, I next inquire, an objection to the patent, that, in its application of a new principle to a certain specified result, it includes every variety of mode of applying the principle according to the general statement of the object and benefit to be attained? You will observe that the greater part of the defender's case is truly directed to this objection. This is a question of law, and I must tell you distinctly, that this generality of claim, that is, for all modes of applying the principle to the purpose specified, according to or within a general statement of the object to be attained, and of the use to be made of the agent to be so applied, is no objection whatever to the patent. That the application or use of the agent for the purpose specified, may be carried out in a great variety of ways, only shows the beauty, and simplicity, and comprehensiveness of the invention. But the scientific and general utility of the proposed application of the principle, if directed to a specified purpose, is not an objection to its becoming the subject of a patent. That the proposed application may be very generally adopted in a great variety of ways, is the merit of the invention, not a legal objection to the patent. The defenders say — you announce a principle, that hot air will produce heat in the furnace; you direct us to take the blast without interrupting or rather without stopping it, to take the current in blast, to heat it after it leaves the blast, and to throw it hot into the furnace. But you tell us no more — you do not tell us how we are to heat it. You say — you may heat in any way, in any sort of form of vessel.

apparent: (1) the means employed; (2) the effect produced; and (3) the action of the means upon the object while pro-

You say — I leave you to do it how you best can. But my application of the discovered principle is, that if you heat the air, and heat it after it leaves the blowing engine (for it is plain you cannot do it before), you attain the result I state; that is the purpose to which I apply the principle. The benefit will be greater or less. I only say, benefit you will get, I have disclosed the principle; I so apply it to a specified purpose by a mechanical contrivance, viz., by getting the heat when in blast, after it leaves the furnace; but the mode and manner, and extent of heating, I leave to you, and the degree of benefit, on that very account, I do not state. The defenders say, the patent, on this account, is bad in law. I must tell you, that taking the patent to be of this general character, it is good in law. I state to you the law to be, that you may obtain a patent for a mode of carrying a principle into effect; and if you suggest and discover, not only the principle, but suggest and invent how it may be applied to a practical result by mechanical contrivance and apparatus, and show that you are aware that no particular sort or modification, or form of the apparatus, is essential, in order to obtain benefit from the principle, then you may take your patent for the mode of carrying it into effect, and are not under the necessity of describing and confining yourself to one form of apparatus. If that were necessary, you see, what would be the result? Why, that a patent could hardly ever be obtained for any mode of carrying a newly discovered principle into practical results, though the most valuable of all discoveries. For the best form and shape or modification of apparatus, cannot in matters of such vast range, and requiring observation on such a great scale, be attained at once; and so the thing would become known, and so the right lost, long before all the various kinds of apparatus could be tried. Hence, you may generally claim the mode of carrying the principle into effect by mechanical contrivance, so that any sort of apparatus applied in the way stated will, more or less, produce the benefit, and you are not tied down to any form. The best illustration I can give you, and I think it right to give you this illustration, is from a case as to the application of that familiar principle the lever to the construction of chairs, or what is called the self-adjusting lever. (Minter's patent. 1 Web. 126, 134.) This case, which afterwards came under the consideration of the whole court, was tried in the court of Exchequer during the presidency of Lord Lyndhurst. The case was as to the patent reclining chair, the luxury of which some of you may have tried; it had a self-adjusting lever, so that a person sitting or reclining, . . . in whatever situation he placed his back, there was sufficient resistance offered through means of the lever, to preserve the equilibrium. Now anything more general than that, I cannot conceive; it was the application of a well-known principle, but for the first time applied to a chair. He made no claim to any particular parts of the chair, nor did he prescribe any precise mode in which they should be made; [he did describe modes in which they *might* be made. R.], but what he claimed was a self-adjusting lever to be applied to the back of a chair, where the weight of the seat acts as a counterpoise to the back, in whatever posture the party might be sitting or reclining. Nothing could be more general. Well, a verdict passed for the patentee, with liberty to have it set aside; but Lord Lyndhurst

ducing the effect. The latter is the function of the means. It is the action of the means considered, not with reference

and the rest of the court hold, that this was not a claim to a principle, but to the construction of a chair on this principle, in whatever shape or form it may be constructed. Just so as to the hot blast, only the principle is also new. The patentee says, 'I find hot air will increase the heat in the furnace, that a blast of hot air is beneficial for that end.' Here is the way to attain it — 'heat the air under blast, between the blowing apparatus and the furnace; if you do that, I care not how you may propose to do it — I neither propose to you, nor claim, any special mode of doing it; you may give the air more or less degrees of heat; but if you so heat it, you will get by that contrivance the benefit I have invented and disclosed, more or less, according to the degree of heat.' This is very simple, very general; but its simplicity is its beauty and its practical value — not an objection in law."

To gather the thread of thought running through this extended citation, and group the important propositions, may serve a useful purpose. The judge begins by stating that a principle, considered as a law of nature or force is not patentable apart from some mode of turning it to account in the practical affairs of life; but when turned to such account the patent will be good, though the principle or force be general and newly discovered. This position he bases, not upon the ground that the force is natural and merely discovered, not invented, by the patentee, but only on the ground that it is abstract and incapable of producing practical results. He then declares that the principle ceases to be abstract when discovered and stated to be useful for a special purpose, or "stated in actual application to, and as the agent of, producing a certain specified effect" and "clothed with the language of practical application, and receives the impress of tangible direction to the actual business of human life." From the context, and especially from what follows, it is apparent that the learned judge is not here speaking of the embodiment of the idea of the inventor in tangible materials, but of the complete conception in the mind of the inventor of the method by which the principle or force is to be applied to its objects in order to produce the specified effect. He then states that having thus brought the principle into relation with practical affairs, the particular form in which he reduces it to practice is immaterial, but that "all modes of applying the principle to the purpose specified, *according to or within a general statement of the object to be attained and of the use to be made of the agent* [principle or force] *to be so applied*" are within the patent. The remainder of the opinion, answering the objections of the defenders and illustrating the doctrine by a reference to Minter's patent, follows the same line of thought, and places the doctrine as to this kind of "principle" in the clearest light.

The discussion of this case in O'Reilly *v.* Morse (1853), 15 How. 62, and in the dissenting opinion of Judge Nelson in Le Roy *v.* Tatham (1852), 14 How. 156, shows at once the influence it has exercised upon the ideas entertained by the courts and the errors into which they have sometimes been led by following the language of the decision rather than the propositions intended to be conveyed. Still more recently, in Tilghman *v.* Proctor (1881), 102 U. S. 707; 19 O. G. 859, § 163, note, *post*, it has received another examination. All these reviews of this famous case are valuable and instructive, and the more thoroughly

to the subject acting, but with reference to the object acted on; and apart from such an object it can neither be apprehended by the senses nor contemplated by the mind. Thus when a machine for smoothing lumber is practically used, the eye and intellect of the observer perceive the machine or means employed, the smoothness or effect produced, and the function or act of smoothing to which the lumber is subjected. Or when a fulminating compound is applied to the ignition of explosives, he sees the means or fulminate, the effect or ignition of the explosive, and the function or the communication of heat to the explosive by the deflagrating fulminate.[1] That in these cases, as in all others, the presence of the object acted on is necessary to the manifestation of the function is evident. Though the machine be perfect and exhaust its capabilities of operation, it can perform no act of smoothing until the boards are placed between its whirling knives. The deflagrating fulminate communicates no heat unless the explosive comes within reach of its fiery tongue.

§ 145. Function Distinct both from Means and Effect.

Yet while no function can exist without the application of some operative means to the production of a physical effect, the function is essentially distinct both from the means and the effect. It is not included in the idea of means nor in the practical embodiment of that idea. Every means is neces-

they are examined and the more carefully they are compared, does the true theory as stated in the text, and in the decision of Judge Gray (Am. Bell Telephone Co. *v.* Dolbear (1883), 23 O. G. 535; 15 Fed. Rep. 448), cited to § 141, *ante*, become apparent, viz., that the principle of the invention, or idea of means, consists in the application of the principle or natural force in some manner to a physical object; that a patent for this application covers and protects it only; but, that when this application or principle of the invention is embodied and practically applied in the arts, the forms of this embodiment and practical application are not material, and the same patent covers and protects them all.

§ 144. [1] In Corning *v.* Burden (1853), 15 How. 252, Grier, J.: (268) "But the term process is often used in a more vague sense, in which it cannot be the subject of a patent. Thus we say that a board is undergoing the process of being planed, grain of being ground, iron of being hammered, or rolled. Here the term is used subjectively or passively as applied to the material operated on, and not to the method or mode of producing that operation, which is by mechanical means, or the use of a machine, as distinguished from a process. In this use of the term it represents the function of a machine, or the effect produced by it on the material subjected to the action of the machine."

sarily complete within itself, whether or not an object is subjected to its operation. Neither the planer nor the fulminate are changed in character or capability by the presence or the absence of the lumber or the explosive. They act with equal energy, and in precisely the same manner, whether their action terminates on the material objects in which their appropriate effects may be produced, or issues only in the beating of the air or in the illumination of surrounding space. And not only is every means thus independent of the function, but every function is in the same measure independent of any individual means. A function is so far identified with an effect that by whatever means the function is performed the effect must be produced. Smoothness will exist whenever an act of smoothing has preceded it, and this act is performed by every means which removes irregularities of surface, whether it be the attrition of some harder substance, the constant flow of water, the excision of the surface by a single knife or by a group of rapidly revolving blades. So the explosive is ignited whenever heat is communicated to it by some foreign substance; but this may be accomplished by a red-hot iron, the flame of burning paper, or the electric spark, as well as by the compound which deflagrates upon percussion. Whichever of these various means is used the effect and function are the same, the object acted on being subjected, under all these different methods, to the same operation, and exhibiting the same result. And yet the function is no part of the effect produced. Although in its relation to the means it has the character of an effect, it is not the ultimate effect which the means is intended to accomplish. The latter is a permanent, concrete effect, perpetually manifested in the object. The function is an abstract, fugitive effect, known only through its sensible results, and ceasing with the operation of the means. They are not even contemporaneous, for the effect comes into being only as the function ceases, and the completion of the one is thus conditioned on the termination of the other. As independent of the effect as of the means, a function is in law as well as fact a separate entity, possessing its own characteristic attributes, and governed by its own peculiar rules.

§ 146. Function Possesses no Attribute of an Invention.

The nature of a function, and its relation to the means and the effect, show that it is wanting in all the necessary attributes of an invention, and, therefore, cannot be protected by a patent.[1] Forming no part of the idea of means, it does not owe its origin to a creative act. As a prerequisite to the effect, it is discerned as soon as the desirability of the effect becomes apparent, and before the inventive faculties attempt to provide means by which the effect can be produced. It is incapable of tangible embodiment, almost of verbal or pictorial description; and is presented to the mind only through processes of abstract reasoning or by the observation of its practical results. Performed by many different means, it cannot be exclusively attributed to any, but remains open to attainment by all methods which human ingenuity is able to devise. Identified with the effect in origin though not in nature, it is, like the effect, the common property of all men; and could it be appropriated to the use of one, all others would be deprived of their right to the effect, whether produced by methods new or old. Thus for all reasons which can be applied to any subject-matter, a function is outside the sphere of an invention, and no patent for the means can be so extended as to protect the operation of the means upon the object in producing the effect.

§ 146. [1] In Corning *v.* Burden (1853), 15 How. 252, Grier, J.: (268) "But it is well settled that a man cannot have a patent for the function or abstract effect of a machine, but only for the machine which produces it."

Further, that a function is not patentable, see Excelsior Needle Co. *v.* Union Needle Co. (1885), 23 Blatch. 147; 32 Fed. Rep. 221; Reay *v.* Raynor (1884), 22 Blatch. 13; 19 Fed. Rep. 308; 26 O. G. 1111; Matthews *v.* Schoneberger (1880), 18 O. G. 1464; 4 Fed. Rep. 635; 18 Blatch. 357; Union Paper Collar Co. *v.* White (1875), 7 O. G. 693, 877; 2 Bann. & A. 60; Wheeler *v.* Simpson (1874), 1 Bann. & A. 420; 6 O. G. 435; Blanchard *v.* Sprague (1839), 3 Sumner, 535; 1 Robb, 734.

That where a new function is performed the real invention is either the physical structure, the combination of devices, or the process, see Matthews *v.* Schoneberger (1880), 18 O. G. 1464; 4 Fed. Rep. 635; 18 Blatch. 357.

That the means, not the function, is the invention, see Excelsior Needle Co. *v.* Union Needle Co. (1885), 23 Blatch. 147; 32 Fed. Rep. 221; Albany Steam Trap Co. *v.* Felthousen (1884), 22 Blatch. 169; 20 Fed. Rep. 633; Pattee *v.* Moline Plow Co. (1881), 22 O. G. 173; 10 Bissell, 377; 9 Fed. Rep. 821.

§ 147. "Effect" or "Result" Defined.

The line of demarcation between the means employed and the effect produced, though often difficult to draw in practice, in theory at least is broad and readily discernible. The want of technical language has resulted, here as elsewhere, in some needless ambiguity. The words "result" and "product" are sometimes employed to represent the idea more properly expressed by the term "effect." At other times they are used to denote the art or article in which the idea of means is practically embodied. The courts, employing these two words in different senses, have in some cases stated and in some denied that a "result" could be the subject-matter of a patent, without explaining in which sense the word was used.[1] A

§ 147. [1] In Fuller *v.* Yentzer (1876), 94 U. S. 288, Clifford, J.: (288) "Patents for a machine will not be sustained if the claim is for a result, the established rule being that the invention, if any, within the meaning of the patent act, consists in the means or apparatus by which the result is obtained." 11 O. G. 551 (551).

In Corning *v.* Burden (1853), 15 How. 252, Grier, J.: (268) "It is for the discovery or invention of some practicable method or means of producing a beneficial result or effect, that a patent is granted, and not for the result or effect itself."

In Le Roy *v.* Tatham (1852), 14 How. 156, McLean, J.: (175) "A patent is not good for an effect, or the result of a certain process, as that would prohibit all other persons from making the same thing by any means whatsoever."

In Whittemore *v.* Cutter (1813), 1 Gallison, 478, Story, J.: (480 "A patent can, in no case, be for an effect only, but for an effect produced in a given manner, or by a peculiar operation. For instance, no patent can be obtained for the admeasurement of time, or the expansive operation of steam; but only for a new mode or new application of machinery, to produce these effects." 1 Robb, 40 (42).

See also Palmer *v.* Gatling Gun Co. (1881), 20 O. G. 815; 19 Blatch. 392; 8 Fed. Rep. 513; Anilin *v.* Higgin (1878), 14 O. G. 414; 3 Bann. & A. 462; 15 Blatch. 290; Union Paper Collar Co. *v.* White (1875), 7 O. G. 698, 877; 2 Bann. & A. 60; Hoe *v.* Simpson (1874), 6 O. G. 435; 1 Bann. & A. 420; *Ex parte* Merrill (1874), 5 O. G. 120; 1 MacArthur, 301: Marsh *v.* Dodge & Stevenson Mfg. Co. (1873), 5 O. G. 398; 6 Fisher, 562; Bailey Washing & Wringing Mach. Co. *v.* Lincoln (1871), 4 Fisher, 379; Morton *v.* N. Y. Eye Infirmary (1862), 5 Blatch. 116; 2 Fisher, 320; Case *v.* Brown (1862), 1 Bissell, 382; 2 Fisher, 268; Morris *v.* Barrett (1859), 1 Bond, 254; 1 Fisher, 461; Burr *v.* Cowperthwait (1858), 4 Blatch. 163; Potter *v.* Holland (1858), 4 Blatch. 238; 1 Fisher, 382; O'Reilly *v.* Morse (1853), 15 How. 62; Carver *v.* Hyde (1842), 16 Peters, 513.

That a patent cannot be granted for all modes of producing an effect, this being equivalent to a patent for the effect itself, see Marsh *v.* Dodge & Stevenson Mfg. Co. (1873), 6 Fisher, 562; 5 O. G. 398; O'Reilly *v.* Morse (1853), 15 How. 62.

But that for a result in the sense of a product, or new art or instrument,

moment's attention to the topic under discussion is usually sufficient to remove all obscurity. An effect is never an invention, whether described as a concrete and independent article or as a new condition of existing objects; but an instrument or operation, in which the idea of means has been embodied, is an invention and is always patentable, under whatever name it may be known.

§ 148. Effect not the Result of an Inventive Act.

Two attributes of an invention are wanting in an effect. In the first place, it is the end and not the means. It is that changed condition of affairs which constitutes the satisfaction of a human want. Although produced by an invented means, it is not the fruit of inventive skill, but has existed, at least in intellectual contemplation, ever since the want which it supplies arose. As the antithesis of this want, it is perceptible to every person to whom the want itself becomes apparent, and none can claim the merit of its sole discovery, or assert a superior title to its benefits. Like everything that is not due to the creative genius of an individual, it is the property of all, and neither indirectly nor directly can the public be restricted in its enjoyment.

§ 149. Effect Producible by Various Means and thus Peculiar to None.

Again, with few exceptions, every effect may be produced by several different means. Each of these means, if artificial, is a true invention and may properly be employed by its inventor for his exclusive benefit. But the invention of one means confers on its inventor no right, either natural or legal, to prohibit others from inventing, for their own use, other and substantially different means.[1] Yet this would be the result

a patent may be granted, see Anilin *v.* Higgin (1878), 14 O. G. 414; 3 Bann. & A. 462; 15 Blatch. 290; Arkell *v.* The Hurd Paper Bag Co. (1870), 7 Blatch. 475.

And that the inventor of a result (product) may protect it by whatever means it may be produced, see Anilin *v.* Higgin (1878), 4 O. G. 414; 3 Bann. & A. 462; also § 184 and notes, *post*.

§ 149. [1] In New Process Fermentation Co. *v.* Maus (1884), 20 Fed. Rep. 725, Drummond, J.: (732) "It

if one who had discovered an effect, and had invented means for its production, could patent the effect as well as means. The progress of inventive genius in the same direction, through whatever different paths, would be suspended. The public would be confined to the use of his means and his only, no matter how imperfect or expensive in comparison with others that might be devised. The rights of the inventor of the means would be subordinated to the claims of the discoverer of the effect, and thus a higher premium be placed on the perception of what all can see than on the creation of that useful and important agency which, but for the inventor, might never have been employed. The principles of justice give no support to such a claim. The scope of the inventor's right is limited by the means he has devised, and whether the effect be new or old, all others are at liberty to produce it by any method which is not substantially identical with his.

§ 150. Essential Requisites of a Concrete Invention.

Thus excluding from the sphere of the invention the principle or force which it employs, the function it performs, and the effect which it produces, we see that the complete result of the inventive act consists in an idea of means, embodied in some instrument or operation, and capable, when brought in contact with its proper object, of performing certain functions and thereby producing in the object certain definite effects. If any of these four essential requisites are wanting, there can

seems to be admitted in the various process cases decided in the supreme court, which have been referred to, and others which might be named, if the process consists of a chemical combination by which the particular result is produced, that does not prevent another inventor from making a mechanical combination which produces the same result. Otherwise, there would be a revolution in what has always been understood to be a principle of the patent law, that a person could not patent a result, but only the means or acts by which the result was produced; and that certainly should be true as well of a chemical as a mechanical combination."

Further, that a patent can cover only the method of effecting a result, not the result itself, see Steam Gauge & Lantern Co. *v.* St. Louis Railway Supplies Mfg. Co. (1886), 38 O. G. 107; Pattee *v.* Moline Plow Co. (1881), 22 O. G. 173; 10 Bissell, 377; 9 Fed. Rep. 821.

That a patent cannot cover all modes of producing a result, see Blake *v.* San Francisco (1885), 113 U. S. 679; 31 O. G. 380; § 147, note 1, *ante*.

be no invention. An idea other than an idea of means, whether it be of principle, of function, or effect; the complete embodiment of an incomplete idea of means; the incomplete embodiment of a complete idea of means; and the complete embodiment of a complete idea of means in any other than a practically operative form, — all these fall short of that result of the inventive act to which the law accords the title and prerogatives of an invention.

§ 151. Concrete Invention a Unit.

An invention, as thus defined, is necessarily a unit. The idea of means, which is its essence, is one, complete, invariable. Though capable of practical embodiment in instruments of different form, or in operations involving actions of apparently different character, its individuality is not affected and its identity remains unchanged. Each of these different instruments may be composed of many parts, each of these different operations may require the use of numerous agents or the performance of long series of acts, but the idea which underlies the instrument or operation is indivisible. Though its effects are various, in the production of each one of them it acts in its entirety, — the whole idea, in its complete embodiment, being employed in the accomplishment of every end.

§ 152. Principal and Subordinate Inventions are Distinct Units.

In most inventions, this attribute of unity is easily discerned and demands slight attention. But in two cases it becomes a matter of importance, and at the same time presents more formidable difficulties. It often happens in the industrial arts that an inventor, in attempting to accomplish some important end, is confronted with wants hitherto unknown, which must be satisfied before his greater want can be supplied. In his endeavors to produce an instrument, for instance, by which an ultimate effect can be performed, he finds himself compelled to devise operations by which the instrument may be produced; and for these operations still lesser agencies must be contrived until, in order to attain his principal result, various subordinate exertions of inventive skill must be exhibited, each bringing into being some new

means for the accomplishment of its subordinate end. But these various means, principal and subordinate, though tending toward the fulfilment of a common purpose, are not one invention. Each is complete within itself. Each is a separate idea of means, embodied in a separate instrument or operation, having its own essential factors, and capable of independent use.[1] A patent for the means in which the efforts of the inventor culminate, therefore, does not secure to him the right to the exclusive use of the subordinate means. Each is a true invention and the subject-matter of a patent, and in reference to legal rights and obligations must be regarded independently of all the rest.

§ 153. Combinations and their Elements Distinct Units: "Combination" Defined.

This doctrine of the unity of an invention becomes especially important in connection with that class of inventions known as "combinations." A combination is an instrument or operation, formed by uniting two or more subordinate instruments or operations in a new idea of means.[1] In one

§ 152. [1] Practical illustrations of this truth are found in cases where the inventor has not only devised a new product but the process by which it is produced, or constructed a new machine some of the subordinate parts of which are also new; or invented a new manufacture as well as the instruments by which it is made. In all such cases he is entitled to protect each of his inventions; sometimes under a single patent, sometimes under separate patents, according to their relation to each other. Otherwise his inventive acts would go unrewarded, since if only his ultimate invention could be patented, or the others were protected only as embraced within it, the subordinate inventions would become public property for every other purpose except the one for which they were specifically devised by him.

See *Ex parte* Bancroft (1881), 20 O. G. 1893.

That the same rule applies when the same inventor has invented both the elements of a combination and the combination as a whole, see Holly *v.* Vergennes Mach. Co. (1880), 18 O. G. 1177; 18 Blatch. 327; 4 Fed. Rep. 74; Herring *v.* Nelson (1877), 12 O. G. 753; 14 Blatch. 293; 3 Bann. & A. 55; Stevens *v.* Pritchard (1876), 10 O. G. 505.

§ 153. [1] In *Ex parte* Marshall (1883), 25 O. G. 882, Butterworth, Com.: (882)

"1. What is a combination, using the term in its generic sense?

"2. What is a patentable combination?

"Considered as a generic term, a combination may be defined to be *a co-ordination of individual functions, so as to constitute a common function. Co-ordination* necessarily implies *some modification* of the *individual* function

sense every invention is a combination, since every art and article is composed of elements which by inventive genius have been brought together to serve a common use. But the distinction between a combination in this general sense, and that in which the term is technically employed in Patent Law, seems to be this: that in a patentable combination every subordinate element must, in its separate state, have been an operative means, capable of discharging its own peculiar functions and producing its own physical effects, and also must, while in the combination, still perform its individual functions and, except perhaps in chemical compositions, retain its individual identity.

§ 154. Combination not a mere Aggregation.

Where operations or instruments are thus united, one of two results must follow. Either each element remains unchanged in function and effect; or by the action of the elements upon each other, or their joint action on their common object, they perform additional functions and accomplish additional effects. The former union is a mere collocation or aggregation of the elements.[1] Although they have been

of *each part* as it existed *prior* to the combination. This principle is recognized and asserted by the Supreme Court of the United States in many cases, notably Pickering *et al. v.* McCullough *et al.*, (14 Otto, 310,) Hailes *v.* Van Wormer, (20 Wall. 353,) and in case of J. D. Sarven *v.* Elihu Hall & Co., (U. S. C. C. District of Conn., reported in 11 Blatchf. 295.) To be patentable a combination must conform to the requirements of the definition given above, and must also contain two other elements — that is to say, there must be a *combination*. That combination must be *novel*. It must be *useful*."

In Yale & Greenleaf Mfg. Co. *v.* North (1867), 3 Fisher, 279, Shipman, J.: (287) "A combination in mechanism must consist of distinct mechanical parts, having some relation to each other, and each having some function in the organism." 5 Blatch. 455 (461).

That the combination of a new device with an existing machine is patentable, see Locomotive Engine Safety Truck Co. *v.* Penna. R. R. Co. (1874), 10 Phila. 252; 1 Bann. & A. 470; 6 O. G. 927.

That in a patent for a combination, the whole combination as such must be original with the inventor or the patent will be void, see Holliday *v.* Rheem (1852), 18 Pa. St. 465.

§ 154. [1] In Hoffman *v.* Young (1880), 2 Fed. Rep. 74, Butler, J.: (77) "A mere aggregation of old parts, without any new result issuing from their united action, is not patentable. The parts must combine in operation, and by their joint effect produce a new result. . . . It would seem . . . that two things are always necessary. *First,*

brought together in an apparent organism and rendered more available for use, they still remain the same distinct and in-

a novel assemblage of parts, exhibiting invention; *Second*, the co-operation of the parts in producing a new result. By the term co-operate, however, the courts do not mean merely acting together or simultaneously, but unitedly to a common end, a unitary result. Each and every part must have its sub-function to perform, and each must have a certain relation to, and dependence upon, the other." 18 O. G. 794 (794); 5 Bann. & A. 316 (318); 14 Phila. 428 (429).

