upon his eye and mind are incorrect unless he distinguishes the appearance produced by the employment of these elements from the appearance of the elements themselves. What characteristics are essential to any given appearance is a matter to be determined by the evidence of persons who are able to perceive and competent to judge. In this respect certain designs may well present far greater difficulties than others, and demand for their accurate discernment a high degree of experience and skill.

§ 204. Design may Consist in Configuration or Ornamentation or Both.

A design may consist in the simple configuration of a substance or the form given to it as a whole, or in the ornamentation imposed upon it without reference to its general form, or in such configuration and ornamentation both.[1] Thus the

It may be difficult to say what degree of evidence is necessary; but it must be a question for the jury, applying their eyes to the article before them." And Cockburn, C. J., stated: (502) "The combination which is what the fabric itself, *when submitted to the eye of a competent judge*, shows to be the design," &c. It was thus evidently in the minds of the judges that the question of identity between two similar designs might be one of some difficulty, and that it could be determined only by the eye of a person competent to distinguish their essential characteristics. As the opinion in our own tribunal was given by a divided court, it is not improbable that, upon further consideration, it may be so far modified as to recognize that differences may exist between designs which, though they escape the notice of an "ordinary observer, giving such attention as a purchaser usually gives," may nevertheless constitute substantial advances in art and deserve the recompense awarded to inventive skill. The rule there laid down has, however, been since adopted in numerous cases, and must be regarded as settled, until further discussion in the higher court. Thus in Jennings *v.* Kibbe (1882), 20 Blatch. 353, Blatchford, J.: (354) "In Gorham Co. *v.* White (14 Wallace, 511), the Supreme Court considered directly the question of identity in regard to a patent for a design. It held that the true test of identity of design is sameness of appearance, in other words, sameness of effect upon the eye; that it is not necessary that the appearance should be the same to the eye of an expert; and that the test is the eye of an ordinary observer, 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." 10 Fed. Rep. 669 (670).

See also Miller *v.* Smith (1880), 5 Fed. Rep. 359; 18 O. G. 1047; Cone *v.* Morgan Envelope Co. (1879), 4 Bann. & A. 107; Perry *v.* Starrett (1878), 3 Bann. & A. 485; 14 O. G. 599.

§ 204. [1] In *Ex parte* Traitel (1883),

essential characteristics of the appearance imparted to a substance may reside in its exterior outlines only, or in the decorations formed by lines or images imposed upon its surface, or in the union of certain outlines and decorations to produce the given design. The same substance, therefore, may exhibit two entirely different designs, one in its outline, the other in its ornament; or one design alone, into which both its form and decoration enter as essential elements.

§ 205. Design may be a Simple Design or a Combination.

A design may either be composed of single lines or images, or it may be created by combining two or more separate designs.[1] But in the latter case the new design must differ in

25 O. G. 783, Butterworth, Com. (783) and configuration, how should it be described? There is no design which is not capable of delineation and description on paper, one or both, such delineations being the primary means. Where the forms are known forms, as in the case of geometrical figures, language may be employed as an auxiliary to describe them. And it follows as a corollary to the foregoing that the applicant's design, if he has one, is capable of being described or delineated on paper without reference to the materials used, or the colors employed, or the mode of their utilization in the construction of the article for which the design is intended."

In Gorham Mfg. Co. *v.* White (1871), 14 Wall. 511, Strong, J.: (525) "The appearance may be the result of peculiarity of configuration, or of ornament alone, or of both conjointly; but in whatever way produced, it is the new thing or product which the patent law regards." 2 O. G. 592 (593) 6 Fisher, 94 (100).

§ 205. [1] In Simpson *v.* Davis (1882), 20 Blatch. 413, Benedict, J.: (414) "In the matter of ornamentation, mere juxtaposition of old forms is, doubtless, sufficient to authorize a patent for an ornament, when, by means of such jux-

"A design is merely a delineation of form or figure, either plane or solid — a shape or configuration. The construction of an article in accordance with that delineation is the materialization of the conception of design. The conception of a building of some particular shape, form, or configuration, and which is delineated on paper or described in language, is a design. The various shapes and figures which appear in colors on the surface of prints and carpets are the expression of so many different designs. The material out of which the building is constructed, whether of stone, brick, wood, or glass, forms no part of a design. The character of the material, whether velvet, cloth, cotton, or wool, upon which the designs find expression, forms no part of the design. The colors in which they find expression are of no possible importance in describing the design itself. A combination of red and blue and green may be beautiful, and the effect very desirable, but it forms no part of the design, but is the medium through which a design, which relates solely to form and configuration, finds expression, or materializes. Then since a design, as used in the statute, relates solely to form

its essence both from its individual and collective elements, presenting a new appearance and making a new and different impression on the eye. The collocation of designs, without such new resulting appearance, is a mere aggregation and possesses no attribute of an invention.

§ 206. Essential Attributes of a Design.