In Reckendorfer *v.* Faber (1874), 5 O. G. 697, Woodruff, J.: (700) "When the functions and uses of each are unaffected by the union and the means of uniting has no novelty, it is not obvious, certainly, that anything of invention can be alleged of the combined implements. (Sawyer *v.* Bixby, 9 Blatch. 362.) That the aggregated result may be very convenient, may, for that reason, be popular, and may find a ready sale, and that such sales are very large and show a great demand does not determine the question. As suggested in several cases relating to aggregation as distinguished from patentable combinations, the aggregate result may be the production of a better structure as an aggregate than was ever before produced, and yet, for the lack of novelty of device or new result produced by the aggregation and due thereto, it may have no patentable quality." 12 Blatch. 68 (79); 1 Bann. & A. 229 (239).

In Hailes *v.* Van Wormer (1873), 20 Wall. 353, Strong, J.: (368) "Merely bringing old devices into juxta-position, and then allowing each to work out its own effect without the production of something novel, is not invention." 5 O. G. 89 (90).

That a union of elements is a mere aggregation unless by their united action they perform some function which they do not separately discharge, see Combined Patents Can Co. *v.* Lloyd (1882), 15 Phila. 485; 11 Fed. Rep. 153.

That collocation or aggregation of elements is not combination, see Thatcher Heating Co. *v.* Burtis (1887), 121 U. S. 286; 39 O. G. 587; Hasselman *v.* Gaar (1886), 29 Fed. Rep. 318; Stephenson *v.* Brooklyn R. R. Co. (1885), 114 U. S. 149; 31 O. G. 263; Mosler Safe & Lock Co. *v.* Mosler (1885), 31 O. G. 1689; 22 Fed. Rep. 901; Bussey *v.* Excelsior Mfg. Co. (1884), 110 U. S. 131; 26 O. G. 733; Hayes *v.* Bickelhoupt (1884), 22 Blatch. 463; 29 O. G. 367; 21 Fed. Rep. 566; Stutz *v.* Armstrong (1884), 20 Fed. Rep. 843; 28 O. G. 367; Double Pointed Tack Co. *v.* Two Rivers Mfg. Co. (1883), 109 U. S. 117; 25 O. G. 1075; Clark Pomace Holder Mfg. Co. *v.* Ferguson (1883), 21 Blatch. 376; 17 Fed. Rep. 79; 24 O. G. 1090; Wood *v.* Packer (1883), 17 Fed. Rep. 650; *Ex parte* Marshall (1883), 25 O. G. 882; Thatcher Heating Co. *v.* Burtis (1882), 22 O. G. 262; 12 Fed. Rep. 569; Perry *v.* Co-operative Foundry Co. (1882), 20 Blatch. 498; 22 O. G. 1623; 12 Fed. Rep. 436; Wilson Packing Co. *v.* Chicago Packing & Provision Co. (1882), 105 U. S. 566; 21 O. G. 1689; Combined Patents Can Co. *v.* Lloyd (1882), 11 Fed. Rep. 153; 15 Phila. 485; Pickering *v.* McCullough (1881), 104 U. S. 310; 21 O. G. 73; Strobridge *v.* Landers (1881), 21 O. G. 1027; 11 Fed. Rep. 880; 20 Blatch. 73; Edgarton *v.* Furst & Bradley Mfg. Co. (1881), 21 O. G. 261; 10 Bissell, 402; 9 Fed. Rep. 450; Fisher *v.* Commissioner (1881), 1 Mackey, 212; 20 O. G. 957; Hoffman *v.* Young (1880), 14 Phila. 428; 2 Fed. Rep.

dependent means, still acting as so many separate units and not co-operating with each other to perform additional functions and accomplish additional results. Such unions, therefore, are not the creation of new means. They do not involve an exercise of the inventive faculties, nor can they be protected by a patent.

§ 155. Combination a New Means.

But when these elements are so united that by their reciprocal influence upon each other, or their joint action on their common object, they perform additional functions and accomplish additional results, the union is a true combination.[1]

74 ; 18 O. G. 794 ; 5 Bann. & A. 316 ; Doubleday *v.* Roess (1880), 11 Fed. Rep. 737 ; 22 O. G. 861 ; Slawson *v.* Grand St. R. R. Co. (1880), 4 Fed. Rep. 531 ; 17 Blatch. 512 ; Double Pointed Tack Co. *v.* Two Rivers Mfg. Co. (1880), 3 Fed. Rep. 26 ; 18 O. G. 683 ; 9 Bissell, 258 ; Double Pointed Tack Co. *v.* Mann (1880), 5 Bann. & A. 465 ; Perfection Window Cleaner Co. *v.* Bosley (1880), 5 Bann. & A. 449 ; 9 Bissell, 385 ; 2 Fed. Rep. 574 ; Alcott *v.* Young (1879), 16 Blatch. 134 ; 16 O. G. 403 ; 4 Bann. & A. 197 ; Webster Loom Co. *v.* Higgins (1879), 4 Bann. & A. 88 ; 15 Blatch. 446 ; 16 O. G. 675 ; Kerosene Lamp Heater Co. *v.* Littell (1878), 3 Bann. & A. 312 ; 13 O. G. 1009 ; Bussey *v.* Wager (1876), 9 O. G. 300 ; Sawyer *v.* Bixby (1872), 1 O. G. 165 ; 5 Fisher, 283 ; 9 Blatch. 361 ; Sarven *v.* Hall (1872), 1 O. G. 437 ; 9 Blatch. 524 ; 5 Fisher, 415 ; Swift *v.* Whisen (1867), 3 Fisher, 343 ; 2 Bond, 115.

That if the connecting means in an aggregation are new they may be an invention, but the claims of the patent must rest on these, see Thatcher Heating Co. *v.* Burtis (1887), 121 U. S. 286 ; 39 O. G. 587.

That no combination is patentable unless each element qualifies every other, producing a new device or a result due to a co-operation of all the forces, distinct from the sum of their collective action, see Peard *v.* Johnson (1885), 23 Fed. Rep. 507 ; 32 O. G. 895 ; Clark Pomace Holder Co. *v.* Ferguson (1883), 21 Blatch. 376 ; 17 Fed. Rep. 79 ; 24 O. G. 1090 ; Pickering *v.* McCullough (1881), 104 U. S. 310 ; 21 O. G. 73 ; Swift *v.* Whisen (1867), 2 Fisher, 343 ; 2 Bond, 115.

That to place old elements in juxtaposition, without a new function or effect, is not combination, see Dosh *v.* A. J. Medlar Co. (1887), 40 O. G. 1242 ; Thatcher Heating Co. *v.* Burtis (1887), 121 U. S. 286 ; 39 O. G. 587 ; Troy Laundry Mach. Co. *v.* Bunnell (1886), 27 Fed. Rep. 810 ; 23 Blatch. 558.

That a union of parts having no common purpose is not a combination, see Tower *v.* Bemis & Call Hardware & Tool Co. (1884), 19 Fed. Rep. 498.

§ 155. [1] In Stutz *v.* Armstrong (1884), 20 Fed. Rep. 843, Acheson, J.: (847) "Now, certainly there is no patentable combination in a mere aggregation of old devices which produce no new effect or result due to their concurrent or successive joint and co-operating action. But it is by no means essential to a patentable combination . . . that the several devices or elements thereof

While every element remains a unit, retaining its own individuality and identity as a complete and operative means,

should coact upon each other; it is sufficient if all the devices co-operate with respect to the work to be done, and in furtherance thereof, although each device may perform its own particular function only." 28 O. G. 367 (369).

In Stephenson *v.* Brooklyn Railroad Co. (1885), 114 U. S. 149, Woods, J.: (157) "A combination is patentable only when the several elements of which it is composed produce by their joint action a new and useful result, or an old result, in a cheaper or otherwise more advantageous way." 31 O. G. 263 (265).

In Clark Pomace Holder Co. *v.* Ferguson (1883), 21 Blatch. 376, Coxe, J.: (378) "All the component parts must so enter into a combination of old elements, that each qualifies every other. . . . If the elements of the combination act independently of each other, or, if one element acts independently of the others, it is an aggregation of parts, and not entitled to protection as a combination." 17 Fed. Rep. 79 (80); 24 O. G. 1090 (1091).

In this opinion there is a confusion of combination and result, as when the judge says that a new and useful result must be produced and "unless this is the case, even though the elements act reciprocally and in combination, the requirements of the law are not satisfied. The combination must be new; so must the result." If this means anything more than that the elements in combination must so coact as to produce a result essentially different from that obtained by their separated or aggregated action, it is erroneous. The result need not be new in any other sense than this. See § 156, note 1, *post*.

In Hall *v.* Johnson (1883), 23 O. G. 2411, Marble, Com.: (2412) "Combinations may be made up of parts entirely new or entirely old, or part new and part old; but if the parts when brought together so co-act as to produce a new and beneficial result, the party so bringing them together has made an invention, and is entitled, if he makes claim thereto, to a patent therefor. If new elements are added to an imperfect combination, and if by the addition of such new elements the combination is made perfect and operative, the person who adds such elements is entitled to claim the new combination."

In Wood *v.* Packer (1883), 17 Fed. Rep. 650, Nixon, J.: (651) "In a combination, the elemental parts must be so united that they will dependently co-operate and produce some new and useful result."

In Pickering *v.* McCullough (1881), 104 U. S. 310, Matthews, J.: (318) "In a patentable combination of old elements, all the constituents must so enter into it as that each qualifies every other; to draw an illustration from another branch of the law, they must be joint tenants of the domain of the invention, seized each of every part, *per my et per tout*, and not mere tenants in common, with separate interests and estates. It must form either a new machine of a distinct character and function, or produce a result due to the joint and co-operating action of all the elements, and which is not the mere adding together of separate contributions. Otherwise it is only a mechanical juxtaposition, and not a vital union." 21 O. G. 73 (75).

In Hailes *v.* Van Wormer (1870), 7 Blatch. 443, Woodruff, J.: (452) "The mere addition of an old device producing a specific result, to another old device producing its own result, in such wise that their combination produces these same two results, and no other, is not invention. . . . On the other hand, if

their combination embodies an entirely new idea of means, and thus becomes another unit, whose essential attributes depend on the co-operative union of the elements of which it is composed.[2] Such a combination is a different invention from the elements themselves, whether considered in their separate or their aggregated state, the method of their co-

the combination itself produces a new and useful result, not due to the separate action of either, nor attained thereby, but due to the co-operative or reciprocal action of the combined devices, a totally different question arises; for, obviously, invention generally (as distinguished from discovery) consists in new modes of employing what was before known, so as to produce thereby effects either not produced before, or not produced in that manner, or not produced so usefully. So, also, if the combination of the old devices be supplemented by other and new devices co-operating therewith, and thereby a new and useful result is produced, not attained by the action of the old devices, there, also, is invention."

But that the elements may coact upon each other only, see Hailes *v.* Van Wormer (1870), 7 Blatch. 443; or upon their common object only, see Stutz *v.* Armstrong (1884), 20 Fed. Rep. 843; 28 O. G. 367; Stilwell & Bierce Mfg. Co. *v.* Cincinnati Gas Light & Coke Co. (1875), 1 Bann. & A. 610; 7 O. G. 829.

That in a combination there must be coaction of the elements and a new function, see Scott Mfg. Co. *v.* Sayre (1885), 26 Fed. Rep. 153; 35 O. G. 255.

That the invention is a combination if some features of each of the elements coact, see Strobridge *v.* Landers (1881), 21 O. G. 1027; 11 Fed. Rep. 880; 20 Blatch. 73.

[2] That a combination is an entirety, a unit, see Rowell *v.* Lindsay (1881), 10 Bissell, 217; 6 Fed. Rep. 290; 19 O. G. 1565; Williams *v.* Rome, Watertown, & Ogdensburg R. R. Co. (1878), 15 O. G. 653; 15 Blatch. 200; 3 Bann. & A. 413; Schumacher *v.* Cornell (1877), 96 U. S. 549; *Ex parte* Gould (1874), 5 O. G. 121; 1 MacArthur, 410; Westlake *v.* Cartter (1873), 6 Fisher, 519; 4 O. G. 630; Watson *v.* Cunningham (1871), 4 Fisher, 528; Densmore *v.* Schofield (1868), 4 Fisher, 148; Case *v.* Brown (1864), 2 Wall. 320; Vance *v.* Campbell (1861), 1 Black, 427.

That the identity and individuality of a combination depend neither upon its elements alone, nor upon the manner of their co-operation alone, but upon the union of certain elements in a certain mode of co-operation, see Allis *v.* Buckstaff (1882), 13 Fed. Rep. 879; 22 O. G. 1705; Dederick *v.* Cassell (1881), 20 O. G. 1233; 9 Fed. Rep. 306; Rowell *v.* Lindsay (1881), 6 Fed. Rep. 290; 10 Bissell, 217; 19 O. G. 1565; Hebeman *v.* Whitman (1880), 5 Bann. & A. 530; Water Meter Co. *v.* Desper (1879). 01 U. S. 332; Williams *v.* Boston & Albany R. R. Co. (1879), 16 O. G. 906; 17 Blatch. 21; 4 Bann. & A. 441; American Whip Co. *v.* Lombard (1878), 14 O. G. 900; 4 Clifford, 495; 3 Bann. & A. 598; Sanford *v.* Merrimac Hat Co. (1876), 4 Clifford, 494; 10 O. G. 466; 2 Bann. & A. 408; Converse *v.* Cannon (1873), 2 Woods, 7; 9 O. G. 105; Locomotive Engine Safety Truck Co. *v.* Erie Railway Co. (1872), 10 Blatch. 292; 3 O. G. 93; 6 Fisher, 187; Le Roy *v.* Tatham (1859), 22 How. 132; Curtis *v.* Platt (1864), 11 L. T. Rep. N. S. 245, and cases cited under § 282, *post*.

operation in the combination being the result of the inventive act.[3] Whether the elements are new or old,[4] and whether

[3] That the union of the elements in a mode of co-operation is the true inventive act in a combination, see Fuller v. Yentzer (1876), 94 U. S. 288; 11 O. G. 551; Smith v. Marshall (1876), 10 O. G. 375; 2 Bann. & A. 371; Gill v. Wells (1874), 22 Wall. 1; Harrison v. Anderson Foundry Co. (1876), L. R. 1 App. 574.

Thus that though the elements remain unchanged and the effect produced by the combination is the same, yet the mode of combining the elements may differ, and if so the combination is a different invention, see Allis v. Buckstaff (1882), 13 Fed. Rep. 879; 22 O. G. 1705; Pattee v. Moline Plow Co. (1881), 10 Bissell, 377; 9 Fed. Rep. 821; 22 O.G. 173; Dederick v. Cassell (1881), 9 Fed. Rep. 306; 20 O. G. 1233; Hebeman v. Whitman (1880), 5 Bann. & A. 530; Gallahue v. Butterfield (1872), 10 Blatch. 232; 2 O. G. 645; 6 Fisher, 203; Woodward v. Dinsmore (1870), 4 Fisher, 163; Murray v. Clayton (1872), L. R. 7 Ch. Ap. 570; Curtis v. Platt (1864), 11 L. T. Rep. N. S. 245; Carpenter v. Smith (1841), 1 Web. 530.

That the elements and the combination are separate inventions, see McMillin v. Rees (1880), 5 Bann. & A. 269; 17 O. G. 1222; 1 Fed. Rep. 722.

[4] In Dederick v. Cassell (1881), 20 O. G. 1233, Butler, J.: (1234) "If it be true . . . that all the parts embraced in the plaintiff's [combination] may be found in the various devices previously used [for the same purpose], the plaintiff's right to the new combination which he constructed would be none the less complete. It will not answer to say this required no invention, that any mechanic might have selected the parts and combined them. The same might be said with equal force in almost every instance in which a patent for combination is issued. The fact that no mechanic did select and combine the parts and produce such a [combination], notwithstanding the great need for it, is a sufficient answer to the suggestion." 9 Fed. Rep. 306 (309).

In Hoe v. Cottrell (1880), 18 O. G. 59, Shipman, J.: (61) "In the determination of the question whether there was invention in any particular combination the important point is to ascertain whether novelty and utility existed. It is true that these requisites may result from more mechanical skill, and a new and useful combination may be formed by the mere mechanical addition of an old member to an old set of members; but when a device has a new mode of operation which accomplishes beneficial results 'courts look with favor upon it,' and are not exacting as to the degree of inventive skill which was required to produce the new result. There must be some, but a little will suffice." 17 Blatch. 546 (552); 1 Fed. Rep. 597 (602); 5 Bann. & A. 256 (262).

In Imhaeuser v. Buerk (1879), 101 U. S. 647, Clifford, J.: (660) "Where the thing patented is an entirety, consisting of a single device or combination of old elements incapable of division or separate use, the respondent cannot escape the charge of infringement by alleging or proving that a part of the entire invention is found in one prior patent, printed publication, or machine, and another part in another prior exhibit, and still another part in a third exhibit, and from the three or any greater number of such exhibits draw the conclusion that the patentee is not the original and first inventor of the patented improvement." 17 O. G. 795 (797).

In Hailes v. Van Wormer (1873), 20 Wall. 353, Strong, J.: (368) "It must be conceded that a new combination, if

they coact successively or simultaneously is of no impor-

it produces new and useful results, is patentable, though all the constituents of the combination were well known and in common use before the combination was made." 5 O. G. 89 (90).

In Blake *v.* Stafford (1868), 6 Blatch. 195, Shipman, J.: (205) "The question is not whether the elements are new, but whether the combination is new. Though the separate parts are all as old as the art of the mechanic, if they are organized into a new machine, having a new mechanical operation, and the organization of this new machine involved the exercise of original thought and is productive of useful results, then it is patentable." 3 Fisher, 294 (305).

In The Union Sugar Refinery *v.* Matthiesson & Co. (1865), 3 Clifford, 639, Clifford, J.: (659) "A patented improvement, consisting of old elements, cannot be proved to be invalid by showing some one of the elements in some prior machine, and another in another prior machine, until it is shown that all the elements which constitute the improvement were in prior use, because the theory of such a patent is, that the elements are old, and the invention consists in a new combination, whereby a new and useful result is obtained." 2 Fisher, 600 (622).

In Ryan *v.* Goodwin (1839), 3 Sumner, 514, Story, J.: (518) "The true question is, whether the combination of materials by the patentee is substantially new. Each of these ingredients may have been in the most extensive and common use, and some of them may have been used for matches, or combined with other materials for other purposes. But if they have never been combined together in the manner stated in the patent, but the combination is new, then, I take it, the invention of the combination is patentable." 1 Robb, 725 (729).

That a new union of old elements is a new combination, see Shaver *v.* Skinner Mfg. Co. (1887), 41 O. G. 232; Hoe *v.* Knap (1886), 27 Fed. Rep. 204; 36 O. G. 1244; May *v.* County of Fond du Lac (1886), 27 Fed. Rep. 691; Scott Mfg. Co. *v.* Sayre (1885), 26 Fed. Rep. 153; 35 O. G. 255; Bell *v.* U. S. Stamping Co. (1884), 19 Fed. Rep. 312; 22 Blatch. 27; Webster Loom Co. *v.* Higgins (1882), 105 U. S. 580; 21 O. G. 2031; Gottfried *v.* Crescent Brewing Co. (1882), 13 Fed. Rep. 479; 22 O. G. 1447; Gale Mfg. Co. *v.* Prutzman (1880), 5 Bann. & A. 154; 17 O. G. 743; Wisner *v.* Grant (1880), 5 Bann. & A. 215; 17 O. G. 447; 7 Fed. Rep. 485; Williams *v.* Rome, Watertown, & Ogdensburg R. R. Co. (1879), 15 O. G. 653; 15 Blatch. 200; 3 Bann. & A. 413; Willimantic Linen Co. *v.* Clark Thread Co. (1879), 4 Bann. & A. 133; Bates *v.* Coe (1878), 98 U. S. 31; 15 O. G. 337; Albright *v.* Celluloid Harness Trimming Co. (1877), 12 O. G. 227; 2 Bann. & A. 629; Booth *v.* Parks (1874), 1 Flippin, 381; 1 Bann. & A. 225; *In re* Gould (1874), 1 MacArthur, 410; 5 O. G. 121; Eickemeyer Hat Blocking Mach. Co. *v.* Pearce (1873), 10 Blatch. 403; 3 O. G. 150; 6 Fisher, 219; Child *v.* Boston & Fairhaven Iron Works Co. (1873), 6 Fisher, 606; 5 O. G. 61; Holmes, 303; Forsyth *v.* Clapp (1873), 6 Fisher, 528; 4 O. G. 527; Holmes, 278; Westlake *v.* Cartter (1873), 6 Fisher, 519; 4 O. G. 636; Watson *v.* Cunningham (1871), 4 Fisher, 528; Woodward *v.* Dinsmore (1870), 4 Fisher, 163; Woodman *v.* Stimpson (1866), 3 Fisher, 98; Emigh *v.* Chicago, Burlington, & Quincy R. R. Co. (1863), 1 Bissell, 400; 2 Fisher, 387; Latta *v.* Shawk (1859), 1 Fisher, 465; 1 Bond, 259; Whipple *v.* Middlesex Co. (1859), 4 Fisher, 41; Furbush *v.* Cook (1857), 2 Fisher, 668; Pitts *v.* Edmonds (1857), 1 Bissell, 168; 2 Fisher, 52; Carr *v.*

tance.[5] To unite them in a new means by the exercise of

Rice (1850), 1 Fisher, 198; Pitts *v.* Wemple (1855), 6 McLean, 558; Crosby *v.* Lapourrillo (1854), Taney, 374; Buck *v.* Hermance (1849), 1 Blatch. 398; Washburn *v.* Gould (1844), 3 Story. 122; 2 Robb, 206; Pitts *v.* Whitman (1843), 2 Story, 609; 2 Robb, 189; Earle *v.* Sawyer (1825), 4 Mason, 1; 1 Robb, 490; Pennock *v.* Dialogue (1825), 4 Wash. 538; 1 Robb, 466; Barrett *v.* Hall (1818), 1 Mason, 447; 1 Robb, 207; Evans *v.* Eaton (1816), 1 Peters C. C. 322; 1 Robb, 68; Harrison *v.* Anderston Foundry Co. (1876), L. R. 1 App. 574; Murray *v.* Clayton (1872), L. R. 7 Ch. Ap. 570; Cannington *v.* Nuttall (1871), L. R. 5 H. L. 205; Morton *v.* Middleton (1863), 1 Cr. S. 3d Series, 721; Lister *v.* Leather (1858), 8 El. & B. 1004; Bovill *v.* Keyworth (1857), 7 El. & B. 725; Cornish *v.* Keene (1837), 3 Bing. N. C. 570; 2 Abb. P. C. 406; Brunton *v.* Hawkes (1821), 1 Carp. 410; 1 Abb. P. C. 336; Patric *v.* Sylvester (1876), 23 Grant Ch. (Can.) 573; Emery *v.* Isedale (1861), 11 Can. C. P. 106.

That in a combination of old elements other evidence of inventive skill than mere novelty and utility must appear, see Enterprise Mfg. Co. *v.* Sargent (1886), 28 Fed. Rep. 185; 37 O. G. 891.

That a combination of old elements may be a new invention, though many of them were combined in a similar device before, see Donoughe *v.* Hubbard (1886), 27 Fed. Rep. 742; 35 O. G. 1561.

That changes in the elements so as to enable them to enter into combination may be invention, see Troy Laundry Mach. Co. *v.* Bunnell (1886), 27 Fed. Rep. 810; 23 Blatch. 558.

[5] In McKesson *v.* Carndick (1881), 21 O. G. 137; Blatchford, J.: (138) "It is also objected that there is no combination between the comb-bar and needles and the pill-holder, but only an aggregation of parts. This is an erroneous view. The pill-holder holds the pill while the needle carried by the comb-bar is being thrust into the pill. The concert of action takes place when the needle enters the pill, and although such concert of action continues only from the time the needle enters the pill until the pill is removed by the needle from the holder, yet the combination made by such concert of action continues as long as it needs to continue, and the concert of action could not exist at all so as to impale the pill on the needle if the pill were not carried by the holder and the needle were not carried by the comb-bar. So, when the needle enters the pill, there is a combination or concert of action between the comb-bar and needle and the holder carrying the pill." 19 Blatch. 158 (161).

In Hoffman *v.* Young (1880), 14 Phila. 428, Butler, J.: (429) "The parts must combine in operation, and by their joint effect produce a new result. They need not act simultaneously. If so arranged that the successive action of each contributes to produce the result, which when obtained is the product of all the parts, viewed as a whole, a valid claim for this combination may be sustained. . . . By the term 'co-operate,' however, the courts do not mean, merely acting together, or simultaneously, but unitedly, to a common end — a unitary result. Each and every part must have its sub-function to perform, and each must have a certain relation to, and dependence upon, the other." 18 O. G. 794 (794); 2 Fed. Rep. 74 (77); 5 Bann. & A. 316 (318).

In Furbush *v.* Cook (1857), 2 Fisher, 668, Curtis, J.: (669) "To make a valid claim for a combination, it is not neces-

inventive skill is invention, and renders the combination, as an entirety, the subject-matter of a patent.

§ 156. Fact of Combination shown by its Result.

This union of elemental instruments or operations in a new operation or instrument must necessarily produce effects beyond the sum of the effects producible by all the elements in their separated state.[1] This is often the only test by which

sary that the several elementary parts of the combination should act simultaneously. If those elementary parts are so arranged that the successive action of each contributes to produce some one practical result, which result, when attained, is the product of the simultaneous or successive action of all the elementary parts, viewed as one entire whole, a valid claim for thus combining those elementary parts may be made."

Further, that the co-operation of the elements may be either successive or simultaneous, see Railway Register Mfg. Co. *v.* Broadway & Seventh Ave. R. R. Co. (1884), 22 Fed. Rep. 655 ; 30 O. G. 180 ; Hoe *v.* Cottrell (1880), 1 Fed. Rep. 597 ; 17 Blatch. 546 ; 18 O. G. 59 ; 5 Bann. & A. 256 ; Herring *v.* Nelson (1877), 14 Blatch. 293 ; 12 O. G. 753 ; 3 Bann. & A. 55 ; Birdsall *v.* McDonald (1874), 6 O. G. 682 ; 1 Bann. & A. 165.

That where one lock is set in motion by the injury done to another, it is a true combination, see Newbury *v.* Fowler (1886), 28 Fed. Rep. 454 ; 36 O. G. 817.

That if the elements coact for a time and then act separately it is a combination, see McKesson *v.* Carndick (1881), 21 O. G. 137; 19 Blatch. 158.

This doctrine reaches its present extreme limit in the case of the Yale Lock Mfg. Co. *v.* Norwich National Bank (1881), 19 Blatch. 123 ; 6 Fed. Rep. 377, where it is held that if two elements, when combined, produce only their separate results, but each result so operates in connection with the other that a net result is obtained beyond what either could accomplish alone, or both could accomplish if separately used, there is co-operation and a true combination.

That elements acting successively and independently are not a combination, see Yale Lock Mfg. Co. *v.* Berkshire Nat. Bank (1883), 17 Fed. Rep. 531 ; (denying Lock Case, 6 Fed. Rep. 377 ; 19 Blatch. 123 *ante*).

That dies used in succession and each doing its own work only are not a combination, see Beecher Mfg. Co. *v.* Atwater Mfg. Co. (1885), 114 U. S. 523 ; 31 O. G. 1306.

§ 156. [1] It is frequently stated in the decisions of the courts that no new combination can be produced unless its result or effect be also new. This is to be understood as referring to the effect of the combination as compared with the effect of its elements in their separate or aggregated state, not as compared with the effect of other combinations of the same or different elements. It is true that no combination can have been invented unless it is capable of producing effects beyond those resulting from the use of any or all the elements in their separated state. But it is not true that the same elements cannot be grouped into different combinations, governed by different co-operative laws, although their practical effect as arts or instruments may be the same. The decisions are to be read with this distinction in mind.

In Niles Tool Works *v.* Betts Ma-

a combination can be distinguished from an aggregation, and is the one usually applied by the courts. And it is certainly

chine Co. (1886), 27 Fed. Rep. 301, Wales, J. : (305) "The propositions established by these cases are that a combination is patentable (1) if it produces new and useful results, though all the constituents of the combination were well known and in common use before the combination was made, provided the results are a product of the combination, and not a mere aggregate of several results, each the product of one of the combined elements; (2) if it produces a different force, effect, or result in the combined forces or processes from that given by their separate parts, and a new result is produced by their union; (3) if it either forms a new machine of distinct character or formation, or produces a result which is not the mere aggregate of separate contributions, but is due to the joint and co-operating action of all the elements; (4) when the several elements of which it is composed produce, by their joint action, *either a new and useful result, or an old result in a cheaper or otherwise more advantageous way*. . . These are but varied expressions of the same doctrine."

In Loom Co. *v.* Higgins (1882), 105 U. S. 580, Bradley, J.: (591) "It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of known elements produce a new and beneficial result, never attained before, it is evidence of invention." 21 O. G. 2031 (2035).

In Slawson *v.* Grand St., Prospect Park, & Flatbush R. R. Co. (1880), 4 Fed. Rep. 531, Benedict, J. : (534) "In order to constitute a patentable combination, the result must be some effect different from the effect of the separate parts, and produced by the combined forces. A new result must arise from the reunion of the elements of the combination, and not simply from the separate action of each element." 17 Blatch. 512 (515).

In Williams *v.* The Rome, Watertown, & Ogdensburg R. R. Co. (1879), 15 O. G. 653, Blatchford J.: (656) "The doctrine of Hailes *v.* Van Wormer (20 Wall. 353) is, that a mere combination, if it produces new and useful results, is patentable, though all the constituents of the combination were well known and in common use before the combination was made; that the results, however, must be a product of the combination, and not a mere aggregate of several results, each the complete product of one of the combined elements; that merely bringing old devices into juxta-position, and then allowing each to work out its own effect without the production of something novel, is not invention; and that no one, by bringing together several old devices without producing a new and useful result, the joint product of the elements of the combination, and something more than an aggregate of old results, can acquire a right to prevent others from using the same devices, either singly or in other combinations." 15 Blatch. 200 (211); 3 Bann. & A. 413 (423).

In Hailes *v.* Van Wormer (1873), 20 Wall. 353, Strong, J. : (368) "But the results must be a product of the combination, and not a mere aggregate of several results each the complete product of one of the combined elements. Combined results are not necessarily a novel result, nor are they an old result obtained in a new and improved manner. Merely bringing old devices into juxtaposition, and then allowing each to work out its own effect without the production of something novel, is not invention. No one by bringing together several old devices without pro-

reliable. For since diversity of end necessitates diversity of means, if the new combination accomplishes results that could not have been achieved either by its individual or collective

ducing a new and useful result the joint product of the elements of the combination and something more than an aggregate of old results, can acquire a right to prevent others from using the same devices, either singly or in other combinations, or, even if a new and useful result is obtained, can prevent others from using some of the devices, omitting others, in combination." 5 O. G. 89 (90).

That no combination is a new invention unless it presents a new force, or effect, or result, see Sawyer *v.* Miller (1882), 4 Woods, 472; 12 Fed. Rep. 725; Reckendorfer *v.* Faber (1876), 92 U. S. 347; 10 O. G. 71.

That a combination is patentable only when its elements produce by their joint action a new and useful effect, or an old effect in a better or cheaper manner, see Railway Register Mfg. Co. *v.* North Hudson Co. R. Co. (1886), 26 Fed. Rep. 411; Railway Register Mfg. Co. *v.* North Hudson Co. R. Co. (1885), 24 Fed. Rep. 793; 33 O. G. 355; Stephenson *v.* Brooklyn R. R. Co. (1885), 114 U. S. 149; 31 O. G. 263.

For other cases in which the novelty of the result is stated to be an essential characteristic of the new combination, see Millner *v.* Voss (1882), 4 Hughes, 262; Simpson *v.* Davis (1882), 20 Blatch. 413; 12 Fed. Rep. 144; *Ex parte* Fisher (1881), 20 O. G. 957; *Ex parte* Skinner (1881), 19 O. G. 662; Packing Co. Cases (1881), 105 U. S. 566; 21 O. G. 1689; *Ex parte* Strong (1880), 17 O. G. 446; Slawson *v.* Grand St. Prospect Park, & Flatbush R. R. Co. (1880), 17 Blatch. 512; 4 Fed. Rep. 531; Sharp *v.* Tifft (1880), 17 O. G. 1282; 2 Fed. Rep. 697; 18 Blatch. 132; 5 Bann. & A. 399; Double Pointed Tack Co. *v.* The Two Rivers Mfg. Co. (1880), 18 O. G. 683; 9 Bissell, 258; 3 Fed. Rep. 26; Gottfried *v.* Philip Best Brewing Co. (1879), 17 O. G. 675; 5 Bann. & A. 4; Webster Loom Co. *v.* Higgins (1879), 16 O. G. 675; 15 Blatch. 446; 4 Bann. & A. 88; Alcott *v.* Young (1879), 16 Blatch. 134; 16 O. G. 403; 4 Bann. & A. 197; Williams *v.* Boston & Albany R. R. Co. (1879), 16 O. G. 906; 17 Blatch. 21; 4 Bann. & A. 441; Kerosene Lamp Heater Co. *v.* Littell (1878), 13 O. G. 1009; 3 Bann. & A. 312; Reckendorfer *v.* Faber (1876), 92 U. S. 347; 10 O. G. 71; Reckendorfer *v.* Faber (1874), 12 Blatch. 68; 5 O. G. 697; 1 Bann. & A. 229; Gallahue *v.* Butterfield (1872), 10 Blatch. 232; 2 O. G. 645; 6 Fisher, 203; Sarven *v.* Hall (1872), 1 O. G. 437; 9 Blatch. 524; 5 Fisher, 415; Woodward *v.* Dinsmore (1870), 4 Fisher, 163; Swift *v.* Whisen (1867), 2 Bond, 115; 3 Fisher, 343; Saxby *v.* The Gloucester Wagon Co. (1881), L. R. 7 Q. B. 305; Cannington *v.* Nuttall (1871), L. R. 5 H. L. 205.

That on the other hand this new result need not be new with reference to other combinations even of the same elements, see Allis *v.* Buckstaff (1882), 13 Fed. Rep. 879; 22 O. G. 1705; Pattee *v.* Moline Plow Co. (1881), 10 Bissell, 377; 9 Fed. Rep. 821; 22 O. G. 173; Detroit Lubricator Mfg. Co. *v.* Renchard (1881), 9 Fed. Rep. 293; Murray *v.* Clayton (1872), L. R. 7 Ch. Ap. 570; Curtis *v.* Platt (1864), 11 L. T. Rep. N. S. 245.

That an alleged combination, if not operative without additions not covered by the combination as described, is not an invention, see Torrant *v.* Duluth Lumber Co. (1887), 30 Fed. Rep. 830.

elements, their union must inevitably have brought into action some new or as yet unawakened energy, which constitutes a new and independent means.[2]

[2] Although the characteristics of a combination, as distinguished from a simple invention, will hereafter more clearly appear, their statement in a few general propositions may be appropriate:—

1. A combination is a union of elemental means in a mode of co-operation; and, as such, it necessarily performs functions into which all its elements enter as operative agents, and produces results which depend upon the presence and action of every one of the elements combined.

2. A combination may result either from mechanical ingenuity and experiment or from the exercise of inventive skill; in the latter case only is it an invention, and the subject-matter of a patent.

3. A combination may be composed of elements wholly new, or wholly old, or partly new and partly old; in every case the combination is a means distinct from the elements, whether new or old, and is the proper subject for a different patent; or, if the elements are new inventions of the same inventor, for a different claim in the same patent.

4. Combinations belong to the same legal class as their elemental means; the co-operative union of elemental arts forming a new art; that of elemental machines, a new machine, etc.; the union of elements of different classes, where such union is possible (as of a manufacture with a machine), not being a true combination, but an improvement on the principal invention with which the subordinate is united.

5. The identity of a combination depends upon that of its elemental means and that of the co-operative law under which its elements are united; any substantial change in either means or law destroying its identity and resulting in the final segregation of the elements or in a new and wholly different combination.

6. This dependence of the identity of a combination upon the identity both of its elements and of their co-operative law requires a departure from the rules governing simple inventions upon several points, especially in relation to Equivalents, Double Use, &c.

7. A patented combination is the combination described and claimed in the patent; i. e., it is composed of the described elements coacting under the described co-operative law, whether or not such description correctly enumerates the true elements or sets forth the real mode of their co-operation.

CHAPTER II.

OF THE CLASSES OF PATENTABLE INVENTIONS.

§ 157. Patentable Invention an Operation or an Instrument: "Operation" and "Instrument" Defined.

EVERY invention in the industrial arts is either an operation or an instrument. An operation is an idea of means, embodied in some act or series of acts which is performed by some physical agent either animate or inanimate. An instrument is an idea of means, embodied in some article or combination of articles which, when employed in the manner designed by the inventor, is capable of producing a certain predetermined effect. In an operation the embodiment of the idea is temporary; the conception of the mind being apparent to the senses only while the means is actually accomplishing its ends. In an instrument, on the contrary, the embodiment of the idea is permanent; the conception of the mind being an object of perpetual observation, though often less clearly apprehended by the observer when the instrument is idle than when it is engaged in the performance of its appropriate functions. This difference between an operation and an instrument is essential, and results in some important variations in the rules by which the completeness and patentability of each is to be determined. To one or the other, however, all inventions must belong, and it has been the object of the Patent Laws, both of England and of the United States, to afford the protection of a patent to every improvement in the industrial arts which could properly be included under either of these two heads.

§ 158. Classes of Patentable Operations and Instruments.

Many attempts have been made by the English courts and writers to arrange subordinate classes, to some one of which

each individual invention might be referred. The statute of James I. embraces all under the term, "Manufacture;" but by the application of various definitions, literal and figurative, to this term it has been extended to include almost every possible species of improvement in the arts. In the United States the classification given in the acts of Congress is, perhaps, as complete as the subject will permit. Under the name "Art" it comprises every kind of operation, and divides instruments into four groups: "Machines," "Manufactures," "Compositions of Matter," and "Designs."[1]

SECTION I.

OF AN ART.

§ 159. "Art" Defined.

An art or operation is an act or a series of acts performed by some physical agent upon some physical object, and producing in such object some change either of character or of condition. It is also called a "process," or a "mode of treatment;" and is said to require that "certain things should be done with certain substances in a certain order."[1] It is so far abstract that it is capable of contemplation by the mind apart from any one of the specific instruments by which it is per-

§ 158. [1] In *Ex parte* Blythe (1884), 30 O. G. 1321, Butterworth, Com.: (1322). "It is evident that the words 'art,' 'machine,' 'manufacture,' and 'composition of matter,' were carefully chosen to cover what were regarded as four great and distinct classes of inventions. It is undoubtedly the intention of the law to distinguish as separate inventions 'a new art,' 'a new machine,' 'a new manufacture,' 'a new composition of matter,' 'an improved art,' 'an improved machine,' 'an improved manufacture,' 'an improved composition of matter,'—eight in all. These may be called the 'statutory classes of invention,' between which the lines of division are sharply drawn."

§ 159. [1] In Cochrane *v.* Deener (1876), 94 U. S. 780, Bradley, J.: (788) "A process is a mode of treatment of certain materials to produce a given result. It is an act, or series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as is a piece of machinery. In the language of the patent law, it is an art. The machinery pointed out as suitable to perform the process may or may not be new or patentable; while the process itself may be altogether new, and produce an en-

formed.[2] It is so far concrete that it consists in the application of physical force through physical agents to physical objects, and can thus become apparent to the senses only in connection with some tangible instrument and object.

§ 160. Patentability of an Art formerly Denied: not a "Vendible Substance."

This abstract character of an art was the occasion of much difficulty in the earlier development of Patent Law. Some of the English authors and judges held that an invention, to be useful to the public, must be a "vendible substance;" that unless a new mode of operation created a new "substance" its inventor had conferred no benefit upon the public and was not entitled to a patent; and that whenever a new operation

tirely new result. The process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence." 11 O. G. 687 (689).

That an art is "the application or operation of some element or power of nature or of one subject to another," see Boyd *v.* Cherry (1883), 4 McCrary, 70.

In Corning *v.* Burden (1853), 15 How. 252, Grier, J.: (267) "A process, *eo nomine*, is not made the subject of a patent in our act of Congress. It is included under the general term 'useful art.' An art may require one or more processes or machines in order to produce a certain result or manufacture. The term machine includes every mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result. But where the result or effect is produced by chemical action, by the operation or application of some element or power of nature, or of one substance to another, such modes, methods, or operations, are called processes. A new process is usually the result of discovery; a machine, of invention. The arts of tanning, dyeing, making waterproof cloth, vulcanizing India rubber, smelting ores, and numerous others, are usually carried on by processes, as distinguished from machines. One may discover a new and useful improvement in the process of tanning, dyeing, &c., irrespective of any particular form of machinery or mechanical device. And another may invent a labor-saving machine by which this operation or process may be performed, and each may be entitled to his patent. . . . It is when the term process is used to represent the means or method of producing a result that it is patentable, and it will include all methods or means which are not effected by mechanism or mechanical combinations."

[2] That a patentable process must have an existence independent of the apparatus which performs it, see *Ex parte* Herr (1887), 41 O. G. 463.

That where the function of a machine cannot exist apart from that machine it cannot be a process, see *Ex parte* Herr (1887), 41 O. G. 463.

That the entirely separate action of two machines, each performing its independent function, may not be a process, see *Ex parte* Herr (1887), 41 O. G. 463.

had resulted in a new substance the patentable invention was the substance, and not the operation by which it was produced.[1] This error had its origin in a confusion of the idea

§ 160. [1] The doubt whether a process or art was the subject of a patent found perhaps its fullest and most pointed expression in the case of Boulton and Watt *v.* Bull (1795), 2 H. Bl. 463. Watt had invented a method of lessening the consumption of steam, and consequently of fuel, in engines. This method consisted in a mode of employing existing machines, not in the creation of a new machine nor in the production of any new vendible substance. He described his method as composed of certain "principles." This invention was eventually held to be patentable (Hornblower *v.* Boulton (1799), 8 T. R. 95); but in their opinions in the first case the dissenting judges advanced objections and stated doctrines which for a long time found adherents in the bar and on the bench. Thus Heath, J.: (481) "What then falls within the scope of the proviso [stat. Jac. I.]? Such manufactures as are reducible to two classes. The first class includes machinery, the second substances, (such as medicines), formed by chemical and other processes, where the vendible substance is the thing produced, and that which operates preserves no permanent form. In the first class the machine, and in the second the substance produced, is the subject of the patent. . . . (482) That which is the subject of the patent . . . ought to be that which is vendible, otherwise it cannot be a manufacture. . . . I asked in the argument for an instance of a patent for a *method*, and none such could be produced. I was then pressed with patents for chemical processes, many of which are for a *method*, but that is from an inaccuracy of expression, because the patent in truth is for a vendible substance." 1 Abb. P. C. (76). And Buller, J.: (486) "The method and the mode of doing a thing are the same; and I think it impossible to support a patent for a method only, without having carried it into effect and produced some new substance. But here it is necessary to enquire, what is meant by a principle reduced into practice. It can only mean a practice founded on principle, and that practice is the thing done or made, or in other words the manufacture which is invented. . . . In most of the instances of the different patents mentioned . . . the patents were for the manufacture, and the specification rightly stated the method by which the manufacture was made; but none of them go the length of proving, that the method of doing a thing without the thing being done, or actually reduced into practice, is a good foundation for a patent. When the thing is done or produced, then it becomes the manufacture which is the proper subject of a patent." 1 Abb. P. C. (81). Lord Chief Justice Eyre, taking a broader view, held that a method, as such, was patentable, and says: (492) "It was admitted in the argument at the bar, that the word 'manufacture' in the statute, was of extensive signification, that it applied not only to things made, but to the *practice of making*, to principles carried into practice in a new manner, to new results of principles carried into practice. Let us pursue this admission. Under *things made*, we may class in the first place, new compositions of things, such as manufactures in the most ordinary sense of the word: secondly, all mechanical inventions, whether made to produce old or new effects, for a new piece of mechanism is certainly a thing made. Under the *practice of making* we may class all new artificial manners

of end with that of means. The true and ultimate benefit which the public derive from any invention resides in the

of operating with the hand, or with instruments in common use, new processes in any art, producing effects useful to the public. When the effect produced is some new substance or composition of things, it should seem that the privilege of the sole working or making, ought to be for such new substance or composition, without regard to the mechanism or process by which it has been produced, which though perhaps also new, will be only useful as producing the new substance. . . . (493) When the effect produced is no substance or composition of things, the patent can only be for the mechanism, if new mechanism is used, or for the process, if it be a new method of operating, with or without old mechanism, by which the effect is produced. . . . (494) In the list of patents with which I have been furnished, there are several for *new methods* of manufacturing articles in common use, where the sole merit and the whole effect produced are the saving of time and expense, and thereby lowering the price of the article, and introducing it into more general use. Now I think these *methods* may be said to be *new manufactures*, in one of the common acceptations of the word, as we speak of the manufactory of glass, or any other thing of that kind. . . . The patent cannot be for the effect produced, for it is either no substance at all, or what is exactly the same thing as to the question upon a patent, no new substance, but an old one, produced advantageously for the public. It cannot be for the mechanism, for there is no new mechanism employed. It must then be, for the method; and I would say, in the very significant words of Lord Mansfield in the great case of the copyright [Miller *v.* Taylor (1769), 4 Burr. 2397], it must be for *method* [idea] detached *from all physical existence whatever*. . . . I believe I might say three fourths of all patents granted since the statute passed, are for *methods of operating* and of manufacturing, producing no new substances and employing no new machinery. . . . (495) An improper use of the word *principle* in the specification set forth in this case, has I think served to puzzle it. Undoubtedly there can be no patent for a mere principle; but for a principle so far embodied and connected with corporeal substances, as to be *in a condition to act*, and to *produce effects* in any art, trade, mystery, or manual occupation, I think there may be a patent. Now this is, in my judgment, the thing for which the patent stated in the case was granted, and this is what the specification describes, though it *miscalls it a principle*. It is not that the patentee has conceived an abstract notion, that the consumption of steam in fire engines may be lessened, but he has discovered a *practical manner* of doing it; and for that *practical manner of doing it* he has taken his patent. Surely this is a very different thing from taking a patent for a principle, it is *not for a principle*, but *for a process.*" 1 Abb. P. C. (87, 88, 89, 91). Rooke, J., supported his decision upon the theory that every new method of employing existing instruments presupposes some change in their construction. He says: (478) "What method can there be of saving steam or fuel in engines, but by some variation in the construction of them? A *new invented method* therefore conveys to my understanding, the idea of *a new mode of construction*. I think those words are tantamount to *fire engines of a newly invented construction*; at least I think they will bear this meaning, if they do not necessarily

end accomplished, not in the means employed, — in that changed condition of affairs in which the want ceases, not in

exclude every other." 1 Abb. P. C. word "method" in the patent, says:
(72). Heath and Buller, JJ., deciding "*Engine* and *method* mean the same
against the patent, and Eyre, C. J., and thing and may be the subject of a pat-
Rooke, J., in its favor, though each on ent. 'Method,' properly speaking, is
different grounds, the case itself was only placing several things and perform-
left undetermined. The same patent, ing several operations in the most con-
however, came before King's Bench in venient order: but it may signify a
1799, in the case of Hornblower *et al. v.* *contrivance*, or *device*; so may *engine*,
Boulton *et al.* (8 T. R. 95), when the and therefore I think it may answer the
patent was sustained. The judges, in word 'method.'" In the King's Bench
rendering their opinions, take various it will be seen that none of the judges
positions, not harmonious with each followed the doctrine given by Eyre,
other except as to the result. Lord C. J., in the former case, — a doctrine
Kenyon, C. J., says: (99) "This is a certainly correct and founded in the
patent for a manufacture, which I un- nature of things, but apparently in-
derstand to be something made by the appreciable by minds in which the idea
hands of man." Ashurst, J., assents of a vendible substance had become
without giving any reason other than identified with that of a "manufacture."
the utility of the invention. Grose, J., 1 Abb. P. C. 98 (100, 104, 107, 108).
says: (103) "He [the patentee] speci- The same doubt is apparent in sev-
fies the particular parts requisite to eral subsequent cases and until a com-
produce the effect intended, and states paratively recent period. Thus in Rex
the manner how they are to be applied. *v.* Wheeler (1819), 2 B. & Ald. 345,
. . . Can it then be said that the mak- Abbott, C. J., speaks of a process as
ing and combining of these parts is not follows: (349) "Now the word 'manu-
some manner of new manufacture? . . . facture' has been generally understood
I do not consider it as a patent for the to denote either a thing made, which is
old engine, but only for the addition to useful for its own sake, and vendible as
or improvement of the old engine. . . . such . . . or an engine or instrument.
(104) A patent cannot be granted for a . . . (350) Or it may perhaps extend
mere principle; but I think that, al- also to a new process to be carried on
though in words the privilege granted by known implements," &c. 1 Abb.
is to exercise a method of making or P. C. 317 (321). The whole opinion
doing anything, yet if that thing is to in this case is permeated with the same
be made or done by a manufacture, and conjectural tone.
the mode of making that manufacture In Crane *v.* Price (1842), 1 Web.
is described, it then becomes in effect, 393, Tindal, C. J.: (409) "We are of
(by whatever name it may be called), opinion, that if the result produced by
not a patent for a mere principle but such a combination is either a new
for a manufacture, for the thing so article, or a better article, or a cheaper
made, and not merely for the principle article to the public, than that produced
upon which it is made." Lawrence, J., before by the old method, that such
considers the patent, (106) "a patent combination is an invention or manu-
for *an engine or mechanical contrivance* facture intended by the statute, and may
for lessening the consumption of steam well become the subject of a patent.
in fire engines;" and construing the Such an assumed state of facts falls

the instrument or operation by which this change has been effected; and the real merit of every inventor thus consists, not in his invention of the means, as such, but in his removal or supply of the public want through the instruments or operations which he has invented. Now if the subject-matter of

clearly within the principle exemplified by Abbott, C. J. (Rex *v.* Wheeler, 2 B. & Ald. 349), where he is determining what is or what is not the subject of a patent, namely, it may, perhaps, extend to a new process to be carried on by known implements or elements acting upon known substances, and ultimately producing some other known substance, but producing it in a cheaper or more expeditious manner, or a better or more useful kind. . . . There are numerous instances of patents which have been granted, where the invention consisted in no more than in the use of things already known, and acting with them in a manner already known, and producing effects already known, but producing those effects so as to be more economically or beneficially enjoyed by the public."

In Gibson *v.* Brand (1842), 1 Web. 631, Tindal, C. J.: (633) "Undoubtedly there is a very strong reason to suppose, if the specification is carefully and properly prepared, so as to point out, with great distinctness and minuteness, what the process is, that such a patent may be good in law." The other judges (Erskine and Cresswell) speak in the same doubtful manner. The latter says: (639) "This patent right, as explained by the counsel for the plaintiffs, is undoubtedly of a very singular character. The plaintiffs do not claim any article produced by the process, they do not claim the machinery used in producing it, nor do they claim any ingredient used in producing it. They claim, it is said, merely a process. Certainly, there are dicta in the books, that a process may be the subject-matter of a patent. Whenever that question arises, of course, I shall be prepared to give it every consideration, and form the best judgment I can upon it."

In Crossley *v.* Potter (1853), Macrory's P. C. 240, Pollock, C. B.: (244) "It is very true that patents are continually taken out for what are called 'methods' or 'processes;' but the real object of the patent, the real end that is secured by the statute, the matter that is alone mentioned in it capable of being made the subject of a patent, is a new manufacture; and everybody who takes out a patent under the name of a process, really takes it out for that which is the result of the process, for the thing that is manufactured, or the process by which it is produced."

Mr. Godson, in discussing the patentability of a process in the light of the principles of Patent Law as then understood and of the cases then decided, thus writes in 1822: (79) "A patent, when it is said to be for a method, cannot be supported, unless the thing invented is a substance or machine. . . . (80) A patent must be for a vendible matter. . . . (88) In other words, though the patent is for *something called* a method, yet the *real subject* of the grant is either a substance, machine, improvement or combination. . . . (94) When an inventor obtains a patent for a new method, if he does not give to the world some new and useful substance, or machine, something material and tangible, the grant is invalid."

To the same effect see Coryton, 65–80, where the non-patentability of a process, as such, is strongly argued and the cases considered.

the patent were the end, as distinguished from the means, inasmuch as the end consists in the changed condition of material objects, the invention must be a material object in its changed condition, and the doctrine above stated would have been correct. But since the invention is the means and not the end, and since an end resulting from a means which becomes tangible only when in actual operation is as conducive to the public welfare as an end whose means is permanently apparent to the senses, both forms of means are equally useful to the public, and the inventor of the one deserves the same reward, encouragement, and protection as the inventor of the other.

§ 161. Patentability of an Art formerly Denied; Confounded with the Force which it Applies.

From the same characteristic of an art arose the further error that its protection by a patent must involve the grant of an exclusive right to the principle or force which it employs.[1] An art, considered apart from the specific physical agent by which it is performed, is simply a force in operation;

§ 161. [1] This objection to a process as patentable subject-matter appears, like the former (§ 160), in Boulton and Watt *v.* Bull (1795), 2 H. Bl. 463. Thus Buller, J.: (486) "I think it impossible to support a patent for a method only without having carried it into effect and produced some new substance. But here it is necessary to enquire what is meant by a principle reduced into practice. It can only mean a practice founded on principle, and that practice is the thing done or made or in other words the manufacture which is invented." Eyre, C. J., grasping the real truth of the matter, denied this, and stated the now universally received doctrine that (495) "a principle so far embodied and connected with corporeal substances as to be in a condition to act and to produce effects is patentable." 1 Abb. P. C. 59 (81, 91). But in Hornblower *v.* Boulton (1799), 8 T. R. 95, Grose, J., reiterated the old idea and said (104): "A patent cannot be granted for a mere principle; but I think that, although in words the privilege granted is to exercise a method of making or doing anything, yet if that thing is to be made or done by a manufacture, and the mode of making that manufacture is described, it then becomes in effect (by whatever name it may be called), not a patent for a mere principle but for a manufacture, for the thing so made, and not merely for the principle upon which it is made." 1 Abb. P. C. 97 (107).

The portions of Godson and of Coryton, referred to in the notes to § 160, *ante*, are also pervaded with the same notion, and further citations may be found in the notes to §§ 134–143, *ante*, where the patentability of a principle is considered.

and since a force in operation, unless applied to physical objects through tangible instruments contrived by man, must either be the force itself, as it exists and operates in nature, or be entirely without physical effects, it was assumed that the inventor of an art was merely the discoverer of the natural operative force, unless he also had devised the instruments through which the force was practically applied. The difficulty here proceeded from the failure to discern the character of the inventive act, and to distinguish between the three subordinate ideas which enter into the complete idea of means. The force, as it exists in nature, acts upon certain objects, and through certain instruments, and in a certain manner. In this condition it is a true subject of discovery, and of discovery only. But to bring other objects under its influence, or to change its mode of operation by applying it in other methods or through other instruments, is not the mere discovery and employment of the natural force in its natural operation for additional and cognate purposes, but is an inventive act resulting in the creation of new means, whether the objects, the modes of application, or the instruments in themselves be new or old. To grant a patent for such a means is not to grant a patent for a principle; nor does the exclusive right to use the force in this specific manner or upon this specific object constitute a wider privilege in the inventor, in relation to the natural force itself, than if the instruments through which he applies the force, or the object upon which it is directed, were made the subject-matter of the patent.

§ 162. Patentability of an Art finally Conceded.

The logical consequences of these errors were too momentous to allow them to remain long uncorrected. If rigorously maintained they would have excluded from the protection of a patent every exercise of inventive skill which did not result in some new vendible substance; and since several of the most important and valuable inventions, whose patentability was controverted in the courts, consisted of new processes and operations performed by well-known instruments, the judges were driven to the alternative of repudiating these

ancient theories, or of denying to the most meritorious of inventors those privileges which the spirit of the law would have certainly conferred upon them.[1] In this emergency, closer attention was devoted to the real nature of the inventive act and to the grounds on which the claims of the inventor rest; and after various struggles with the language of the law, as contained in the statutes and in previous decisions, the doctrine was established that a new "mode of operating," or a "manner of making," was equally patentable with an operating instrument or an object made.

§ 163. Patentability of an Art always Recognized in the United States.

In the Patent Law of the United States no such problems have arisen. Our earliest statute recognized an art as a true operative means, and as having the same title to protection as a machine or an article of manufacture.[1] In the endeavors of

§ 162. [1] The first person to definitely assert and attempt to prove that an application of force was patentable, without reference to the particular apparatus used or results produced, was Lord Chief Justice Eyre, in Boulton *v.* Bull (1795), 2 H. Bl. 463. 1 Abb. P. C. 59. The tardiness and hesitation with which his example was followed by later judges may be seen in the opinions quoted in notes to §§ 160, 161, *ante*. That the doctrine is now settled on the proper basis in England is apparent from Hills *v.* London Gas Light Co. (1860), 5 H. & N. 312; Ralston *v.* Smith (1865), 11 H. L. 222.

For further cases on the same subject see Hall *v.* Jarvis (1822), 1 Web. 100; 1 Abb. P. C. 363; Russell *v.* Cowley (1832), 1 Web. 457; Heath *v.* Unwin (1844), 2 Web. 218; Steiner *v.* Heald (1851), 6 Exch. 607; Wallington *v.* Dale (1852), 7 Exch. 888; Booth *v.* Kennard (1856), 1 Hurl. & N. 527; Higgs *v.* Godwin (1858), E. B. & E. 529; Young *v.* Fernie (1864), 4 Giff. 577; Simpson *v.* Holliday (1865), 11 L. T. N. S. 99; in which the history and development of the doctrine may be traced.

§ 163. [1] In New Process Fermentation Co. *v.* Maus (1884), 20 Fed. Rep. 725, Drummond, J.: (728) "It is well known that the term 'process' is not used in the statute, but it has been uniformly held that there may be a patent for a process, because it is regarded as an art, which *is* a word used in the statute. But it must be confessed that it is often one of the most difficult questions to decide, in the practical application of claims made in a patent, what is a process which may be the subject of a patent. To illustrate and prove this, it is only necessary to refer to the case of Mitchell *v.* Tilghman, 19 Wall. 287, which was most elaborately argued and fully considered, and where a majority of the court held that although the manufacture of fat acids and glycerine from fatty or oily substances by the action of water at a high temperature and pressure was a process, yet that the patentee was

the courts to define or describe it, and to draw the line between it and its principle or force on one side, and the instru-

limited to the particular method or means of applying highly-heated water under pressure, pointed out in the specifications, although the claim was on its face broader than that, and to the case of Tilghman *v.* Proctor, 102 U. S. 707, where the same patent was in question, and where the court held that it was a patent for a process, irrespective of the particular mode or form of apparatus for carrying it into effect. If, then, we now consider this last case in connection with one of the first cases decided by the Supreme Court, (Corning *v.* Burden, 15 How. 252), and some of the intervening cases where patents have been sustained for a process, we ought to be able to determine the rule established by that court as to what is a process for which a patent can issue. In Corning *v.* Burden the court said that one might discover a new and useful improvement in the process of dyeing, tanning, &c., irrespective of any particular form of machine or mechanical device, and another might invent a labor-saving machine, by which the same process might be performed, and each might be entitled to his patent; that one by exposing India rubber to a certain degree of heat, in mixture or connection with certain metallic salts, might produce a valuable product and be entitled to a patent for his discovery as a process or improvement in the art, irrespective of mechanical devices. And another might invent a furnace or stove, or some apparatus by which the same process might be carried on with a saving of labor and of expense, and he would be entitled to a patent for his machine as an improvement in the art, and yet one could not have a patent for a machine, nor the other for a process. Each would be entitled to a patent for the method of producing certain results, but not for the result itself. And the court further stated that it was when the term 'process' was used to represent the means of producing a result that it was patentable, and it would include all methods or means not effected by mechanism. This definition is intelligible. A part of it, but not the whole, is cited in Tilghman *v.* Proctor. In Corning *v.* Burden the court held that Burden had not discovered any new process, but a new machine or combination of mechanism by which the result was produced. In McClurg *v.* Kingsland, 1 How. 202, where the only change made in the method of casting iron rolls was by directing the metal into the mould, when in a liquid state, at a tangent, the patent was sustained, although there does not seem to have been much discussion directly upon the patentability of the claim. All that was done in that case was simply to change the direction of the tube which carried the metal into the mould, the old method being to convey it from the furnace to the mould in a horizontal or perpendicular direction. In Mowry *v.* Whitney, 14 Wall. 620, and Tilghman *v.* Proctor, *supra*, the court sustained the claim in each as a patent for a process. In the latter case, the court says that the patent law is not confined to new machines and new compositions of matter, but extends to any new or useful art and manufacture, and that a manufacturing process is an art. Goodyear's patent was for a process; namely, vulcanizing India Rubber. The apparatus for performing the process was not material, and was not patented, and the court then refers to Neilson's English patent. Neilson's patent was for the discovery, which he made, of applying a blast of hot air, instead of cold, to a smelting furnace, and for describing a method by which that was accomplished, that

ments which it employs upon the other, some ambiguity in the use of language has necessarily occurred; but this is dis-

method not being material, and the court declares that Neilson's patent was sustained as a process patent, and quotes the language of the Court of Exchequer, 'that the plaintiff did not merely claim a principle, but a machine embodying a principle, and a very valuable one;' and also the language of Lord Campbell, in the House of Lords, that 'the patent must be taken to extend to all machines, of whatever construction, whereby the air is heated intermediately between the blowing apparatus and the blast furnace;' and therefore it was unnecessary to compare one apparatus with another. The court, in Tilghman *v.* Proctor, also quotes the language of Chief Justice Taney in O'Reilly *v.* Morse, 15 How. 112, where he says, in commenting on Neilson's Case, 8 M. & W. 806, — 'That the manner in which air might be heated was immaterial. His patent was supported because he (Neilson) had invented the mechanical apparatus by which the current of hot air could be thrown in. The interposition of a heated receptacle in any form was the novelty he invented.' And, after quoting still further from the opinion of the Chief Justice in O'Reilly *v.* Morse, the court states: 'It seems to us that this clear and exact summary of the law affords the key to almost every case that can arise. "Whoever discovers that a certain useful result will be produced in any art by the use of certain means, is entitled to a patent for it, provided he specifies the means." It is very certain that the means need not be a machine or an apparatus; it may be, as the court says, a process. A machine is a thing. A process is an act or mode of acting. . . . The mixing of certain substances together, or the heating of a substance to a certain temperature, is a process. If the mode of doing it, or the apparatus in or by which it may be done, is sufficiently obvious to suggest itself to persons skilled in the particular art, it is enough in the patent to point out the process to be performed, without giving supererogatory directions as to the apparatus or method to be employed.' The majority of the court in O'Reilly *v.* Morse refused to sustain the eighth claim of Morse, because he disavowed the specific machinery or means mentioned, but claimed the use of the motive power of the electric current, however developed; and this was held to be a principle simply. There has always been some difference of opinion as to the true grounds upon which this rejection of the eighth claim of Morse was placed, it being maintained by some that Morse was not entitled to have a patent including all applications of what he termed electro-magnetism in the transmission of words, letters, and signs, but only his own particular application. It has been uniformly held that a patent for a mere principle, or what is sometimes called a law of nature, cannot be sustained; but in all the cases referred to, from the Neilson to the Tilghman patent, the law or laws of nature discovered were utilized, and it is said that in giving this construction to principle and process, a patent for a process leaves the field open to future inventors; whereas a patent for a principle or law of nature would give a monopoly to the person making that discovery. So that the rule established by the Supreme Court is said to be that the patent for a process will include every application of the principle that involves the use of the process described and claimed by the patentee, and this does not include the particular machine or apparatus described by the patentee, but the mode of operation which is carried out by means of the apparatus. Walk. Pat. § 14. In

appearing as the nature of the inventive act, and the relation of the end accomplished to the means applied, become more

Neilson's Case the defendant did not use the means employed by Neilson in throwing the hot air into the smelting furnace, for it was admitted he used a better device; but it was assumed that when once the idea existed in the mind of the superiority of a hot-air blast to a cold one, any person skilled in smelting could devise his own mode of introducing the hot air to the furnace. And see Cochrane *v.* Deener, 94 U. S. 780, and Rubber Co. *v.* Goodyear, 9 Wall. 796. It is to be regretted that the difficulty inherent in the subject is so great that a more intelligible distinction has not been made, for it must be admitted that the application of the rule which has been established by the Supreme Court to other cases, as they hereafter arise, may cause embarrassment, for there must be a method by which the principle or law which has been discovered is applied; and if that method is immaterial, then it is difficult to understand why it does not become substantially a patent for the discovery of the principle or the law of nature. Such seems to have been the opinion of Mr. Justice Nelson. See Foote *v.* Silsby, 1 Blatch. 445, and 2 Blatch. 260; and the case on appeal, 20 How. 378; Le Roy *v.* Tatham, 14 How. 156, and 22 How. 132."

In some portions of this opinion the learned judge seems not to distinguish between the "method" *in* which the principle or force is applied to its object, and the "mechanism" or "apparatus" *through* which it is applied. The "method" of treating ore in the Neilson case, rubber in the Goodyear case, metal in McClurg's case, wheels in Mowry's case, and fat in the Tilghman case, by subjecting them to certain forces in a certain order and degree, was a true process, entirely independent of the instruments by means of which those forces were applied. The forces or laws of nature and the susceptibility to them of the objects named existed, not by the creation of the inventor, but by the act of God. When the inventor discovered that the latter were capable of being influenced by the former with certain results, and devised a series of operations by which these influences might be brought to bear on these objects, his conception of the method or process was complete, although no idea of the particular utensils or instruments to be employed had been presented to him. The reduction of this method to practice, by selecting suitable apparatus or mechanism for carrying out this method, would be, so far as this invention was concerned, the work of the constructor, not of the inventor, and if the apparatus were wholly new and original with him, yet its relation to the method devised by him would be the same. As mechanism and apparatus it would be a new invention, but with reference to the method it would still be mere reduction to practice. In every case of invention a method and an instrumentality for employing that method must exist. Where the method is new it is patentable as a process. Where the method is old and the instrumentality new, the latter may be patented as a machine, a manufacture, or a composition, according to its form. But the method is never the natural force, nor the natural object, nor the instrumentality, but has a distinct physical and legal existence, and if possessing the other necessary requisites is a patentable subject-matter.

In Tilghman *v.* Proctor (1881), 102 U. S. 707; Bradley, J.: (722) "That a patent can be granted for a process, there can be no doubt. The patent law is not confined to new machines and

clearly understood. It has, however, always been the settled law of this country that any artificial operation performed by

new compositions of matter, but extends to any new and useful art of manufacture. A manufacturing process is clearly an art, within the meaning of the law. Goodyear's patent was for a process, namely, the process of vulcanizing india-rubber by subjecting it to a high degree of heat when mixed with sulphur and a mineral salt. The apparatus for performing the process was not patented, and was not material. The patent pointed out how the process could be effected, and that was deemed sufficient. Neilson's patent was for the process of applying the hot blast to furnaces by forcing the blast through a vessel or receptacle situated between the blowing apparatus and the furnace, and heated to a red heat; the form of the heated vessel being stated by the patent to be immaterial. These patents were sustained after the strictest scrutiny and against the strongest opposition. On the subject of patents for processes, Mr. Justice Grier, in delivering the opinion of this court in Corning *v.* Burden (1853, 15 How. p. 267) said: 'A process *eo nomine* is not made the subject of a patent in our act of Congress. It is included under the general term of "useful art." An art may require one or more processes in order to produce a certain result or manufacture. The term "machine" includes every mechanical device or combination of mechanical powers and devices to perform some function, or to produce a certain effect or result. But where the result or effect is produced by chemical action, by the operation or application of some element or power of nature, or of one substance to another, such modes, methods, or operations are called "processes." A new process is usually the result of a discovery; a machine of invention. The arts of tanning, dyeing, making waterproof cloth, vulcanizing india-rubber, smelting ores, and numerous others, are usually carried on by processes as distinguished from machines. One may discover a new and useful improvement in the process of tanning, dyeing, &c., irrespective of any particular form of machinery or mechanical device. And another may invent a labor saving machine, by which the operation or process may be performed, and each may be entitled to his patent. As, for instance: A has discovered that by exposing india rubber to a certain degree of heat, in mixture or in connection with certain metallic salts, he can produce a valuable product or manufacture; he is entitled to a patent for his discovery as a process or improvement in the art irrespective of any machine or mechanical device. B, on the contrary, may invent a new furnace or stove or steam apparatus by which this process may be carried on with much saving of labor and expense of fuel, and he will be entitled to a patent for his machine as an improvement in the art.' 15 How. 252, 267. Neilson's patent, above referred to, had some features very similar to those of Tilghman's. The strong objection urged against the latter is that the particular apparatus described in the specification is not that which is generally used, and that it cannot be used with much profit or success in large manufacturing operations; whereas the slower method of dissolving fats in a common boiler or digester at a lower temperature even than that of melting bismuth, which is not described in the specification, is the one which is generally adopted. Precisely this circumstance existed in reference to the patent of Neilson. The specification directed that the blast or current of air produced by the blowing apparatus should be

physical agents and producing physical effects, when within the domain of the industrial arts, is a true invention, and can

passed into an air vessel or receptacle heated to a red heat, and from thence into the furnace. Then, after stating that the air vessel or receptacle should be increased in size according to the size of the forge or furnace to be supplied, the specification adds: The form or shape of the vessel or receptacle is immaterial to the effect, and may be adapted to the local circumstances or situation. Now, the most simple and natural form of an air vessel for heating the blast, as here directed, would be a box or chamber or a cylindrical vessel; but it turned out in practice that a receptacle of this kind would answer the purpose but very imperfectly, and that the best and most useful method was to heat the blast in a series of tubes placed in a heated oven. This was held to be no ground for invalidating the patent, or for preventing it from covering intermediate tubes, as well as an intermediate box or chamber, the jury being of opinion that a man of ordinary skill and knowledge in the construction of blowing and air-heating apparatus would be able, from the information contained in the specification, to erect a machine which would answer some beneficial purpose in the application of the process, and would not be misled and prevented from so doing by the declaration that the form or shape of the vessel or receptacle was immaterial to the effect. In this view of the subject the patent was sustained after very great consideration. Some question has indeed been made whether Neilson's patent was sustained as a patent for a process. The Court of Exchequer, in reviewing the proceedings at the trial and answering the objection that it was a patent for a principle, said: 'It is very difficult to distinguish it from the specification of a patent for a principle, and this at first created in the minds of some of the court much difficulty; but after full consideration we think that the plaintiff does not merely claim a principle, but a machine embodying a principle, and a very valuable one. We think the case must be considered as if, the principle being well known, the plaintiff had first invented a mode of applying it by a mechanical apparatus to furnaces; and his invention consists in this, — by interposing a receptacle for heated air between the blowing apparatus and the furnace. In this receptacle he directs the air to be heated by the application of heat externally to the receptacle, and thus he accomplishes the object of applying the blast, which was before of cold air, in a heated state to the furnace.' Web. P. C. 275, 371. In this passage we think that the Court of Exchequer, (who spoke through Baron Parke), drew the true distinction between a mere principle as the subject of a patent and a process by which a principle is applied to effect a useful result. That a hot blast is better than a cold blast for smelting iron in a furnace was the principle or scientific fact discovered by Neilson; and yet, being nothing but a principle, he could not have a patent for that. But, having invented and practically exemplified a process for utilizing this principle, namely, that of heating the blast in a receptacle between the blowing apparatus and the furnace, he was entitled to a patent for that process, although he did not distinctly point out all the forms of apparatus by which the process might be applied, — having nevertheless pointed out a particular apparatus for that purpose, and having thus shown that the process could be practically and usefully applied. Another person might invent a better apparatus for applying the process than

be patented as such without reference to the specific instruments engaged or the specific objects in which its effects may be produced.

that pointed out by Neilson, and might obtain a patent for such improved apparatus, but he could not use the process without a license from Neilson. His improved apparatus would in this respect stand in a relation to the process analogous to that which an improvement on a patented machine bears to the machine itself. That Neilson's patent was regarded as for a process is apparent from what is said by the judges who had it under consideration. Thus Baron Parke at the trial had said: 'The specification and patent together make it clear what the discovery was; it was the introduction of hot air by means of heating it before it was introduced into the furnace between the blowing apparatus and the furnace.' Web. P. C. 275, 312. And when the matter came before the House of Lords, after a trial in Scotland, Lord Campbell said: 'After the construction first put upon it [the patent] by the learned judges of the Court of Exchequer, sanctioned by the high authority of my noble and learned friend now upon the woolsack, when presiding in the Court of Chancery, I think the patent must be taken to extend to all machines of whatever construction, whereby the air is heated intermediately between the blowing apparatus and the blast furnace. That being so, the learned judge was perfectly justified in telling the jury that it was unnecessary for them to compare one apparatus with another, because, confessedly, that system of conduit-pipes was a mode of heating air by an intermediate vessel between the blowing apparatus and the blast furnace, and therefore it was an infraction of the patent.' Id. 715. This case of the hot blast was commented upon in the great case of O'Reilly *v.* Morse (reported in 15 Howard, 62), and is there recognized and approved in the opinion of this court, delivered by Chief Justice Taney. After quoting the remarks of Baron Parke in the Court of Exchequer, cited above, the Chief Justice says: 'We see nothing in this opinion differing in any degree from the familiar principles of law applicable to patent cases. Neilson claimed no particular mode of constructing the receptacle or of heating it. He pointed out the manner in which it might be done, but admitted that it might also be done in a variety of ways, and at a higher or lower temperature, and that all of them would produce the effect in a greater or less degree, provided the air was heated by passing through a heated receptacle. . . . Whoever, therefore, used this method of throwing hot air into the furnace used the process he had invented, and thereby infringed his patent, although the form of the receptacle or the mechanical arrangements for heating it might be different from those described by the patentee. For whatever form was adopted for the receptacle, or whatever mechanical arrangements were made for heating it, the effect would be produced in a greater or less degree, if the heated receptacle was placed between the blower and the furnace, and the current of air passed through it. . . . The patent was supported because he [Neilson] had invented a mechanical apparatus by which a current of hot air, instead of cold, could be thrown in. And this new method was protected by the patent. The interposition of a heated receptacle in any form was the novelty he invented.' (15 How. 62, 115, 116.) We have quoted these remarks of the Chief Justice more fully because they show most clearly that he put the same construction upon Neilson's patent that

§ 164. An Art the most Comprehensive of Inventions.

As every patentable invention is either an instrument or an operation, and as the term "art" includes all those which

was put upon it by Lord Campbell, and that he fully acquiesced in the legality and validity of a patent for a process. Yet it has been supposed that the decision in O'Reilly *v.* Morse was adverse to patents for mere processes. The mistake has undoubtedly arisen from confounding a patent for a process with a patent for a mere principle. We think that a careful examination of the judgment in that case will show that nothing adverse to patents for processes is contained in it. The eighth claim of Morse's patent was held to be invalid, because it was regarded by the court as being not for a process, but for a mere principle. It amounted to this, namely, a claim of the exclusive right to the use of electro-magnetism as a motive power for making intelligible marks at a distance; that is, a claim to the exclusive use of one of the powers of nature for a particular purpose. It was not a claim of any particular machinery, nor a claim of any particular process for utilizing the power, but a claim of the power itself, — a claim put forward on the ground that the patentee was the first to discover that it could be thus employed. This claim the court held could not be sustained. That this was the true ground of the decision will be manifest from the following observations of the Chief Justice in the opinion already quoted from. He says: 'He [Morse] claims the exclusive right to every improvement where the motive power is the electric or galvanic current, and the result is the marking or printing intelligible characters, signs, or letters at a distance. If this claim can be maintained, it matters not by what process or machinery the result is accomplished. For aught that we now know, some future inventor, in the onward march of science, may discover a mode of writing or printing at a distance by means of the electric or galvanic current, without using any part of the process or combination set forth in the plaintiff's specification. . . . In fine, he claims an exclusive right to use a manner and process which he has not described, and indeed had not invented, and therefore could not describe, when he obtained his patent. The court is of opinion that the claim is too broad and not warranted by law. . . . It is the high praise of Professor Morse that he has been able by a new combination of known powers, of which electro-magnetism is one, to discover a method by which intelligible marks or signs may be printed at a distance. And for the method or process thus discovered he is entitled to a patent. But he has not discovered that the electro-magnetic current, used as a motive power in any other method and with any other combinations, will do as well.' After reviewing the statutes and decisions bearing upon the subject the Chief Justice makes a summary conclusion of the whole matter, as follows: 'Whoever discovers that a certain useful result will be produced in any art, machine, manufacture, or composition of matter by the use of certain means is entitled to a patent for it, provided he specifies the means he uses in a manner so full and exact that any one skilled in the science to which it appertains can, by using the means he specifies, without any addition to or subtraction from them, produce precisely the result he describes. And if this cannot be done by the means he describes, the patent is void. And if it can be done, then the patent confers on him the exclusive right to use the means he specifies to produce the result or effect he describes,

cannot be embraced under one or more of the four groups of instruments enumerated in the statute, its outer limits are less

and nothing more. And it makes no difference in this respect whether the effect is produced by chemical agency or combination, or by the application of discoveries or principles in natural philosophy known or unknown before his invention, or by machinery acting altogether upon mechanical principles. In either case he must describe the manner or process as above mentioned, and the end it accomplishes. And any one may lawfully accomplish the same end without infringing the patent, if he uses means substantially different from those described.' Id. 110. It seems to us that this clear and exact summary of the law affords the key to almost every case that can arise. 'Whoever discovers that a certain useful result will be produced in any art by the use of certain means is entitled to a patent for it, provided he specifies the means.' But everything turns on the force and meaning of the word 'means.' It is very certain that the means need not be a machine or an apparatus; it may, as the court says, be a process. A machine is a thing. A process is an act or a mode of acting. The one is visible to the eye, — an object of perpetual observation. The other is a conception of the mind, seen only by its effects when being executed or performed. Either may be the means of producing a useful result. The mixing of certain substances together, or the heating of a substance to a certain temperature, is a process. If the mode of doing it, or the apparatus in or by which it may be done, is sufficiently obvious to suggest itself to a person skilled in the particular art, it is enough in the patent to point out the process to be performed, without giving supererogatory directions as to the apparatus or method to be employed. If the mode of applying the process is not obvious, then a description of a particular mode by which it may be applied is sufficient. There is, then, a description of the process and of one practical mode in which it may be applied. Perhaps the process is susceptible of being applied in many modes and by the use of many forms of apparatus. The inventor is not bound to describe them all in order to secure to himself the exclusive right to the process, if he is really its inventor or discoverer. But he must describe some particular mode or some apparatus by which the process can be applied with at least some beneficial result, in order to show that it is capable of being exhibited and performed in actual experience." 19 O. G. 859 (863).

In Mitchell *v.* Tilghman (1873), 19 Wall. 287, Clifford, J.: (392) "Doubtless an invention may be good though the subject of it consists in the discovery of some principle of science or property of matter never before known or used, by which some new and useful result is obtained; and such an invention or discovery may be the subject of a valid patent, without including in the claim any new arrangement of machinery to accomplish the object, provided the inventor describes, as required in the patent law, the method, process, or means of applying the invention to practical use, and of obtaining the described new and useful result. (Household Co. *v.* Neilson, 1 Web. 683; Curtis, p. 279; Foote *v.* Silsby, 2 Blatch. 260.)" 5 O. G. 299 (304).

In Roberts *v.* Dickey (1871), 1 O. G. 4, Strong, J.: (5) "It is not to be doubted that a novel process or method of operation, that amounts to a successful application of known things to a practical use, is patentable as an art." 4 Fisher, 532 (538).

In O'Reilly *v.* Morse (1853), 15 How.

easily discernible than those of any other class of operative means. These limits are, however, indicated by the charac-

62, Grier, J.: (130) "A new and useful art, or a new and useful improvement on any known art, is as much entitled to the protection of the law as a machine or manufacture. The English patent acts are confined to 'manufactures' in terms; but the courts have construed them to cover and protect arts as well as machines, yet without using the term, 'art.' Here we are not required to make any latitudinous construction of our statute for the sake of equity or policy; and surely we have no right, even if we had the disposition, to curtail or narrow its liberal policy by astute or fanciful construction. It is not easy to give a precise definition of what is meant by the term 'art' as used in the acts of Congress; some, if not all, the traits which distinguish an art from the other legitimate subjects of a patent are stated with clearness and accuracy by Mr. Curtis, in his Treatise on Patents. 'The term art applies,' says he, 'to all those cases where the application of a principle is the most important part of the invention, and where the machinery, apparatus, or other means, by which the principle is applied, are incidental only, and not of the essence of his invention. It applies also to all those cases where the result, effect, or manufactured article is old, but the invention consists in a new process or method of producing such result, effect, or manufacture.' Curt. on Pat. 80. A machine, though it may be composed of many parts, instruments, or devices combined together, still conveys the idea of unity. It may be said to be invented, but the term 'discovery' could not well be predicated of it. An art may employ many different machines, devices, processes, and manipulations, to produce some useful result. In a previously known art a man may discover some new process, or new application of a known principle, element, or power of nature, to the advancement of the art, and will be entitled to a patent for the same, as an 'improvement in the art,' or he may invent a machine to perform a given function, and then he will be entitled to a patent only for his machine. That improvements in the arts, which consist in the new application of some known element, power, or physical law, and not in any particular machine or combination of machinery, have been frequently the subject of patents, both in England and in this country, the cases in our books most amply demonstrate. . . . (133) When a new and hitherto unknown product or result, beneficial to mankind, is effected by a new application of any element of nature, and by means of machines and devices, whether new or old, it cannot be denied that such invention or discovery is entitled to the denomination of a 'new and useful art.' The statute gives the inventor of an art a monopoly in the exercise of it as fully as it does to the inventor of a mere machine. And any person who exercises such new art without the license of the inventor is an infringer of his patent, and of the franchise granted to him by the law as a reward for his labor and ingenuity in perfecting it."

In Whitney *v.* Emmett (1831), Baldwin, 303, Baldwin, J.: (312) "A patent may be for a mode, or method of doing a thing; mode, when referred to something permanent, means an engine or machine, when to something fugitive, a method, which may mean engine, contrivance, device, process, instrument, mode and manner of effecting the purpose; the word "principle" may mean engine, in an act of parliament under which the patent issued, or may mean

teristic attributes of three species of arts which lie upon the boundary line between the creative and the imitative acts; (1) The application of a new force to known objects, through known instruments used in their accustomed manner and producing previously known effects;[1] (2) The application of a known force to a new object, through known instruments used in their accustomed manner and producing known effects;[2] (3) The application of a known force to known objects, through known instruments used in a new manner and producing effects either new or old.[3] Each of these arts is a new operative means. In the first, the force is new; in the second, the object; and in the third, although the instrument is old as a concrete embodiment of one idea of means, its new use constitutes a means of an entirely different character in reference to the operation in which it is now employed. Beyond these three, no result of an inventive act can be imagined. Whatever lies between them and the concrete instruments must be an art or operation.

the constituent parts thereof. A patent for a method of producing a new thing may apply to the mechanism, a new method of operating with old machinery, or producing an old substance; a patent for a mode or method detached from all physical application would not refer to an engine or machine, but when referred to the mode of operation, so as to produce the effect, would be considered as for an engine or machine. The words used as mode or method are not the subject of the patent; it is the thing done by the invention, and patents are so construed *ut res magis valeat quam pereat.*" 1 Robb, 567 (579).

That an art or process is patentable without reference to new results or new apparatus, see also Goodyear *v.* Wait (1867), 3 Fisher, 242; 5 Blatch. 468; French *v.* Rogers (1851), 1 Fisher, 133.

That an art means a useful art, see Smith *v.* Downing (1850), 1 Fisher, 64.

§ 164. [1] That the practical application of a new or hitherto unapplied natural force is a new art, see Roberts *v.* Dickey (1871), 1 O. G. 4; 4 Fisher, 532; 4 Brews. 260; Poillon *v.* Schmidt (1869), 6 Blatch. 299; 37 How. Pr. 77; 3 Fisher, 476; Goodyear *v.* Wait (1867), 3 Fisher, 242; 5 Blatch. 468; Le Roy *v.* Tatham (1859), 22 How. 132; Smith *v.* Ely (1849), 5 McLean, 76.

[2] That the practical application of a known force to a new object is a new art, see Whitney *v.* Mowry (1867), 2 Bond, 45; 3 Fisher, 157; Steiner *v.* Heald (1851), 6 Exch. 607.

[3] That the application of a known force to known objects in a new manner is a new art, see Foote *v.* Silsby (1849), 1 Blatch. 445; Higgs *v.* Goodwin (1858), E. B. & E. 529.

That a new mode of using old apparatus may be a new art, see Lawther *v.* Hamilton (1888), 42 O. G. 487.

That to do by machine what had before been done by hand is not a new process though the machine may be new, see Marchand *v.* Emken (1886), 26 Fed. Rep. 629; 23 Blatch. 435; 34 O. G. 1275.

§ 165. An Art may be either a "Force Applied," a "Mode of Application," or the "Specific Treatment of a Specific Object."

An art may fall within either of the three great fundamental groups of means, according to the number of its essential factors, and the subject of the process of discovery. In many arts the force or capability has been discovered by the inventor of the art, and is made practically useful by its union with a mode of application. Such an art is a force applied, and its essential factors are the force and mode of application.[1] Other arts employ known forces on known objects in new methods, the availability of the art or instrument adopted as the connecting agency between the force and object being the subject of discovery. These arts are simply modes of application, and have no other essential factor than the mode itself. In still other arts the object or susceptibility is the discovered factor, and the art consists in operating with specific forces through specific modes of application on this object or susceptibility. To such arts the three factors are essential, and a substantial change in either constitutes a different art.

§ 166. An Art must Produce Physical Effects.

But though an art embraces so wide a field of inventive skill, it includes only such operations as are capable of producing physical effects. Every invention, when applied according to the design of its inventor, must accomplish some change in the character or condition of material objects. This is as essential in a patentable art as in an instrument.[1]

§ 165. [1] That the discovery that steam may be made to become self-packing is patentable as a process not merely as an apparatus, see Poillon *v.* Schmidt (1869), 37 How. Pr. 77 : 6 Blatch. 299 ; 3 Fisher, 476.

That a mode of controlling a natural force may be a patentable art, see Dolbear *v.* American Bell Telephone Co. (1888), 43 O. G. 377.

§ 166. [1] A distinction is necessarily drawn by the courts between a plan or project for doing something and the method by which it is to be physically effected. The former, if the ideas or mode of delineation are new, may be protected by copyright, not by patent ; since the plan or project though capable of being carried out by the use of means is not in itself a means. Thus an architectural plan for the building of a house, though new and original, is not an art or any other form of invention. See Jacobs *v.* Baker (1868), 7 Wall. 295.

A distinction is also drawn between a method by which a change is pro-

Hence a plan or theory of action which, if carried into practice, could produce no physical results proceeding directly from the operation of the theory or plan itself, is not an art within the meaning of the Patent Law, however greatly it may promote the comfort or the welfare of mankind. It is, indeed, a means and may accomplish an important end, but it lies outside the domain of the industrial arts; and its inventor, if he is entitled to protection from any source, must seek it from the Copyright and not the Patent Law.

§ 167. An Art is Distinct from the Instruments which it Employs: may Employ any Available Instrument.

While an art cannot be practised except by means of physical agents through which the force is brought in contact with or is directed toward its object, the existence of the art is not dependent on any of the special instruments employed. It is a legal, practical invention in itself. Its essence remains unchanged, whatever variation takes place in its instruments, as long as the acts of which it is composed are properly performed.[1]

duced in some physical substance and a mode of giving an agreeable appearance to the substance, unless such appearance amounts to a design. Thus a new manner of arranging articles for sale, or of packing simply, is not an art or an invention of any kind, see Forncrook *v.* Root (1884), 29 O. G. 774; 21 Fed. Rep. 328; King *v.* Gallun (1883), 109 U. S. 99; 25 O. G. 980; Langdon *v.* De Groot (1822), 1 Paine, 203; 1 Robb, 433.

§ 167. [1] In *Ex parte* Blythe (1884), 30 O. G. 1321, Butterworth, Com.: (1323) "Process and apparatus, therefore, constitute two separate inventions. If they are separate inventions when one has been invented by one person and the other by another, they must be separate inventions when both have been invented by the same person."

In James *v.* Campbell (1881), 104 U. S. 356, Bradley, J.: (377) "But a process and a machine for applying the process are not necessarily one and the same invention. They are generally distinct and different." 21 O. G. 337 (343).

In Goodyear *v.* The Railroad (1853), 2 Wall. Jr. 356, Grier, J.: (360) "It must be obvious, also, that there is not only a distinction, but a wide difference, between one who merely invents a new method or process by which a well known fabric, product, or manufacture is produced in a cheaper or better way, and the discovery of a new compound, substance, or manufacture, having qualities never found to exist together in any other material. In the first case, the inventor can patent nothing but his process, and not his composition of matter. In the latter, both are new and original, and both patentable, not severally, but as one discovery or invention. It is evident, also, that the question of infringement must, in such cases, depend on different condi-

These instruments, therefore, may be either new or old. If new, they are separate and complete inventions, even though useless outside of the art for which they were devised. Though old, the art in which they are now used may nevertheless be new. For the same reason these instruments may be either natural or artificial. The elements, the earth, the

tions. Steel is a well-known substance. Any one who could devise a new and cheaper method of combining the iron and carbon in order to form it could patent his process only; and every other person would be at liberty to devise any different process for effecting the same purpose. But if steel, as a substance, was before unknown, the person who first discovered that a composition of iron and carbon could be made to assume such valuable qualities, would have a right to patent not only his process, but his product. And no person who had thus taken the benefit of the patentee's discovery, and by it was informed of the valuable qualities of this compound of iron and carbon, could, by varying or improving the mode or process of its production, rob the patentee of his franchise." 1 Fisher, 626 (632).

In Foote *v.* Silsby (1851), 2 Blatch. 260, Nelson, J.: (264) "Where a party has discovered a new application of some property in nature never before known or in use, by which he has produced a new and useful result, the discovery is the subject of a patent, independently of any peculiar or new arrangement of machinery for the purpose of applying the new property in nature; and hence the inventor has a right to use any means, old or new, in the application of the new property to produce the new and useful result, to the exclusion of all other means."

That the process and instrument used are two different inventions, see also Dolbear *v.* American Bell Telephone Co. (1888), 43 O. G. 377; Phillips *v.* Kochert (1887), 31 Fed. Rep. 39; Eastern Paper Bag Co. *v.* Standard Paper Bag Co. (1887), 30 Fed. Rep. 63; 41 O. G. 231; New Process Fermentation Co. *v.* Maus (1887), 122 U. S. 413; 39 O. G. 1419; Scrivner *v.* Oakland Gas Co. (1884), 22 Fed. Rep. 98; 10 Sawyer, 390; New Process Fermentation Co. *v.* Koch (1884), 21 Fed. Rep. 580; 29 O. G. 535; Nichols *v.* Ross (1849), 8 C. B. 679.

That a process may be new though the apparatus is old, see Lawther *v.* Hamilton (1888), 42 O. G. 487; New Process Fermentation Co. *v.* Maus (1887), 122 U. S. 413; 39 O. G. 1419; Celluloid Mfg. Co. *v.* American Zylonite Co. (1887), 31 Fed. Rep. 904.

That an improvement in the apparatus used does not constitute a new process, see Lawther *v.* Hamilton (1884), 21 Fed. Rep. 811; 29 O. G. 449.

That a patentable process must have an existence distinct from the apparatus that performs it, see *Ex parte* Herr (1887), 41 O. G. 463.

That the process and product are two different inventions, see Excelsior Needle Co. *v.* Union Needle Co. (1885), 23 Blatch. 147; Tucker *v.* Dana (1881), 7 Fed. Rep. 213; Kelleher *v.* Darling (1878), 4 Clifford, 424; 14 O. G. 673; 3 Bann. & A. 438; Jones *v.* Sewall (1873), 3 Clifford, 563; 6 Fisher, 343; 3 O. G. 630; Waterbury Brass Co. *v.* Miller (1871), 5 Fisher, 48; 9 Blatch. 77; Goodyear *v.* Wait (1867), 3 Fisher, 242; 5 Blatch. 468; Goodyear *v.* Providence Rubber Co. (1864), 2 Clifford, 351; 2 Fisher, 499.

animal creation, the members of the human body are as available as the machines and chemical compositions which have resulted from inventive skill.[2] Their action may be positive or negative, — working their changes in material objects by adding to or altering their quantity or qualities, or by subtracting or suspending attributes which otherwise would hinder a desired result.[3] To the inventor of an art the entire universe thus offers itself as his armory, and all the works of God and man are ready to become his instruments. Whatever he may deem it best to use in the practical expression of his idea of means, the idea is not thereby changed, nor can another practise the same art, either by the same or any other instruments, without infringing upon his exclusive rights.

§ 168. An Art may be a Simple Art or a Combination.

An art may consist either of one act alone, or of a series of acts so related to each other as to co-operate in the production of an ultimate result.[1] There is no limit, on the one hand, to the simplicity or, on the other hand, to the complexity of the operations included in the practice of an art, — a single motion

[3] That a new use of the earth, or any other natural object may be a new art, see Andrews *v.* Cross (1881), 8 Fed. Rep. 269 ; 19 Blatch. 294 ; 19 O. G. 1705 ; Andrews *v.* Carman (1876), 9 O. G. 1011 ; 13 Blatch. 307 ; 2 Bann. & A. 277 ; Gilbert & Barker Mfg. Co. *v.* Tirrell (1874), 12 Blatch. 144 ; 8 O. G. 2 ; 1 Bann. & A. 315.

That a method of using heat which accomplishes a new purpose and result is a new process, see Cary *v.* Lowell Mfg. Co. (1887), 40 O. G. 1239.

That to employ the natural instincts of animals to induce them to move a machine is not a new art, see Merrill *v.* Cousins (1866), 26 U. C. Q. B. 49.

[3] That to discover that the presence of the mucous membrane prevents the effectual curing of fish, and to devise or adopt a method of removing it, is a new art of curing fish, see Crowell *v.* Harlow (1880), 1 Fed. Rep. 140 ; 5 Bann. & A. 63.

That to discover that the obstacles to the proper use of a chemical composition are caused by certain impurities therein, and to devise or adopt a method of removing them, constitutes a new and patentable process, see United Nickel Co. *v.* Harris (1878), 17 O. G. 325 ; 3 Bann. & A. 627 ; 15 Blatch. 319.

§ 168. [1] That a new combination of old processes constitutes a new process, see Wallace *v.* Noyes (1882), 23 O. G. 435; 21 Blatch. 83; 13 Fed. Rep. 172 ; Andrews *v.* Carman (1876), 9 O. G. 1011; 13 Blatch. 307 ; 2 Bann. & A. 277 ; Cannington *v.* Nuttall (1871), L. R. 5 H. L. 205 ; Bovill *v.* Keyworth (1857), 7 El. & B. 725.

of the human arm, or of some little instrument, as often constituting a new means as the prolonged action of many pieces of intricate machinery.

§ 169. Essential Attributes of an Art.

The essential attributes of an art reside either in the nature of the acts of which it is composed, or in their relation to the object upon which they act, or in the mode of their co-operation with each other. Where the art consists of a single act, the characteristics which distinguish it from every other art are found either in the nature of the act alone, or in its relation to the object upon which it operates; and such an act is a new art only when the act itself is new, or when it is for the first time directed toward an object whose susceptibility to its influence was hitherto unknown. Where it is composed of several acts, its essence is to be sought not only in the nature of the acts themselves, and in their individual relation to their common object, but also in their relation to each other, or the method in which they co-operate in the production of their joint result. This relation to each other may consist in the operation of one act upon another, modifying in some manner its natural activities, or in the simultaneous or successive influence exerted by these acts upon their common object; and may depend on the mere order of performance, or even on the interruption of one act by another at a particular period in its execution.

§ 170. An Art a Unit: its Unity how Destroyed.

An art, like every other invention, is a unit. Whatever number of acts it may employ, it is still one; and any variation in the number or the character of its elements which introduces a different idea of means constitutes a different art, and, if hitherto unknown, a new invention.[1] Thus the addi-

§ 170. [1] In New Process Fermentation Co. *v.* Maus (1884), 20 Fed. Rep. 725, Drummond, J.: (732) "Where, in a process, there is a combination of different substances, and to that combination another substance or element is added, by which a new result is obtained, that is a process which we can easily understand; and if unknown before, and it is useful, the person devising it may be entitled to a patent. . . . If a process exists which consists of different steps

tion to an existing art of a single step by which its essential character is changed, or the omission of one act which was a necessary element in the art as previously practised, or even a material alteration in the order of the acts performed, is sufficient to destroy its unity, and produce another art which is entitled to the same protection as the old.

§ 171. An Art not Complete until Reduced to Practice.

Although an art cannot be permanently embodied in a tangible form, it is no more the subject of a patent before it is reduced to practice than is an article of manufacture.[1] Indeed, the rule which governs this part of the inventive act seems to be more stringent in reference to an art than in regard to any other species of invention. An instrument may perhaps be considered as completed, within the meaning of the law, when it has been so far perfected as to be capable of

created by machinery, and there is an improvement in that process caused by a new element added to or taken away from the machinery, then, the process existing and being known, the party who added or took away the part of the machinery might, if it were useful, be entitled to a patent, not for the process which formerly existed and was well known, but only for that which had been added to or taken from the mechanism."

That no change in the proportions of materials used in a process will affect its identity, if it operates in the same way to produce the same result, see Rumford Chemical Works *v.* Lauer (1872), 10 Blatch. 122; 5 Fisher, 615; 3 O. G. 349.

That the omission of one step hitherto regarded as necessary to a process may constitute a new process, see Hammerschlag Mfg. Co. *v.* Judd (1886), 28 Fed. Rep. 621; Heller *v.* Bauer (1884), 19 Fed. Rep. 96; Arnold *v.* Phelps (1884), 20 Fed. Rep. 315; 29 O. G. 538; Hammerschlag *v.* Garrett (1882), 10 Fed. Rep. 479; 21 O. G. 1199; Dittmar *v.* Rix (1880), 17 O. G. 973; 1 Fed. Rep. 342; 5 Bann. & A. 240; Booth *v.* Kennard (1856), 1 H. & N. 527.

That a substantial alteration in one step in a process may make a new process, see Cotter *v.* New Haven Copper Co. (1882), 13 Fed. Rep. 234; 23 O. G. 740.

That the materials used in a process are "similar" to each other when they act or are acted on, in that process, in the same way, see American Wood Paper Co. *v.* Fibre Disintegrating Co. (1868), 3 Fisher, 362; 6 Blatch. 27.

§ 171. [1] That a process resting in idea only, no means being devised or adopted for carrying it into operation, is not a complete invention, see Downton *v.* Yaeger Milling Co. (1880), 1 McCrary, 26; 5 Bann. & A. 112; 17 O. G. 906; 1 Fed. Rep. 199.

That a process cannot be fully invented until apparatus is constructed by which the process can be performed, see Eastern Paper Bag Co. *v.* Standard Paper Bag Co. (1887), 30 Fed. Rep. 63; 41 O. G. 231.

immediate practical employment, though never actually used in the arts, — its capability of use being apparent from an inspection of the instrument itself. But an art cannot become known to the public as a practical means unless it has been tested by actual use, in the manner and for the purpose intended by the inventor; and the law, therefore, should and does require that it shall be subjected to such tests before it can receive the indorsement of a patent.

§ 172. An Art Reducible to Practice in Many Forms: all Identical Inventions.

It is evident from the nature of an art that the form of its embodiment is susceptible of great variations while the essence of the art itself remains unchanged. The acts of which it is composed are the same acts whenever they express the same idea, however they appear to differ from each other; and the essential nature of the acts is not diversified by any substitution of one instrument for another unless a new idea of action is thereby substituted for the old.[1] The scope of an

§ 172. [1] In Piper *v.* Brown (1870), Holmes, 20, Shepley, J.: (22) "It follows, from the law as expounded by the Supreme Court of the United States in Corning *v.* Burden, and in O'Reilly *v.* Morse, 15 How. 62, — where the true distinction between a principle and a process is clearly defined in the explanations given by the court of the case of Neilson *v.* Harford, — that where a result or effect is produced by mechanical action, the patent can ordinarily only be for the mechanical appliances or means employed; where the result is attained or effect produced by chemical action, by the operation or application of some element or power of nature, or of some property in matter, or of one substance to another, then the patent may be for the art, process, or method. It is essential to the validity of the process as an invention, to show how it may be adapted to practical use. In showing this, the inventor may describe mechanical means of applying, or peculiarly shaped vessels for containing, any of the ingredients used in his process or art. But they constitute no part of his invention. Another person may discover new and useful means of applying or using the inventor's process, and be entitled to a patent for that improvement, without the right to use the process. So the inventor himself may discover such new means or invent new appliances, which may be the subjects of a patent to him, separate and apart from his patent for the art itself." 4 Fisher, 175 (179).

That a patent for a process, describing one means for performing it, covers all other methods of performing the same process, see Bridge *v.* Brown (1871), Holmes, 53.

That the use of an old process upon a different object, involving no inventive skill in the use itself, does not affect the identity of the process, see

invention of this class is, therefore, very broad, reaching far beyond the limits of any of the machines or other instruments employed. Hence it is advisable, wherever the nature of an invention will permit, to treat it as an art in which various instruments may be indifferently used, rather than as an instrument itself. This may be done in every art unless the practice of the art consists only in the employment of an instrument which is also the invention of the same inventor.[2]

Brown *v.* Piper (1875), 91 U. S. 37 ; 10 O. G. 417.

That the use of anything in an art, without other invention than the mere employment of it for the first time in that art, is not a change in the art itself, see Morton *v.* N. Y. Eye Infirmary (1862), 5 Blatch. 116 ; 2 Fisher, 320.

[2] Where a process consists entirely in the operation of a machine or other instrument, it approaches so nearly to the function of the instrument employed that several decisions have been rendered identifying it therewith, and hence denying its patentability. But the process and the function are, after all, two entirely separate entities, both in intellectual and physical contemplation ; the former being capable of conception apart from any object acted on, the latter not so. The difficulty is another form of the old confusion between the end and the means, and is to be avoided by defining sharply the end to be accomplished, and determining whether the machine or the operation performed by it is the actual means. For if the operation performed by the machine is new in reference to the object upon which it is employed, a new process has been invented ; and this is no less true if the machine or instrument employed is new than if it were old, or if the process can be performed in no other known way than by this particular machine. While, on the other hand, if the operation is known in reference to the object, the invention of a new machine for performing it does not make a new process, but only a new instrument for applying it. Thus in the art of planing lumber, if the end to be accomplished were the smoothing of the boards, and there were no known methods of attaining this end, the process of smoothing by removing inequalities would be a means, and the inventor of this process would be entitled to a patent for it, no matter what method he may have employed. But it being once apparent that smoothness could be effected by removing inequalities, the removal of inequalities becomes the end, and a process for removing them the means ; and if the process now invented for that purpose be the cutting of the surface by a group of knives applied in a certain speed or order of succession, this also, as a new means, is a new invention. This peculiar excision of the surface now becomes an end, and every machine devised for performing it a means, and at this point invention passes from process into instrument, and every subsequent invention for the same end is only as broad as the new character of the instrument produced. Whether or not a new machine is the reduction to practice of a new process, or is a new instrument for the performance of an old process, is, therefore, to be determined by the state of the art at the date of the invention. If it is the former, the process is patentable, though the machine be new. If the latter, only the machine can be allowed the protection of the law. Thus in New Process

Here, as the art and the operation of the instrument are identical, a patent for the one would effectually protect the other. Such instances are, however, comparatively rare, and the possibility which always exists that some new instrument may be devised, by which the same act could be performed, renders a patent for an art the only sure protection to the inventor. By it, as by no other, he can appropriate to himself the entire benefit of his original conception, and yet remain free to employ in its embodiment every known or imaginable variety of instrument.

SECTION II.

OF A MACHINE.

§ 173. "Machine" Defined.

A machine is an instrument composed of one or more of the mechanical powers, and capable, when set in motion, of producing, by its own operation, certain predetermined physical effects. It is an artificial organism, governed by a permanent artificial rule of action, receiving crude mechanical force from the motive power, and multiplying, or transforming, or transmitting it, according to the mode established by that rule. This rule of action, imposed by the inventor on the material substances of which the machine consists, is what the courts have called the "principle of the machine;"

Fermentation Co. *v.* Koch (1884), 21 Fed. Rep. 580, Brown, J.: (582) "Indeed, we understand the law to be that, where a patent clearly shows and describes a machine whose use necessarily involves the production of a certain process, no other person can afterwards patent that process." 29 O. G. 535 (535).

See, also, that where the process is identical with the *modus operandi* of the machine, the machine alone is patentable, *Ex parte* Herr (1887), 41 O. G. 463; Excelsior Needle Co. *v.* Union Needle Co. (1885), 32 Fed. Rep. 221; 23 Blatch. 147; Dryfoos *v.* Wiese (1884), 26 O. G. 639; 19 Fed. Rep. 315; 22 Blatch. 19; Hatch *v.* Moffitt (1883), 15 Fed. Rep. 252; McKay *v.* Jackman (1882), 20 Blatch. 466; 22 O. G. 85; 12 Fed. Rep. 615; Brainard *v.* Cramme (1882), 20 Blatch. 530; 12 Fed. Rep. 621; 22 O. G. 769; New *v.* Warner (1882), 22 O. G. 587; Goss *v.* Cameron (1882), 11 Bissell, 389; 23 O. G. 741; 14 Fed. Rep. 576; Matthews *v.* Schoneberger (1880), 4 Fed. Rep. 635; 18 Blatch. 357; 18 O. G. 1464.

That the operation of a machine may be a patentable process, see *Ex parte* Herr (1887), 41 O. G. 463; McKay *v.* Dibert (1881), 19 O. G. 1351; 5 Fed. Rep. 587.

a phrase synonymous with "*modus operandi*" and "structural law." It is, however, neither more nor less than the idea of means, which is embodied in the machine itself.[1] It is the conception of a mechanical force operating in a specific manner through agents of a specific character; and the expression of that idea in any one of those specific agents constitutes the patentable machine.

§ 173. [1] In Burr *v.* Duryee (1863), 1 Wall. 531, Grier, J.: (570) "A machine is a concrete thing, consisting of parts, or of certain devices and combinations of devices. The principle of a machine is properly defined to be its 'mode of operation,' or that peculiar combination of devices which distinguish it from other machines."

In Roberts *v.* Ward (1849), 4 McLean: 565 (566) "The word 'principle,' as applied to mechanics, is where two machines or things are made to operate substantially in the same way so as to produce a similar result, they are considered the same in principle." 2 Robb, 746 (748).

In Brooks *v.* Jenkins (1844), 3 McLean, 432 (451) "The word 'principle' is not used here in its general signification, but as applied to the structure of a machine. It means the operative cause by which a certain effect is produced. I observe the board before you is made smooth upon its surface, on one edge of it a groove is formed and on the other a tongue. This has been done by the machine before you in one operation. That machine is formed, as you perceive, by a combination of certain mechanical powers. This combination of powers is what is called the principle of the machine. Now it does not follow that the same effect may not be produced by a machine different in principle from the plaintiff's. But where a similar effect is produced by a combination of the same mechanical powers, though the machines may be somewhat different in their structure, in principle they are the same."

In Smith *v.* Pearce (1840), 2 McLean, 176, the court say: (178) "The principle here spoken of is not a new mechanical power. . . . The principle consists in the mode of applying or combining mechanical powers which produce a certain result." 2 Robb, 13 (16).

In Barrett *v.* Hall (1818), 1 Mason, 447, Story, J.: (470) "The true legal meaning of the principle of a machine, with reference to the patent act, is the peculiar structure or constituent parts of such machine." 1 Robb, 207 (232).

In Whittemore *v.* Cutter (1813), 1 Gallison, 478, Story, J.: (480) "By the principles of a machine (as these words are used in the statute) is not meant the original elementary principles of motion, which philosophy and science have discovered, but the *modus operandi*, the peculiar device or manner of producing any given effect. The expansive powers of steam, and the mechanical powers of wheels, have been understood for many ages; yet a machine may well employ either the one or the other, and yet be so entirely new in its mode of applying these elements as to entitle the party to a patent for his whole combination. The intrinsic difficulty is to ascertain, in complicated cases like the present, the exact boundaries between what was known and used before, and what is new, in the *mode of operation*." 1 Robb, 40 (42).

See also Latta *v.* Shawk (1859), 1 Fisher, 465; 1 Bond, 259; Pitts *v.* Wemple (1855), 1 Bissell, 87; 2 Fisher, 10.

§ 174. Machine how Distinguished from an Art.

A machine thus differs from an art in that the act or series of acts which constitutes the art becomes, in the machine, inseparably connected with a specific physical structure. The idea, which in the one may be temporarily expressed through any instruments capable of performing the act, is in the other permanently expressed in a determinate instrument by which the act is not merely performed, but is performed in an invariable manner.[1] The art is, therefore, the primary conception; the machine, like every other instrument, the secondary,—the idea of the act to be performed necessarily preceding the idea of the special agent to be employed; and the union of the idea of the act with the idea of a particular instrument for performing it is thus a limitation, not an extension, of the scope of the invention.

§ 175. Machine how Distinguished from other Instruments.

A machine differs from all other mechanical instruments in that its rule of action resides within itself.[1] Such other in-

§ 174. [1] The distinction between the "operation" of a machine and its "mode of operation" is a necessary and fundamental one. The former is in its nature an art or process, and if new may be patented as such. See § 172, and notes. The latter is inseparable from the machine itself and cannot be patented apart from some mechanical structure in which it is embodied. It is to the latter only that the decisions hereafter cited can properly refer, although their language is broad enough to cover both. Thus in Burr *v.* Duryee (1863), 1 Wall. 531, Grier, J.: (570) "We find here no authority to grant a patent for a 'principle' or a 'mode of operation' or an *idea* or any other abstraction. . . . A machine is not a principle or an idea. The use of ill-defined abstract phraseology is the frequent source of error. It requires no great ingenuity to mystify a subject by the use of abstract terms of indefinite or equivocal meaning. Because the law requires a patentee to explain the mode of operation of his peculiar machine, which distinguishes it from others, it does not authorize a patent for a 'mode of operation as exhibited in a machine.'" This latter sentence must not be understood to deny that the mode of operation is *covered* by the patent, only that the mode of operation apart from the tangible embodiment, is not patentable subject-matter. See also Hatch *v.* Moffitt (1883), 15 Fed. Rep. 252, and cases named under § 172.

§ 175. [1] In spite of some doubts on the part of judges and law-writers as to the existence of such a distinction as is here indicated between machines and other instruments, it is nevertheless certain that the harmony of the law and the proper application of the decisions of the courts to their subject-matter require it to be drawn. The

struments receive their law of operation as well as their motive power from exterior sources, and act in a variety of methods according to the will of their employer or the *modus operandi* of the machine to which they may be temporarily attached. The structural law of a machine, however, is its

whole doctrine of "*modus operandi*," as the distinguishing element of a machine, is involved in it and inexplicable without it; and it has been sufficiently recognized to place it among the established features of our patent system. Thus in Hammerschlag *v.* Scamoni (1881), 7 Fed. Rep. 584, Blatchford, J.: (589) "In all machinery, the arrangement of it is designed to secure the operation of laws whose operation is certain to follow such arrangement of it, and those certain laws are the laws of nature; and it is because those known laws are certain to follow such arrangement, that the arrangement is made. The arrangement is none the less an invention because it brings into operation the laws of nature." 20 O. G. 75 (76).

So also in Parker *v.* Hulme (1849), 1 Fisher, 44, Kane, J.: (50) "All machines may be regarded as merely devices, by the instrumentality of which the laws of nature are made applicable and operative to the production of a particular result. He who first discovers that a law of nature can be so applied, and having devised machinery to make it operative, introduces it in a practical form to the knowledge of his fellow-men, is a discoverer and inventor of the highest grade, — not merely of the mechanism, the combination of iron, brass, and wood, in the form of levers, screws, or pulleys, but the force which operates through the mechanical medium — the principle — or, to use the synonyme given for this term in the act of 1793, the *character* of the machine, and this title, as a discoverer, he may lawfully assert, and secure to himself by letters-patent; thus establishing his property, not only in the formal device for which mechanical ingenuity can at once, as soon as the principle is known, imagine a thousand substitutes, — some as good, others better, perhaps all dissimilar, yet all illustrative of the same principle, and depending on it, — but in the essential principle which his machine was the first to embody, to exemplify, to illustrate, to make operative, and to announce to mankind."

That a machine is an organization of materials and that its characteristics are in the organism, not in the materials or their arrangement merely, see Bailey Washing & Wringing Mach. Co. *v.* Lincoln (1871), 4 Fisher, 379.

Among the statements which appear to deny this characteristic of a machine, the following may be cited: In Coupe *v.* Weatherhead (1883), 23 O. G., 1927, Lowell, J.: (1928) "The argument that a machine must be automatic in order to be patentable is not sound. A piano is not automatic, nor is any tool or implement intended for use by hand, but improvements in any such tool used in an art or industry are patentable." 16 Fed. Rep. 673 (675). But here it is evident that the term "machine" is employed as a synonyme of "instrument," and not in its technical sense as one class of instruments. A piano is not a machine, though the mechanism which is constituted by each of its keys, in connection with its own hammer, &c., might be so regarded; nor is a tool or an implement characterized by any *modus operandi*, but is an ordinary manufacture. See also *Ex parte* Blythe (1884), 30 O. G. 1321.

one enduring and essential characteristic. It becomes a complete invention only when it is capable of entire practical obedience to this law; and when its power to correspond therewith is interrupted or destroyed, it at once ceases to be the machine on which that law was formerly imposed.

§ 176. Machine may be a Simple Machine or a Combination.

A machine may be either a single organism or a combination of organisms so related to each other as to co-operate, successively or simultaneously, in the production of the required result.[1] When it is composed of parts, none of which

§ 176. [1] In Union Sugar Refinery *v.* Matthiesson & Co. (1865), 3 Clifford, 639, Clifford, J.: (641) "Inventions pertaining to machines may . . . be divided into four classes. First, where the invention embraces the entire machine, as a car for a railway, or a sewing-machine, as was decided by this court in a well-known case. Such inventions are seldom made, but when made, and duly patented, any person is an infringer who, without license, makes or uses any portion of the machine. Under such a patent the patentee holds the exclusive right to make, use, and vend to others to be used, the entire machine; and if another, without license, makes, uses, or vends any portion of it, he invades the right of the patentee. The second class of inventions referred to are those which embrace one or more of the elements of the machine, but not the entire machine; as the coulter of the plough, or the divider of the reaping-machine. In patents of that class any person may make, use, or vend all other parts of the machine or implement, and he may employ a coulter or a divider in the machine mentioned, provided it be substantially different from that embraced in the patent. The third class of machines which are to be mentioned are those which embrace both a new element, and a new combination of elements previously used and well-known. The property in the patent in such a case consists in the new element and in the new combination. No one can lawfully make, use, or vend the machine containing such new element or such new combination. They may make, vend, or use the machine without the patented improvements, if it is capable of such use; but they cannot use either of those improvements, without making themselves liable as infringers. The fourth class of machines to be mentioned are those where all the elements of the machine are old, and where the invention consists in a new combination of those elements, whereby a new and useful result is obtained. Most of the modern machines are of this class, and many of them are of great utility and value." 2 Fisher, 600 (605).

That any new combination or organization of old mechanical elements may be a machine, see Wintermute *v.* Redington (1856), 1 Fisher, 239.

But that no co-operation between the product and the machine while in action will make the two together a new machine, see Dederick *v.* Cassell (1881), 20 O. G. 1233; 9 Fed. Rep. 306.

That the combination of two existing machines is patentable, see Holliday *v.* Rheem (1852), 18 Penn. St. 465.

without all the others constitute a machine, or when certain of its parts form a complete machine but the other portions, whether taken singly or together, are incapable of organic action, the machine is a single organism. But when two or more machines, each in itself complete and operating in accordance with its own law, are united in a new organism the elemental machines of which co-operate to effect a single result, their union forms a combination, which is a new machine with a new rule of action, distinct in law as well as in mechanics from any and from all of the subordinate machines of which it is composed.

§ 177. Machine Distinct from its Integral Parts or Elements.

As its rule of action is the only essential characteristic of a machine, its various parts if it be a single organism, or if it be a combination its elemental machines, may either be original with its inventor or may be borrowed by him from nature or from the inventions of other men.[1] A union of old parts, or a combination of old machines, is as truly a new machine, provided the rule of action be new, as if all the parts or elements were previously unknown. In like manner, the force employed as the motive power of the machine, and the effect produced by it in the objects upon which it acts, may be old or new; for the machine still operates in obedience to its inherent law, from whatever source its energies are drawn, and on whatever substance its activities are exercised.

§ 178. Essential Attributes of a Machine.

The essence of a machine thus consists of its principle, or structural law. Its shape, appearance, size, materials, and arrangement are of no importance, except as they control its mode of operation.[1] No change in any of its parts, no sub-

§ 177. [1] That it is not necessary that every part of a machine be invented by the patentee, see Holliday *v.* Rheem (1852), 18 Penn. St. 465.

§ 178. [1] In Union Paper Bag Machine Co. *v.* Murphy (1877), 97 U. S. 120, Clifford, J.: (125) "The court or jury, as the case may be, are not to judge about similarities or differences by the names of things, but are to look at the machines or their several devices or elements in the light of what they do, or what office or function they perform and how they perform it, and to find that one thing is substantially the same as another if it performs sub-

stitution of a new part for an old where the same office is performed by both, or of another motive power for that origi-

stantially the same function in substantially the same way to obtain the same result, always bearing in mind that devices in a patented machine are different, in the sense of the patent law, when they perform different functions, or in a different way, or produce a substantially different result. Nor is it safe to give much heed to the fact that the corresponding device in two machines, organized to accomplish the same result, is different in shape or form, the one from the other, as it is necessary in every such investigation to look at the mode of operation or the way the device works, and at the result as well as at the means by which the result is attained. Inquiries of this kind are often attended with difficulty ; but if special attention is given to such portions of a given device as really do the work, so as not to give undue importance to other parts of the same, which are only used as a convenient mode of constructing the entire device, the difficulty attending the investigation will be greatly diminished, if not entirely overcome." 13 O G. 366 (367).

In Union Sugar Refinery *v.* Matthiesson & Co. (1865), 3 Clifford, 639, Clifford, J. : (663) " In determining that question, you are not to determine about similarities or differences merely by the names of things ; you are to look at the machines and their several devices and elements in the light of what they do, or what office or function they perform, and how they perform it ; and to find that a thing is substantially the same as another if it performs substantially the same function or office in substantially the same way, to attain substantially the same result ; and that the things are substantially different when they perform different duties in substantially a different way, or produce a substantially different result. For the same reasons you are not to judge about similarities or differences merely because things are apparently the same or apparently different in shape or form ; but the true test of similarity or difference in making the comparison is the same in regard to shape or form as in regard to name, and in both cases you must look at the mode of operation, — the way that the parts work, and at the result, as well as at the means by which the result is attained. In all your inquiries about the mode of operation of other machines, you are to inquire about and consider more particularly those portions of the particular part or element which really do the work, so as not to attach too much importance to the other portions of the same part, which are only used as a convenient method of constructing the entire part or device. You will regard a well-known substantial equivalent of a thing as being the same as the thing itself ; so that, if two machines, having the same mode of operation, do the same work in substantially the same way, and accomplish the same result, they are the same. And so, also, if the parts of two machines, having the same mode of operation, do the same work in substantially the same way, and accomplish substantially the same result, those parts are the same, although they may differ in name, form, or shape. But in both cases, if the two things perform a different work, or in a way substantially different, or do not accomplish the same result, then they are substantially different." 2 Fisher, 600 (626).

In Eames *v.* Cooke (1860), 2 Fisher, 146, Sprague, J. : (148) " In comparing the plaintiff's patent with any other machine in order to determine whether

nally employed by the inventor, although such change or substitution may increase the speed, capacity, or usefulness of the

the mechanism is the same, we must first see whether such other contains substantially the same devices, and if it does, then whether the arrangement or mode of applying them is substantially the same. . . . If either the devices or the mode of applying them, in any other machine, be substantially different from the plaintiff's, then it is not the same. In order to determine whether the mechanism of any other machine is the same as the plaintiff's, we may not only look at the mechanism itself, — that is, the devices and the arrangement of them, — but also at their mode of operation, and their effects or results. If the mode of operation be different, it is evidence that the mechanism is different. Or, if the result be different, then, reasoning from effects to causes, we may presume that some new instrumentality has been introduced. If, upon examining the mechanism, we find that it is substantially different in two machines, then they are not the same, although they may produce the same result. That would be the common case where the same end is attained by different processes or instrumentalities. But, if a materially different result is reached, it is evidence of some new course or means, although the mechanism may, apparently, be substantially the same. Hence a greater degree of utility being achieved by one machine is evidence, and sometimes conclusive evidence, of novelty in the means or instrumentalities which are used."

In Latta *v.* Shawk (1859), 1 Fisher, 465, Leavitt, J.: (470) "On the question of identity the law regards substance and not form, and the real question is, whether the machine used by the defendant is in *principle* the same as that patented to the plaintiff. . . . By the term 'principle of a machine' we understand its mode or manner of operation, and hence there may be two structures widely different in appearance or dimensions, and yet identically the same in principle." 1 Bond, 259 (264).

In Foss *v.* Herbert (1856), 1 Bissell, 121, Drummond, J.: (126) "A machine is an infringement of another if it incorporates in its structure and operation, the substance of the invention; that is, by an arrangement of mechanism which performs the same service, or produces the same effect in the same way, or substantially the same way. Mere colorable alterations, or adroit evasions, by substituting one mechanical equivalent for another in the combination which constitutes the machine, should never be allowed to protect a party. . . . (127) The question to be determined is, whether, under a variation of form, or by the use of a thing which bears a different name, the defendant accomplishes, in his machine, the same purpose, object or effect, as that accomplished by the patentee, or whether there is a real change of structure and purpose." 2 Fisher, 31 (36).

In Tatham *v.* Le Roy (1852), 2 Blatch. 474, Nelson, J.: (488) "It will be seen from these observations, that a difference in the mechanical arrangement and construction of the two machines is not necessarily a test by which to determine that the two are not identical. They may be, apparently, very different externally, and still embrace the same substantial identity in principle or mode of operation. So, on the other hand, the converse of the proposition is equally true. The two may, apparently, be very similar externally, and still in principle and mode of operation be very different. I do not know any better mode of examining a question of this kind, than to inquire

machine, can alter its essential character, as long as it still operates according to the same inherent law. Yet greater

whether the mechanical arrangement and construction of the two embrace the same set of ideas, the same leading features or ideas, which, in practical operation, produce the useful result. In other words, whether the arrangement and combination of the parts of machinery found in each are substantially the same, and operate in substantially the same way in producing the result. Hence, the real question in this case, as it respects the identity of the two machines, looks simply to their mechanical arrangement and construction, as to whether or not the defendant's incorporates, in its structure and operation, the spirit and substance of the plaintiff's improvement; that is, uses the arrangement and mechanism of the plaintiff's to perform the same functions or produce the same effect in the same way, or substantially the same way."

In Barrett *v.* Hall (1818), 1 Mason, 447, Story, J.: (470) "In the minds of some men, a principle means an elementary truth, or power, so that in the view of such men, all machines which perform their appropriate functions by motion, in whatever way produced, are alike in principle, since motion is the element employed. No one, however, in the least acquainted with law, would for a moment contend that a principle in this sense is the subject of a patent; and if it were otherwise, it would put an end to all patents for all machines which employed motion, for this has been known as a principle, or elementary power, from the beginning of time. The true legal meaning of the principle of a machine, with reference to the patent act, is the peculiar structure or constituent parts of such machine. And in this view the question may be very properly asked, in cases of doubt or complexity, of skilful persons, whether the principles of two machines be the same or different. Now the principles of two machines may be the same, although the form or proportions may be different. They may substantially employ the same power in the same way, though the external mechanism be apparently different. On the other hand, the principles of two machines may be very different, although their external structure may have great similarity in many respects." 1 Robb, 207 (231).

In Evans *v.* Eaton (1818), 3 Washington, 443, Washington, J.: (449) "We take the rule to be, and so it has been settled in this and other courts, that, if the two machines be substantially the same, and operate in the same manner, to produce the same result, though they may differ in form, proportions, and utility, they are the same in principle; and the one last discovered has no other merit than that of being an improved imitation of the one before discovered and in use, for which no valid patent can be granted to any one; &c." 1 Robb, 193 (199).

In Odiorne *v.* Winkley (1814), 2 Gallison, 51, Story, J.: (54) "It is often a point of intrinsic difficulty to decide whether one machine operates upon the same principles as another. In the present improved state of mechanics, the same elements of motion, and the same powers must be employed in almost all machines. The lever, the wheel, and the screw, are powers well known; and if no person could be entitled to a patent who used them in his machine, it would be in vain to seek for a patent. The material question, therefore, is not whether the same elements of motion, or the same component parts are used, but whether the given effect is produced substantially by

usefulness or an increased economy of time or power may, in the absence of all other evidence, sometimes suffice to demonstrate that the structural law itself has undergone a change, and therefore that a new machine has been created.

the same mode of operation and the same combination of powers in both machines." 1 Robb, 52 (55).

Further, that identity of machines consists in identity of principle or mode of operation, see Morley Sewing Mach. Co. *v.* Lancaster (1885), 23 Fed. Rep. 344; Blanchard *v.* Puttman (1867), 2 Bond, 84; 3 Fisher, 186; Cahoon *v.* Ring (1859), 1 Fisher, 397; 1 Clifford, 592; Foss *v.* Herbert (1856), 1 Bissell, 121; 2 Fisher, 31; Sickels *v.* Borden (1856), 3 Blatch. 535; Blanchard *v.* Beers (1852), 2 Blatch. 411; Parker *v.* Stiles (1849), 5 McLean, 44; Brooks *v.* Bicknell (1844), 3 McLean, 432; Evans *v.* Eaton (1822), 7 Wheaton, 356; 1 Robb, 336.

The same proposition is stated by the courts in various ways. Thus, for example, that machines are identical when they perform the same function, or attain the same result in the same way, see Cantrell *v.* Wallick (1886), 117 U. S. 689; 35 O. G. 871; Holly *v.* Vergennes Mach. Co. (1880), 4 Fed. Rep. 74; 18 Blatch. 327; 18 O. G. 1177; Wicke *v.* Ostrum (1880), 103 U. S. 461; 19 O. G. 867; Tatham *v.* Le Roy (1852), 2 Blatch. 474; Brooks *v.* Bicknell (1844), 3 McLean, 432.

That differences in the shape of the parts of the machine do not disturb its identity, if the mode of operation remains unchanged, see Blanchard *v.* Puttman (1867), 3 Fisher, 186; 2 Bond, 84; Sickels *v.* Borden (1856), 3 Blatch. 535; Wilson *v.* Barnum (1849), 2 Fisher, 635; 2 Robb, 749.

That difference in the arrangement of parts does not destroy the identity of the machine unless its structural law is changed, see Ives *v.* Hamilton (1875), 92 U. S. 426; 10 O. G. 336; Florence Sewing Mach. Co. *v.* Grover & Baker Sewing Mach. Co. (1872), 110 Mass. 70; Roberts *v.* Ward (1849), 4 McLean, 565; 2 Robb, 746.

That mode of use does not change the machine unless the structural law is also changed, see Sewing Mach. Co. *v.* Frame (1884), 24 Fed. Rep. 596; 28 O. G. 96.

But that any change producing a new result indicates a change in the mode of operation, and hence produces a new machine, see Sewing Mach. Co. *v.* Frame (1884), 24 Fed. Rep. 596; 28 O. G. 96; Barber *v.* Hallett (1879), 20 O. G. 449; 10 Fed. Rep. 130.

And that even a change in the rapidity or economy with which the machine operates may show the existence of a new mode of operation, see Gallahue *v.* Butterfield (1872), 2 O. G. 645; 10 Blatch. 232; 6 Fisher, 203.

That such a change in a machine that it requires fewer persons to operate it indicates that it is a different machine, see Coupe *v.* Weatherhead (1883), 23 O. G. 1927; 16 Fed. Rep. 673.

That changes in the materials of which a machine is composed, unless affecting the principle on which it operates, do not disturb its identity, see Bailey Washing & Wringing Mach. Co. *v.* Lincoln (1871), 4 Fisher, 379.

That to omit some parts of a machine and add others may make a new machine, see Coupe *v.* Weatherhead (1883), 23 O. G. 1927; 16 Fed. Rep. 673.

§ 179. Machine a Unit: its Unity how Destroyed.

The unity of a machine also resides in the same rule of action. Whether composed of a single organism or of several subordinate organisms, as a machine it is a unit, and is destroyed whenever any change, addition, or withdrawal of its elements results in the alteration of its structural law.[1]

§ 179. [1] All the cases cited in the notes to § 178 bear upon this question of the unity of a machine. In addition thereto are the following, equally germane perhaps to the doctrines of identity and individuality. In Seymour *v.* Osborne (1870), 11 Wall. 516, Clifford, J.: (548) "Particular changes may be made in the construction and operation of an old machine so as to adapt it to a new and valuable use not known before, and to which the old machine had not been, and could not be, applied without those changes; and under those circumstances, if the machine, as changed and modified, produces a new and useful result, it may be patented, and the patent will be upheld under the existing laws. Such a change in an old machine may consist merely of a new and useful combination of the several parts of which the old machine is composed, or it may consist of a material alteration or modification of one or more of the several devices which entered into its construction, and whether it be one or the other, if the change of construction and operation actually adapts the machine to a new and valuable use not known before, and it actually produces a new and useful result, then a patent may be granted for the same, and it will be upheld as a patentable improvement."

In Stainthorp *v.* Humiston (1864), 4 Fisher, 107, Hall, J.: (110) "Upon the question of identity of machines, or of mechanical devices, whenever that question arises in a patent case, the mode of operation and the result produced are important considerations; and if the modes of operation and the results produced are both clearly and substantially different, when the material or substance brought under their operation is the same, the question of identity must ordinarily, at least, be determined in the negative; and this is generally true, whether the invention patented is an organized machine, or an improvement upon an existing machine; and whether the patent is for a machine or a mechanical device, new in all its parts, or merely for a combination of two or more well known existing machines or mechanical devices."

In Brooks *v.* Bicknell (1843), 3 McLean, 250, McLean, J.: (262) "It may be proper, however, to remark, that a mere colorable or slight alteration of a machine, or a change in its proportions, gives no ground for a patent; nor can it shelter an individual from the consequences of an infringement. In such cases the inquiry always is, whether the principle of the two machines is the same. If the principle on which the machinery works is the same, and the effect is similar in both, in contemplation of law the machines are identical. A change in the position of the operating powers or in the thing on which the effect is produced, is of no importance. Such a modification does not rise to the dignity of an invention. There must be an essential difference in the application of the mechanical power, to make the machines dissimilar." 2 Robb, 118 (130).

That the principle is the essence of the machine, and may remain the same though the machine be apparently much

While this law remains undisturbed, any such change, addition, or subtraction is at the most an improvement on the old machine, however marked may be the effect produced upon its shape or usefulness. But when the increase or withdrawal of its parts introduces a new law or mode of operation, with or without a change in shape or usefulness, the unity of the machine disappears and a new instrument is substituted for the old.

§ 180. Machine not Complete until Reduced to Practice.

Although the *modus operandi* is thus the essence of the machine, it becomes entitled to protection by a patent only when reduced to practice and embodied in an operative instrument.[1] An operative instrument is one capable of immediate practical use in the arts, in the manner proposed by its inventor. The expression of his idea in language, drawings, or a model does not fulfil the requirements of the law. A machine must be constructed of sufficient size, strength, and capacity to serve

changed, see Smith *v.* Higgins (1859), 1 Fisher, 537.

That no change in the mode of use of the machine can make it a different machine unless the principle be changed, see Sewing Mach. Co. *v.* Frame (1884), 24 Fed. Rep. 596; 28 O. G. 96; Boston Elastic Fabrics Co. *v.* East Hampton Rubber Thread Co. (1874), Holmes, 372; 5 O. G. 696; 1 Bann. & A. 222.

That unless the organism be changed the unity of the machine is not affected, see Seymour *v.* Marsh (1872), 6 Fisher, 115; 9 Phila. 380; 2 O. G. 675.

And that the introduction into a compound machine of one new operating agency does change the principle and destroy the unity, see Sanford *v.* Merrimac Hat Co. (1876), 4 Clifford, 404; 10 O. G. 466; 2 Bann. & A. 408; Le Roy *v.* Tatham (1859), 22 How. 132.

§ 180. [1] That the inventive act is complete only when an operative machine is produced, see Knox *v.* Loweree (1874), 6 O. G. 802; 1 Bann. & A. 589; Burr *v.* Duryee (1863), 1 Wall. 531; Hayden *v.* Suffolk Mfg. Co. (1862), 4 Fisher, 86; Winans *v.* N. Y. & Harlem R. R. Co. (1855), 4 Fisher, 1; Pitts *v.* Wemple (1855), 2 Fisher, 10; 1 Bissell, 87.

That the machine, if clearly capable of use, need not have been actually operated in public, see Knox *v.* Loweree (1874), 6 O. G. 802; 1 Bann. & A. 589; Wheeler *v.* Clipper Mower & Reaper Co. (1872), 2 O. G. 442; 10 Blatch. 181; 6 Fisher, 1; Hayden *v.* Suffolk Mfg. Co. (1862), 4 Fisher, 86; Pitts *v.* Wemple (1855), 2 Fisher, 10; 1 Bissell, 87.

That a rude machine, made for experiment and then abandoned, is not a practically operative machine, see Gottfried *v.* Phillip Best Brewing Co. (1879), 17 O. G. 675; 5 Bann. & A. 4.

But that the machine need not be perfect provided it be practically operative, see Wheeler *v.* Clipper Mower & Reaper Co. (1872), 2 O. G. 442; 10 Blatch. 181; 6 Fisher, 1.

as an effective means for the accomplishment of its predetermined end. Its sufficiency, if not apparent on its face, must be demonstrated by such tests as prove its readiness for immediate public use. But otherwise than for the purposes of such demonstration, it need not have been actually employed; nor is it necessary that its mechanical execution be so perfect as to leave no room for further improvement.

§ 181. Machine Reducible to Practice in Many Forms: all Identical Inventions.

It is evident that the structural law or idea of means embodied in a machine must often be capable of expression through several mechanical structures, differing from each other either in the shape, the number, or the arrangement of their subordinate parts. Each of these different structures is, however, the same machine. The inventor may select whatever form he chooses for the embodiment of his idea, but all its various forms are supposed to be present to his mind, and to be equally his property with that which he adopted and delineated in his application for a patent. And therefore his letters-patent, when obtained, protect him as effectually against all other possible embodiments of the same structural law as against the imitation or appropriation of the one he has described.

SECTION III.

OF A MANUFACTURE.

§ 182. "Manufacture" Defined.

A manufacture is an instrument created by the exercise of mechanical forces and designed for the production of mechanical effects, but not capable, when set in motion, of attaining by its own operation to any predetermined result. It has no inherent law which compels it to perform its functions in a given method, but receives its rule of action from the external source which furnishes its motive power. In this absence of "principle" or "*modus operandi*" lies the distinction

between a manufacture and a machine, — the former requiring the constant guidance and control of some separate intelligent agent, the latter operating under the direction of that intelligence with which it was endowed by its inventor when he imposed on it its structural law.

§ 183. "Manufactures" a Comprehensive Class of Inventions.

The species of inventions belonging to this class are very numerous, comprehending every article devised by man except machinery upon the one side, and compositions of matter and designs upon the other. Thus the parts of a machine considered separately from the machine itself, all kinds of tools and fabrics, and every other vendible substance which is neither a complete machine nor produced by the mere union of ingredients, is included under the title "manufacture."[1] The mechanical effects which they are intended to produce are of all varieties, from the simple interruption of the action of natural forces to the direction and application of forces artificially developed. In this wide field of inventions many articles must, of course, be found lying so close to the dividing line that doubt may well arise whether they do not more properly belong to the class which follows or precedes it; but even here careful attention to the exact idea of means which the inventor has intended to express will usually remove all ambiguity.

§ 184. Manufacture Distinct from its Component Substances and from the Means Employed in its Production.

A manufacture is an entity distinct from the substances of which it is composed, and from the instruments or art by which it is produced.[1] It is an instrument by itself, embody-

§ 183. [1] That an article of ornament, if of new utility also, may be a manufacture, see Simpson *v.* Davis (1882), 20 Blatch. 413; 12 Fed. Rep. 144.

That a bond and coupon register, in the form of a book, is a manufacture, see Munson *v.* Mayor of N. Y. (1880), 3 Fed. Rep. 338; 18 Blatch. 237; 5 Bann. & A. 486.

That a wood pavement is a manufacture, see Stead *v.* Williams (1843), 2 Web. 126.

§ 184. [1] In Milligan & Higgins Glue Co. *v.* Upton (1874), 4 Clifford, 237, Clifford, J.: (251) "Nothing short of invention or discovery will support a patent for a manufacture, any more than for an art, machine, or composition

ing a separate and complete idea of means, and derives from this idea its own essential character. If known already to the

of matter, as is clearly illustrated in another case decided in this circuit: Merrill *v.* Yeomans, 5 Gaz. 267; where the circuit judge says that a patentee who has invented a process in the arts, whereby an article of manufacture is produced, new in kind and not before known, may separately claim and patent both the art and the manufacture, if both are new and useful in the sense of the patent law; and it is doubtless true, if the thing be new in and of itself, it is patentable as a new manufacture, and that the patent would be infringed by the unlicensed construction or use of the product, though produced by other means than those described in the specifications of the patent. Inventions of the kind are rare, as it much more frequently happens that the process is inseparable from the product, so that the patentee cannot claim the product if produced by hand tools, or by other means substantially different from those employed by the inventor or discoverer. Patentees in the former case may claim the new product without qualification, but in the latter, they should claim the product only when made by the described means or their equivalents, as the process inheres in the manufacture and constitutes an element of the invention." 6 O. G. 837 (842); 1 Bann. & A. 497 (512).

In Wooster *v.* Calhoun (1873), 11 Blatch. 215, Woodruff, J.: (216) "Nor am I prepared to assent to the proposition, that the product of a machine is patentable on the mere ground that it makes an already known article more perfectly than it has been, or can be, made without a machine. The idea being old, men strive to embody it perfectly. Human skill is exhausted in the effort. Human hands, less exact and unvarying in their movements, only approximate perfection. A machine is devised which makes it better than it has ever before been made. Another machine is invented which approaches more nearly. Still another machine is invented which performs, it may be, better, — it may be, not so well. Is the product of the best human skill, in such case, patentable? Is the product of each successive machine patentable? If all the makers are not entitled to a patent for the article, as a product, which of them is entitled? Surely, improvements in degree or quality are not the subject of a patent." 6 Fisher, 514 (516).

In The Wood-Paper Patent (1873), 23 Wall. 566, Strong, J.: (593) "It is quite obvious that a manufacture, or a product of a process, may be no novelty, while, at the same time, the process or agency by which it is produced may be both new and useful, — a great improvement on any previously known process, and therefore patentable as such. And it is equally clear, in cases of chemical inventions, that when, as in the present case, the manufacture claimed as novel is not a new composition of matter, but an extract, obtained by the decomposition or disintegration of material substances, it cannot be of importance from what it has been extracted. There are many things, well known and valuable in medicine, or in the arts, which may be extracted from divers substances. But the extract is the same, no matter from what it has been taken. A process to obtain it from a subject from which it has never been taken may be the creature of invention, but the thing itself, when obtained, cannot be called a new manufacture. It may have been in existence and in common use before the

arts, its production by a new process or by new instruments cannot make it new; nor if unknown is it the less a new invention that the agencies or methods by which it is now evolved are old. As to all the conditions required to render it a patentable invention it must stand or fall alone.

§ 185. Manufacture may be a Simple Manufacture or a Combination.

A manufacture may consist of a single instrument, or of a combination of instruments which act together for a common purpose. The instrument is single where none of the parts of which the manufacture is composed could be used without other parts in the production of mechanical effects. But where two or more single instruments are united in a new instrument, and co-operate with each other in the production of an effect beyond the sum of the effects of the individual instruments, they form a combination which is a new manufacture. The distinction between a combination and an aggregation is

new means of obtaining it was invented, and possibly before it was known that it could be extracted from the subject to which the new process is applied. Thus, if one should discover a mode, or contrive a process, by which prussic acid could be obtained from a subject in which it is not now known to exist, he might have a patent for his process, but not for prussic acid."

That a manufacture is not new and patentable unless the creative act in which it originated is distinct from that required to invent the process or apparatus by which it is made, see Union Paper Collar Co. *v.* Van Deusen (1875), 23 Wall. 530; 7 O. G. 919; Draper *v.* Hudson (1873), 3 O. G. 354; Holmes, 208; 6 Fisher, 327.

That a manufacture, if new in itself, may be patentable, whether the process or apparatus by which it is produced be new or old, see Anilin *v.* Hamilton Mfg. Co. (1878), 13 O. G. 273; 3 Bann. & A. 235; Draper *v.* Hudson (1873), 3 O. G. 354; 6 Fisher, 327; Holmes, 208; Young *v.* Lippman (1872), 2 O. G. 249; 9 Blatch. 277; 5 Fisher, 230; Woodward *v.* Morrison (1872), 2 O. G. 120; Holmes, 124; 5 Fisher, 357.

That a manufacture is an invention distinct from the mode of producing it, see United Nickel Co. *v.* Pendleton (1883), 21 Blatch. 226; 24 O. G. 704.

That a new process producing a new manufacture involves two separate inventive acts, see Tucker *v.* Dana (1881), 7 Fed. Rep. 213; *Ex parte* Bancroft (1881), 20 O. G. 1893.

That to make an article by a new process or new apparatus is not to produce a new manufacture, see McCloskey *v.* Dubois (1881), 19 Blatch. 205; 8 Fed. Rep. 710; 19 O. G. 1286; 20 O. G. 371; McCloskey *v.* Dubois (1881), 20 Blatch. 7; 9 Fed. Rep. 38; Anilin *v.* Hamilton Mfg. Co. (1878), 13 O. G. 273; 3 Bann. & A. 235; Draper *v.* Hudson (1873), 6 Fisher, 327; 3 O. G. 354; Holmes, 208; Rex *v.* Else (1785), 1 Web. 76; 1 Abb. P. C. 40.

not as easily discerned in this class of inventions as in the case of a machine. Where two machines, each having its own law of operation, are united, it is not generally difficult to ascertain whether each operates only according to its own peculiar law, or whether by their union a new structural law has been imposed on the conjoined machines, whereby they have become the expression of a new idea of means which severally and collectively they did not suggest. But in a manufacture the law of operation is in the source from which the motive power is drawn; and the action of the instruments in their united state, so far as it depends upon the instruments themselves, often remains the same as before they were united. In such cases the act of the inventor in the collocation of these instruments gives the resulting instrument no new inherent mode of operation, but simply places the collocated instruments in such relations to a common object that under the direction of the external motive power their co-action upon it or upon each other may produce some effect which, if they acted separately, could not be obtained. Thus it may be assumed as to most inventions of this class that a true combination has been formed whenever the action of the combined elements leads to a result essentially distinct from any that could be attained by the employment of the elements in a separated state, although the mode of their co-operation cannot be perceived;[1] while in a machine the principal if not the sole test of the formation of a new combination is to be sought, not in its product or result, but in its manifestation of a new structural law.

§ 185. [1] That a new end or result is accomplished by an art or instrument is conclusive evidence that the art or instrument is also new. Hence when the collocation of two simple manufactures produces an instrument capable of doing what neither manufacture could have done alone, and what both could not have done if each were used independently of the other, this resulting instrument is necessarily a different manufacture, whether the fact or the mode of the co-operation between the combined instruments is otherwise discernible or not. It may well be doubted whether many of the cases which have been decided against the patentees of manufactures on the ground that the instrument claimed was a mere aggregation have not been governed by principles applicable rather to machines than manufactures, and really meritorious inventions been thus denied the protection of the law.

§ 186. Manufacture may be Composed of Known Substances.

The substances of which a manufacture is composed form no part of its essential nature, except so far as their respective properties endow it with its characteristic attributes. The idea embodied in it is an idea distinct from that which is expressed in any of its integral elements, and may be capable of the same embodiment in an instrument composed of different members. That all these substances or elements have long been known, or even that they have previously been associated in an instrument effecting the same end, is immaterial. As in all other cases, the inventor of a manufacture is free to select any sufficient method of embodying his conception of the instrument, and does not imperil his own creation by using the same tangible materials which others have employed.

§ 187. Manufacture Identical however Produced.

Although every manufacture is an instrument essentially distinct in its idea of means from every other instrument, it has sometimes been held that the invention of a method whereby a natural substance can be artificially produced, or a product heretofore too costly for general use can be manufactured at an expense which places it for the first time within reach of the public, entitles the inventor to a monopoly of the substance or the product resulting from the employment of his method, as if it were a new product or substance, legally if not physically different from its natural or costly prototype.[1] This position is manifestly erroneous. The arti-

§ 187. [1] In Stevens *v.* Keating (1847), 2 Web. 181, Pollock, C. B.: (182) "All patents must be for a manufacture. The real invention may be not so much for the thing when produced as for the mode in which it is produced; and its novelty may consist not so much in its existence as a new substance, as in its being an old substance, but produced by a different process. In one sense, an old substance produced by a new process is a new manufacture; of that there cannot be a doubt; and therefore, although the language of the Act has been said to apply only to manufactures and not to processes, when you come to examine it, either literally or even strictly, it appears to me the expression 'manufacture' is free from objection, because, though an old thing, if made in a new way, the very making of it in a new way makes it a new manufacture." And in this country it has been held that to make by artificial means a substance, which as a natural product is already known in the arts, is

ficial or inexpensive substance, or, what is the same thing, the fact that the substance can be artificially or inexpensively produced, may indeed have been discovered by the inventor, but this discovery is not the creation of a means, it is merely the discerning of an end to be accomplished by the method which he has devised. Were the substance itself hitherto unknown an inventive act would be required for its production, but being known its reproduction by a new method cannot change its essential characteristics, nor demand any other exercise of the inventive faculties than such as are engaged in the creation of the method from which it results. While, therefore, the inventor may have added to the stock of scientific knowledge by his discovery that the substance can be manufactured artificially or cheaply, it is not this discovery which confers upon the public any practical advantage. It is only when he discovers and constructs a process or device by which the substance can be artificially or inexpensively supplied, that he increases the industrial appliances of mankind, and brings the fruit of his researches and experiments within the field of patentable inventions.

a new invention both as to the process and the product. See Anilin *v.* Cochrane (1879), 16 Blatch. 155; Anilin *v.* Higgin (1878), 15 Blatch. 290. So also it has been decided that where an article, though produced before, but at so great an expense as to be useless in the arts, is now supplied by a new method or new apparatus so cheaply as to be available for public use, it is to be treated as in itself a new invention, because although known before it was never reduced to practical utility. See Lamb *v.* Hamblen (1882), 11 Fed. Rep. 722; Hammerschlag *v.* Scamoni (1881), 7 Fed. Rep. 584; 20 O. G. 75.

These decisions have, however, now been overruled and the true doctrine stated in Cochrane *v.* Anilin (1884) 111 U. S. 293, where Blatchford, J., says: (311) "It was an old article. While a new process for producing it was patentable, the product itself could not be patented, even though it was a product made artificially for the first time, in contradistinction to being eliminated from the madder root. Calling it artificial alizarine did not make it a new composition of matter, and patentable as such, by reason of its having been prepared artificially for the first time from anthracine, if it was set forth as alizarine, a well-known substance." 27 O. G. 813 (818). See also Wooster *v.* Calhoun (1873), 11 Blatch. 215; 6 Fisher, 514.

That a new form of an old article may be a new manufacture, see Duff *v.* Calkins (1883), 25 O. G. 601.

That to perceive a hitherto unknown quality in an existing substance is not the invention of a new substance, see Ansonia Brass and Copper Co. *v.* Electrical Supply Co. (1887), 32 Fed. Rep. 81; 42 O. G. 1168.

§ 188. Essential Attributes of a Manufacture.

The essence of a manufacture resides in the idea of means which it embodies. A manufacture, being a finished product, usually impresses the observer as a complete realization of the purposes of the inventor, and suggests the idea of an end accomplished rather than that of a means by which an end may be attained. This impression is, however, incorrect. Until applied by some one, a manufacture is as useless as an unemployed machine; and when applied it benefits the public, not by its mere existence nor by its simple application, but by producing some change in the condition of material objects. Those qualities of the manufacture which enable it, when so applied, to produce those changed conditions are the expression of its idea of means, and by these, as a group of attributes, its essential character is manifested. Whenever its shape, materials, size, or proportions are among these attributes they become the necessary features of the invention, and any change in either constitutes a different means.[1] But when unnecessary to enable it to effect such changes of condition, these qualities of the manufacture may be subjected to any number or degree of substitutions and alterations without destroying its identity.

§ 188. [1] In Emerson *v.* Howe (1881), 8 Fed. Rep. 327, Lowell, J.: (329) "In these patents for small articles slight differences are often important; and, if such things are patentable at all, it must almost always be in virtue of a more useful adaptation to the needs of commerce by small changes of structure, which in a great machine might be merely alternate modes of reaching a part of a general result."

In Glue Co. *v.* Upton (1877), 97 U. S. 3, Field, J.: (6) "A distinction must be observed between a new article of commerce and a new article which, as such, is patentable. Any change in form from a previous condition may render the article new in commerce; as powdered sugar is a different article in commerce from loaf sugar, and ground coffee is a different article in commerce from coffee in the berry. But to render the article new in the sense of the patent law, it must be more or less efficacious, or possess new properties by a combination with other ingredients; not from a mere change of form produced by a mechanical division. It is only where one of these results follows that the product of the compound can be treated as the result of invention or discovery, and be regarded as a new and useful article."

That to pulverize or comminute an existing product, involving no change in its actual properties, though rendering it more convenient for transportation and use, is not to invent a new product, see The Milligan & Higgins Glue Co. *v.* Upton (1874), 4 Clifford, 237; 6 O. G. 837; 1 Bann. & A. 497.

§ 189. Manufacture a Unit: its Unity how Destroyed.

A manufacture is a unit to whose existence the presence of each one of its characteristic attributes is necessary. When the manufacture is a simple instrument, the withdrawal of any attribute destroys its unity; and if those which remain constitute an operative means, the means so constituted is a different manufacture from the former. The addition of an attribute, which so far modifies the action of the others that they can no longer produce the same effects, is also the creation of a new instrument and the destruction of the old; while if the former action and effect are still preserved, but have been brought, by the addition, to a higher excellence or a wider application, the unity of the manufacture continues undisturbed, and the addition is a mere improvement. When the manufacture is a combination of several instruments its unity consists in the correlation of its elemental instruments, and is dissolved by the withdrawal of any one of these essential elements, or by the substitution for either of one which is not in the combination the equivalent of that whose place it occupies, or by any rearrangement of the elements which introduces different methods of co-operation, or by the addition of new elements which modify the action of existing elements upon each other, or upon their common object, in such a manner that their action is no longer able to produce the old result. But when the withdrawal, substitution, or addition leaves the previous co-operation of the elements undisturbed, merely enabling them to achieve their joint result in a more perfect or more serviceable manner, an improvement only has been effected, and the unity of the manufacture still remains unbroken.

§ 190. Manufacture not Complete until Reduced to Practice.

Reduction to practice, in reference to this species of inventions, consists in the production of an operative instrument adapted for immediate public use. The requirements in regard to tests and practical employment are the same as those which govern a machine. Whatever may be necessary, in order to establish the sufficiency of the manufacture for the accomplishment of its proposed results, must be performed

by its inventor before his inventive act is considered as complete and his invention becomes entitled to the protection of the law. Sometimes the instrument carries in itself the evidence of its own capabilities; in other cases actual use is indispensable.

§ 191. Manufacture Reducible to Practice in Many Forms: all Identical Inventions.

The inventor of a manufacture, as of other instruments, by the embodiment of his idea in one operative instrument appropriates to himself all other practical expressions of the same idea. The scope of an idea which is embodied in a manufacture may be very broad, as in the case of most generic simple manufactures, or may be very narrow, as in improvements and in combinations. But whether broad or narrow, under whatever form or name it is embodied, it is always the same manufacture, and belongs to the originator of its characteristic idea.

SECTION IV.

OF A COMPOSITION OF MATTER.

§ 192. "Composition" Defined.

A composition of matter is an instrument formed by the intermixture of two or more ingredients, and possessing properties which belong to none of these ingredients in their separate state. An ingredient is a substance which, though capable of independent existence, may yet so far lose its identity and individuality, when mingled with other substances, as no longer to be distinguishable from them. In this respect it differs from a part or element of a machine or manufacture which, however closely united with its associated parts or elements, always preserves its own identity, and is discernible in its independent as well as in its combined condition. The intermixture of ingredients in a composition of matter may be produced by mechanical or chemical operations, and its result may be a compound substance resolvable

into its constituent elements by mechanical processes, or a new substance which can be destroyed only by chemical analysis. Its properties may be entirely new, — never before possessed by any substance, simple or compound; or may be new only in relation to its own ingredients, being essentially distinct from any with which they are separately or collectively endowed.

§ 193. Composition a True Combination.

A composition of matter is always a true combination. Each of its ingredients is itself a means whose operative forces manifest themselves through the chemical or mechanical properties by which it is distinguished. The intermixture of these ingredients results in the co-operation of their respective forces in such a manner as to produce a new force, which is distinct both from the forces of the individual elements and from the sum of their collective forces, and is exhibited in the new qualities with which the composition is endowed. It differs from all other combinations in that its ingredients or elemental means, when once united in the combination, often become individually undiscernible by human sense, and can be recovered and distinguished only by the destruction of the combination as a whole. This difference leads to radical differences in the rules by which the identity of these elemental forces is determined, as will hereafter be particularly explained.[1]

§ 193. [1] Although the rule is often stated to be that chemical and mechanical equivalents rest on the same basis of principle, the statement cannot be taken without material qualification. As will hereafter (§ 254 and notes) appear, the rule which governs equivalents in mechanical combinations is not the same as that which applies to equivalents in a simple machine or manufacture, — the test in the latter case being that the alleged equivalents perform the same function in the mechanism; in the former case, that they perform the same function in the same way. Chemical equivalents generally follow the rule of equivalents in simple instruments, and are equivalent when they discharge the same office in the composition, and were known as such at the date of its invention. See § 254 and notes; also Roots *v.* Hyndman (1873), 6 Fisher, 439; 4 O. G. 29; Rumford Chemical Works *v.* Lauer (1872), 10 Blatch. 122; 5 Fisher, 615; 3 O. G. 349; Woodward *v.* Morrison (1872), 2 O. G. 120; Holmes, 124; 5 Fisher, 357; Poppenhusen *v.* Falke (1862), 2 Fisher, 213; 5 Blatch. 46; Goodyear *v.* Railroad (1853), 2 Wall. Jr. 356; 1 Fisher, 626.

§ 194. Composition Distinct from its Elements and from their Mode of Intermixture.

A composition of matter is a complete and independent means, having an existence distinct from that of the substances of which it is composed, and from the processes by which it is created. Though these substances are old, the composition may be new. Though they have been already grouped together, the forces then called into action and co-operating in that union may have resulted in a different composition. Though the same mode of intermixture may have been employed in reference to various substances, its application to the present elements may produce a compound never previously known. The character of a composition of matter cannot, therefore, be determined from an examination of its elements alone, nor of the method by which they have been combined. It must be judged also by its own intrinsic attributes. While it must be composed of substances, no particular substance is essential unless it is the only one by which the necessary elemental force can be supplied. While some mode of intermixture must be employed, no special mode is indispensable unless the substances can by no other mode be so united that the same properties will be developed in the composition as a whole.

§ 195. Essential Attributes of a Composition.

The essence of a composition of matter resides in the idea of means expressed by the co-operation of its specific elemental forces in the production of its new and characteristic force. While two compositions which possess different properties are essentially distinct, two compositions which possess the same properties are not necessarily the same. Such compositions are identical only when the forces which are manifested through their characteristic properties result from the same co-operation of the same elemental forces; and this requires that the composition should consist of the same grouping of the same ingredients.[1] Ingredients are the same,

§ 195. [1] In Goodyear v. Berry (1868), 3 Fisher, 439, Leavitt, J.: (449) "The principle is conceded that a patent for a mechanical structure or contrivance, producing a new and useful result, is no protection against the use of an invention producing the same result by appliances and on principles substantially different

however they may differ as mere substances, when they furnish to the composition the same elemental force; and groupings of ingredients are the same when in each grouping every elemental force co-operates with every other in the same manner to produce the new resulting force.[2] Hence no addition, substitution, or withdrawal of ingredients can affect the identity of the composition unless it introduces, or removes, or modifies the action of an elemental force; nor can a change in the proportions of ingredients, or in the order of their intermixture, vary the character of the result unless it summons into action, in the same ingredients, some new elemental force or imposes on existing forces some new method of co-operation.[3]

§ 196. Composition a Unit: its Unity how Destroyed.

A composition of matter is a unit, whose integrity depends upon the preservation of the precise union and co-operation

from the patented invention. The rights of the patentee or proprietor of the patent are only invaded by a result like that of his invention, effected by what are substantially the same means. And so in the case of patented chemical combinations; the exclusive right to the invention imports nothing but protection against the use of the same or substantially the same elements, compounded and treated on principles substantially the same as those of the patented article. In brief, a patent right does not cover every possible mode of accomplishing the result proposed by an inventor." 2 Bond, 189 (202).

That compositions are the same where the same or equivalent ingredients are compounded and treated on principles substantially the same, see Francis *v.* Mellor (1871), 5 Fisher, 153; 1 O. G. 48; Goodyear *v.* Berry (1868), 2 Bond, 189; 3 Fisher, 439.

[2] That two substances are not the same ingredient unless they perform the same office in the composition, though chemically they may be the same, see Bridgeport Wood Finishing Co. *v.* Hooper (1880), 5 Fed. Rep. 63; 20 O. G. 156; 18 Blatch. 459.

That substances are the same ingredient when, in reference to the composition, they have similar properties and produce the same effects, see Matthews *v.* Skates (1860), 1 Fisher, 602.

[3] That the addition of substances which do not change the properties, effect, or usefulness of the composition, do not destroy its identity, see Klein *v.* Russell (1873), 19 Wall. 433.

That the substitution of purer materials, rendering the composition more useful, or useful for additional purposes, analogous to the former ones, if the materials perform the same office, is no change of ingredients or of the composition itself, see Buchan *v.* McKesson (1880), 7 Fed. Rep. 100; 19 O. G. 222; 18 Blatch. 485.

That no change in the shape or appearance of a composition destroys its identity while its properties remain unchanged, see Milligan & Higgins Glue Co. *v.* Upton (1874), 4 Clifford, 237; 6 O. G. 837; 1 Bann. & A. 497.

of those elemental forces which are furnished to it by its essential ingredients. Substances which neither supply the composition with an elemental force nor affect the operation of its elemental forces are not ingredients, and may be added, altered, or withdrawn without attacking its integrity.[1] A change in the ingredients or in their mode of intermixture which leaves the elemental forces and their method of co-operation undisturbed, but yet endows the composition with increased efficiency, is an improvement in the existing composition, not a new one. But every modification in the ingredients or the process of combining them, which varies either the number, character, or co-operation of its elemental forces, is a destruction of its unity, and any composition which results from such a modification of another must be essentially different therefrom.[2]

§ 197. Composition Identical however Produced.

A composition of matter, in order to be patentable, must, like a manufacture, differ in its essential characteristics from any substance previously known.[1] The artificial combination

§196. [1] In Loutrel *v.* Mellor (1871), 1 O. G. 48, McKennan, J.: (51) "While characteristic resemblance is preserved they may, perhaps, be considered as identical within the meaning of the patent law, although one of them may not contain some of the constituents of the other, which are not necessary to impart to it its peculiar attributes."

[2] That to change the proportions of the ingredients and thus secure new properties in the resulting composition is a new invention, see Loutrel *v.* Mellor (1871), 1 O. G. 48; Francis *v.* Mellor (1871), 5 Fisher, 153; 1 O. G. 48.

That to add an ingredient producing new properties in the compound makes a new composition, see Rogers *v.* Ennis (1878), 14 O. G. 601; 15 Blatch. 47.

That to omit one essential ingredient makes of the remainder a different composition, see Tarr *v.* Folsom (1874), 1 Bann. & A. 24; 5 O. G. 92; Holmes, 312.

That to discover the causes of defects in a chemical composition, and devise means to remove them, is the invention of a new chemical composition and covers all modes of curing the defects, see United Nickel Co. *v.* Harris (1878), 15 Blatch. 319; 17 O. G. 325; 3 Bann. & A. 627.

That a composition consisting of certain substances of a given quality, mixed in a specific manner, and producing certain resultant properties, is a different composition from one comprising the same substances but mingled without reference to any particular quality or any special mode of mixing, and possessing different properties, see Muntz *v.* Foster (1843), 2 Web. 93, 96.

§ 197. [1] If the position that a manufacture for the first time made accessible to the public is to be regarded as a new manufacture were correct, the same rule would, of course, apply to compositions

of ingredients into a substance which exists in nature is simply a new process for the production of that substance, not the creation of a new substance; and in such cases the process, not the substance, is the patentable invention.

§ 198. Composition not Complete until Reduced to Practice.

Reduction to practice, in reference to a composition of matter, consists in the actual intermixture of those ingredients which are necessary to supply it with its elemental forces, in such a manner that the co-operation of these forces will endow the resulting compound with its essential characteristic properties.[1] The specific substances employed as ingredients are of no consequence, since all substances are the same ingredient when they furnish to the composition the same elemental force. The particular mode of intermixture is also immaterial, since all modes which subject these elemental forces to the required law of co-operation are identical. A practically operative compound must, however, be produced, capable of immediate useful application. Neither recipes, formulæ, nor descriptions are sufficient. Nor, where tests are necessary in order to determine whether or not the composition possesses those properties which constitute its essential character as an operative means, can the invention be re-

also. The lower courts have been divided on this subject. On one hand it has been urged that an artificial substance is not identical either legally or scientifically with a natural substance, though both are composed of the same constituents and possess the same properties. (See § 187, and notes, *ante.*) On the other hand it has been claimed that the only invention in such cases is a process, either consisting in a specific treatment of new objects, or in applying new forces to the treatment of known objects, and that a patent for the process adequately protects the inventor. (See § 187, and notes, *ante.*) The latter view is correct in principle and has recently been sanctioned by the Supreme Court of the United States. (See Cochrane *v.* Anilin (1884), 111 U. S. 293; 27 O. G. 813.) If proper protection is given in the patent to the process by which the artificial substance is produced, the inventor may secure the exclusive right to the artificial substance resulting from his process or from any process equivalent thereto. To go further and award him a patent for the substance, however produced, would create in him a monopoly in the scientific fact which he has discovered, namely, that the substance can be artificially produced, — a fact which is an effect and not a means.

§ 198. [1] That a chemical invention is not complete if experiment is still necessary to render it operative, see Tyler *v.* Boston (1868), 7 Wall. 327.

garded as complete until such tests have been applied and have been successfully endured.

§ 199. Composition Reducible to Practice in Many Forms: all Identical Inventions.

As a composition of matter is a union of elemental forces, each of which may be supplied by various substances, it is evident that the idea of means which it embodies may often be expressed by several combinations composed of different substances or intermingled in different methods. But in such cases all these combinations are the same composition, representing the same intellectual conception and furnishing to the industrial arts the same operative means. All are therefore presumed to have been contemplated by the inventor, whose idea has been reduced to practice in but one, and by his patent for that one all are alike appropriated to his exclusive use.

SECTION V

OF A DESIGN.

§ 200. "Design" Defined.

A design is an instrument created by the imposition upon a physical substance of some peculiar shape or ornamentation which produces a particular impression upon the human eye, and through the eye upon the mind. Its creation involves a change in the substance itself, and not merely in the mode of presenting it for sale; and affects, not its abstract qualities, nor those on which its practical utility depends, but those only which determine its appearance to the sight.[1] Thus, while an

§ 200. [1] In Theberath *v.* Harness Trimming Co. (1883), 23 O. G. 1121, Nixon, J.: (1122) "They differ from patents for inventions or discoveries in this respect, that they have reference to appearance rather than utility. Their object is to encourage the arts of decoration more than the invention of useful products. A picture or design that merely pleases the eye is a proper subject for such a patent, without regard to the question of utility which is always an essential ingredient in an invention or discovery patent." 15 Fed. Rep. 246 (250).

In Gorham Manufacturing Co. *v.* White (1871), 14 Wall. 511, Strong, J.: (524) "The Acts of Congress, which

increase in the beauty of the substance is the purpose of this species of invention, a mere increase in beauty, without an alteration in the shape or ornamentation of the substance, does not possess the characteristics of a design; nor, on the other hand, does a change of shape or ornament intended to increase the practical value of an instrument in the industrial arts, although such change augments the beauty of the instrument, bring it within this species of invention. When a new design is created by the exercise of the inventive faculties, and not otherwise, it is a patentable invention.[2]

authorize the grant of patents for designs, were plainly intended to give encouragement to the decorative arts. They contemplate not so much utility as appearance, and that not an abstract impression or picture, but an aspect given to those objects mentioned in the acts. . . . And the thing invented or produced, for which a patent is given, is that which gives a peculiar or distinctive appearance to the manufacture or article to which it may be applied or to which it gives form." 2 O. G. 592 (593); 6 Fisher, 94 (100).

That a design must be new and original, but not useful, see Miller *v.* Young (1864), 33 Ill. 354.

That a design is a matter of decoration, of "æsthetic 'art," which reaches the mind through the eye, not a matter of industrial utility, see *Ex parte* Schulze-Berge (1888), 42 O. G. 293.

That "utility" in a design is the power to create agreeable sensations through the eye, see *Ex parte* Schulze-Berge (1888), 42 O. G. 293.

That a mere beautiful appearance is not a design, but a new appearance resulting from inventive skill, see Northrup *v.* Adams (1877), 2 Bann. & A. 567; 12 O. G. 430; *Ex parte* Neidringhaus (1875), 8 O. G. 279; 2 MacArthur, 149; Adams *v.* Clementson (1879), L. R. 12 Ch. D. 714; Lazarus *v.* Charles (1873), L. R. 16 Eq. 117.

That the new appearance must result from a change in the substance itself, not merely in the mode of presenting it for sale, see Pratt *v.* Rosenfeld (1880), 18 Blatch. 234; 3 Fed. Rep. 335; 21 O. G. 866.

That a design is an entirely different thing from the substance to which it is applied, see Mulloney *v.* Stevens (1864), 10 L. T. N. S. 190; Norton *v.* Nichols (1859), 1 El. & El. 761.

That a design is patentable though not more beautiful than former ones, see Lehnbeuter *v.* Holthaus (1882), 105 U. S. 94; 21 O. G. 1783.

[2] In Western Electric Mfg. Co. *v.* Odell (1883), 18 Fed. Rep. 321, Blodgett, J.: (322) "I find the law on the subject of design patents so well condensed and stated in a little work lately published by Mr. Simonds, that I cannot do better than read his summary, as stated on page 212: 'For a time it was the practice of the patent-office to grant these design patents for almost any subject-matter presented, and with little or no inquiry as to whether any degree of patentable origination had been exercised. It is now tolerably well settled that design patents stand on as high a plane as utility patents, and require as high a degree of exercise of the inventive or originative faculty. In patentable designs a person cannot be permitted to select an existing form and simply put it to a new use any more than he can be permitted to take

§ 201. Design Distinct from its Component Parts.

A design is to be distinguished both from the elements of which it is composed and from the impression which it makes upon the mind of the observer.[1] Its elements are the lines

a patent for a mere double use of a machine; but the selection and adaptation of an existing form may amount to patentable design as the adaptation of an existing mechanical device may amount to patentable invention.' In support of this enunciation of the law, Mr. Simonds quotes from Wooster *v.* Crane, 2 Fisher, Pat. Cas. 583, as follows: 'The act, although it does not require utility in order to secure the benefit of its provisions, does require that the shape produced shall be the result of industry, effort, genius, or expense, and must also, I think, be held to require that the shape or configuration sought to be secured shall at least be new and original as applied to articles of manufacture.' So, also, in Northrup *v.* Adams, 2 Bann. & A. 567, it is said: 'The same general principles of construction extend to both. To entitle a party to the benefit of the act, in either case, there must be originality and the exercise of the inventive faculty. In the one there must be novelty and utility; in the other, originality and beauty. There must be something akin to genius, — an effort of the brain as well as the hand. The adaptation of old devices or forms to new purposes, however convenient, useful, or beautiful they may be in their new role, is not invention. . . . If a combination of old designs be patentable at all, — of which I have some doubt, — the combination must be such as to produce a new appearance. If the effect produced be simply the aggregation of familiar designs it would not be patentable. For example, if one should paint upon a familiar vase a copy of Stuart's portrait of Washington, it would not be patentable, because both elements of the combination, — the portrait and the vase, — are old; but if "any new and original impression or ornament" were placed upon the same vase, it would fall within the express language of the section.' In Gorham Co. *v.* White, 14 Wall. 511, the Supreme Court said: 'In whatever way produced it is the new thing produced which the patent law regards.'"

That there are two kinds of patents, mechanical patents and design patents, see C. A. Yale Cigar Mfg. Co. *v.* Yale (1884), 30 O. G. 1183.

That where industrial utility depends on shape or configuration the invention is a manufacture, not a design, see *Ex parte* Schulze-Berge (1888), 42 O. G. 293.

That a design is not less a design because the substance as shaped has industrial utility, see Kraus *v.* Fitzpatrick (1888), 42 O. G. 1292.

That all patent regulations apply to designs, see Theberath *v.* Rubber & Celluloid Harness Trimming Co. (1883), 23 O. G. 1121; 15 Fed. Rep. 246.

§ 201. [1] The distinction between the design or appearance given to the substance and the means by which it is produced was clearly indicated in the case of Gorham Manufacturing Co. *v.* White. In the Circuit Court (1870), 7 Blatch. 513, Judge Blatchford treated the appearance as the effect, and the arrangement of lines, etc., as the means from which the appearance resulted, and held that the latter, not the former, was the patentable design. Thus he says: (521) "A patent for a design, like a patent for an improvement in machinery, must be for the means of produc-

and images which, when imposed upon the substance, result in the design. But though the design results from these, arranged in certain courses or groupings, they do not enter into its essential character except in cases where no other lines or images could be employed to effect the same apparent change. Every design containing more than one line or image is in its nature a true combination. Each of its elements, when taken by itself, produces an impression on the eye. Combined together, each co-operates with all the others in the creation of a form or decoration which, taken as a whole, makes an impression entirely different from that of either of its separated elements. The essence of a design, therefore, resides not in its elements alone, nor in their method of arrangement alone, but in that appearance which results from the co-operation of these elements as they are employed in the design.

ing a certain result or appearance, and not for the result or appearance itself. . . . Even if the same appearance is produced by another design, if the means used in such other design to produce the appearance are substantially different from the means used in the prior patented design to produce such appearance, the later design is not an infringement of the patented one."

That the appearance given to the substance is an effect of the arrangement of lines, etc., is undoubtedly true; and if the appearance, as predicable of the substance, had been the end to be accomplished by the invention, the decision of the learned judge would have been correct. But the real end to be attained was the impression upon the mind of the observer; that is, the appearance of the substance not in itself but to the eye; and this end is achieved by giving to the substance any appearance which produces this impression. Hence the true means invented and patentable is the aspect assumed by the substance in consequence of the configuration or decoration imposed upon it; and this means is always the same as long as the appearance of the substance is the same, no matter what lines or ornaments be employed to produce it.

This is the view taken by the Supreme Court in the same case (1871), 14 Wall. 511; overruling the decision of Judge Blatchford upon this point. Says Strong, J.: (526) "We are now prepared to inquire what is the true test of identity of design. Plainly it must be sameness of appearance, and mere difference of lines in the drawing or sketch, a greater or smaller number of lines or slight variances in configuration, if insufficient to change the effect upon the eye, will not destroy the substantial identity. An engraving which has many lines may present to the eye the same picture, and to the mind the same idea or conception, as another with much fewer lines. The design, however, would be the same. . . . The same conception was in the mind of the designer, and to that conception he gave expression." 2 O. G. 592 (593); 6 Fisher, 94 (101).

That a design and a device for producing it are different inventions, see Clark *v.* Bousfield (1869), 10 Wall. 133.

§ 202. Design Distinct from the Impression it makes on the Mind of the Observer.

Again, though a design is an instrument created for the purpose of making an impression, through the eye, upon the mind of the observer, this impression cannot be regarded as necessarily corresponding with the design itself. The accuracy with which an eye whose visual powers are unimpaired perceives an object cannot be called in question; for the same rays of light, reflected from the same surfaces, must form the same image upon every healthy retina. But the accuracy of a mental impression depends not only on the accuracy of physical vision, but on the degree of attention with which the mind contemplates the object, and on its acquaintance with the class of objects in which the one now subject to inspection is embraced. The image formed upon the retina may often differ widely from that formed in the mind, — one being the exact representation of the object as it really is; the other being composed of certain features of the object only, or of those features in connection with such elements as are suggested by the imagination or the memory. Hence, while no test can be applied to the character of a design except by the mind through the eye,[1] this test is not reliable unless the impression made upon the mind corresponds in all its essential characteristics with the appearance presented to the eye.

§ 203. Design is an Appearance Imparted to an Object.

A design is thus a specific physical means for the production of a specific physical effect. The idea, as it lies in the mind

§ 202. [1] In Holdsworth *v.* McCrea (1867), L. R. 2 H. L. 380, Lord Westbury: (388) "Now in the case of those things as to which the merit of the invention lies in the drawing, or in forms that can be copied, the appeal is to the eye, and the eye alone is the judge of the identity of the two things. Whether, therefore, there be piracy or not is referred at once to an unerring judge, namely, the eye, which takes the one figure and the other figure, and ascertains whether they are or are not the same."

In Harrison *v.* Taylor (1859), 4 H. & N. 815, Cockburn, C. J.: (819) "The question is one of fact, viz.; whether this is a new and original design. . . . This is a question to be determined by the eye — is it a design in the sense of drawing? . . . That leads to the question, is it in its present shape . . . a new design? That is a matter of which anybody can satisfy himself by looking at it. There is a new combination, which is in substance a new design."

of the inventor, is that of an appearance imparted to a material substance by imposing upon it whatever lines or images may be necessary and sufficient for that purpose. The appearance thus imparted to the substance, when presented to the eye in such a manner that the eye receives and transmits to the mind of the observer its essential characteristics, becomes an operative means and produces its appropriate effect. If any of these essential characteristics escape the eye and mind of the observer, the appearance of the substance to him is not identical with that imparted to the substance by the inventor.[1] If in addition to those essential characteristics, he

§ 203. [1] The fact that the impressions made upon the mind do not always correspond with the actual appearance presented by the object becomes important in reference to the question whether the true design is that perceived by the ordinary careless observer or that which is detected by the experienced and cautious examiner. It must be conceded that the eye is the sole judge; but whose eye? and how carefully applied? The principal authority in this country is the case of Gorham Manufacturing Co. *v.* White (1871), 14 Wall. 511. In the Circuit Court (1870), 7 Blatch. 513, the presiding judge had said: (519) "It is impossible to assent to the view, that the test, in regard to a patent for a design, is the eye of an ordinary observer. . . . (520) There must be a uniform test, and that test can only be, as in the case of a patent in respect to machinery, substantial identity, not in view of the observation of a person whose observation is worthless, because it is casual, heedless and unintelligent, and who sees one of the articles in question at one time and place and the other of such articles at another time and place, but in view of the observation of a person versed in the business of designs in the particular trade in question. . . . The question is not whether one design will be mistaken for another by a person who examines the two so carelessly as to be sure to be deceived, but whether the two designs can be said to be substantially the same when examined intelligently side by side. There must be such a comparison of the features which make up the two designs. As against an existing patented design, a patent for another design cannot be withheld because, to a casual observer, the general appearance of the later design is so like that of the earlier one as to lead him, without proper attention, to mistake the one for the other."

This view was the logical consequence of the position taken by the learned judge as to the real nature of a design (see § 201, n. 1, *ante*). If the design be the particular arrangement of lines, etc., by which the appearance is imparted to the substance, it is evident that as only a skilled and careful observer can determine whether two similar appearances are produced by the same arrangement of the same lines, etc., such an observer alone is competent to judge as to the identity of two designs. Thus the decision of Judge Blatchford, if not correct in principle, was at least consistent with itself.

In overruling this doctrine as to the essential nature of a design, the Supreme Court went also to the opposite extreme upon the question now under consideration. Thus Strong, J.: (527) "If then identity of appearance, or (as ex-

perceives the individual elements by whose arrangement and co-operation the appearance is produced, the impressions made

pressed in McCrea *v.* Holdsworth) sameness of effect upon the eye, is the main test of substantial identity of design, the only remaining question upon this part of the case is, whether it is essential that the appearance should be the same to the eye of an expert. The court below was of opinion that the test of a patent for a design is not the eye of an ordinary observer. . . . With this we cannot concur. Such a test would destroy all the protection which the act of Congress intended to give. There never could be piracy of a patented design, for human ingenuity has never yet produced a design in all its details exactly like another, so like, that an expert could not distinguish them. . . . (528) Experts, therefore, are not the persons to be deceived. Much less than that which would be substantial identity in their eyes would be undistinguishable in the eyes of men generally, of observers of ordinary acuteness, bringing to the examination of the article upon which the design has been placed that degree of observation which men of ordinary intelligence give. . . . We hold, therefore, that if, in the eye of an ordinary observer, giving such attention as a purchaser usually gives, two designs are substantially the same, if the resemblance is such as to deceive such an observer, inducing him to purchase one supposing it to be the other, the first one patented is infringed by the other." 2 O. G. 592 (593); 6 Fisher, 94 (102).

Here the court seem to regard a design as subject to very much the same rule as a trade-mark, although in all its essential characteristics it is entirely different. It is not the primary object of a design, in the eye of the law at least, to distinguish one class of goods, or the product of one manufactory, from others; for a design is the same invention, to whatever substance it may be applied, and it is the appearance imparted to the substance, not the substance to which the appearance is given, that is the subject-matter of the patent. And it is not in harmony with the spirit of the age or of the law which represents it, that when one person has devised an appearance of a certain general character, the field of invention is closed in that direction against every designer, unless his production differ so widely from the former that "an ordinary observer, giving such attention as a purchaser usually gives" would detect essential variations between them. A design is a work of art, a thing of beauty; and shades of difference, wholly imperceptible to the uneducated eye, may have required for their creation a high degree of inventive skill, and in the opinion of any competent observer may constitute entirely separate designs. It is submitted that this doctrine was too broadly stated in the case at bar, and that distinctions must be made among observers to correspond with those which exist between different classes of designs. Simple designs, such for example as spoon-patterns, may well be left to the judgment of the ordinary observer. But the triumphs of a higher art demand for their discrimination a more experienced and cultured eye.

The English case which the Supreme Court professed to follow in this decision does not sustain the extreme view advanced by Mr. Justice Strong. In that case (McCrea *v.* Holdsworth (1865), 5 B. & S. 495), Blackburn, J., had said: (504) "In all cases . . . the question must arise, what is the design? More or less of what is there seen may be the design, and that is a question of fact to be asked of the jury.