The essence of a design resides in the idea of that configuration or ornamentation which constitutes the new appearance given to the substance. If this idea embraces outline only, no change in decoration will disturb its identity unless the apparent configuration of the substance be also changed. If it relates to the adornment of a substance of some known external form, the form may be indefinitely varied and yet the design of ornament remain the same. Where both configuration and adornment, being new, enter into the same design, a change in the necessary attributes of either changes the essence of the whole design; but when though new they are

taposition, accomplished by industry, genius, effort, and expense, the old forms are made to become component parts of an ornament substantially new in its effect. But the result of the industry, genius, effort and expense employed must, as I suppose, be a single ornament, which, taken as a whole, can be considered to be the embodiment of a new idea in ornamentation. The amount of the novelty may be small, but the effect of the ornament must, to some extent, at least, be new." 12 Fed. Rep. 144 (145).

In Harrison *v.* Taylor (1859), 4 H. & N. 815, Wightman, J.: (820) "The Act uses the words 'any new and original design.' That is not a project or idea in the nature of an invention, but the representation of something which a draughtsman has for the first time produced. If that be the true meaning of the word 'design,' there is no doubt in this case that there was a design; for there was a drawing and it was an original drawing. It is true that all its component parts had already been produced; but no one had produced such a pattern. It was said in the court below, that this was 'a mere' combination in a manner well known; so it is with a picture, all its parts may be old; but the combination forms a new design. It seems to me that it was properly left to the jury to say whether this was substantially a new and original design; and the jury have found that it was."

That a new design may consist of a combination of old designs, see Kraus *v.* Fitzpatrick (1888), 42 O. G. 1292; Northrup *v.* Adams (1877), 2 Bann. & A. 567; 12 O. G. 430; Holdsworth *v.* McCrea (1867), L. R. 2 H. L. 380; McCrea *v.* Holdsworth (1864), 5 B. & S. 495; Norton *v.* Nichols (1859), 1 El. & El. 761.

But that a mere aggregation of old designs is not a new design, see Northrup *v.* Adams (1877), 2 Bann. & A. 567; 12 O. G. 430.

distinct designs, each stands upon a separate foundation and can be affected only by a variation in its own essential elements. Moreover, the identity of a design is not destroyed by its imposition upon different substances unless the inherent qualities of the substance cause the outline or the ornament to assume a different appearance; and hence the impartation of an old appearance to a new material is not alone sufficient to create a new design.[1]

§ 207. Design a Unit: its Unity how Destroyed.

The unity of a design remains unbroken, notwithstanding any changes in its elements, as long as its essential character as an appearance is preserved. Any addition, substitution, or withdrawal of lines or images, which simply increases its beauty without destroying the identity of the impression made upon the eye, is a mere improvement. But if its elements are dissociated from each other and reorganized into a new appearance, making a distinct impression, the former design ceases to exist and a new one is substituted in its place.[1]

§ 208. Design not Complete until Reduced to Practice.

Reduction to practice, in reference to a design, consists in the embodiment of the idea of the appearance, as conceived

§ 206. [1] That a design is the same, to whatever substances it may be applied, see *Ex parte* Traitel (1883), 25 O. G. 783; Mulloney *v.* Stevens (1864), 10 L. T. N. S. 190.

That the transfer of an old appearance to a different object is not a new design, but the appearance itself must be new, see New York Belting & Packing Co. *v.* New Jersey Car Spring & Rubber Co. (1887), 30 Fed. Rep. 785; Wooster *v.* Crane (1865), 5 Blatch. 282; 2 Fisher, 583.

That a design, though embodying certain features of another design, may nevertheless be so unlike the former in outline and detail as to be a new design, see Wood *v.* Dolbey (1881), 20 O. G. 523; 7 Fed. Rep. 475; 19 Blatch. 214.

That novelty is required in designs as in other inventions, see Northrup *v.* Adams (1877), 2 Bann. & A. 567; 12 O. G. 430; Niedringhaus *v.* Commissioner (1875), 2 MacArthur, 149; 8 O. G. 279.

§ 207. [1] That a design is an entirety, and any substantial change, by addition, substitution, or rearrangement, makes a new design, see Holdsworth *v.* McCrea (1867), L. R. 2 H. L. 380.

But that though details may differ, yet if the impression upon the eye is the same, it is the same design, see Wood *v.* Dolbey (1881), 7 Fed. Rep. 475; 20 O. G. 523; 19 Blatch. 214; McCrea *v.* Holdsworth (1870), L. R. 6 Ch. Ap. 418.

by the inventor, in such a visible, substantial form as produces the intended effect upon the eye of an observer. A design differs from the preceding classes of inventions in that it accomplishes the end for which it was created through its mere perception by the sense to which it is addressed; and this perception may often be as perfect when obtained from a mere drawing of the design as from a permanent form or ornamentation imparted to a physical substance. Having been once impressed upon the eye in any manner, the design thereby becomes a practically operative means.[1] Whether the inventor need go farther, except where his design relates to a particular substance only, and embody his idea in a material object upon which his conception of the appearance is permanently imposed, or whether the requirements of the law are satisfied by any method of communication which will serve to convey to others this conception, is not yet determined.

§ 209. Design Reducible to Practice in Many Forms: all Identical Inventions.

In view of the distinction already taken between the appearance of the design as a whole and the lines and images by whose arrangement it is created, it is evident that the same idea of an appearance may sometimes be embodied by several different methods. As the idea of the appearance first forms itself in the mind of the inventor the elements of which it is

§ 208. [1] Although not directed to the question of reduction to practice, many of the opinions, both of our own and the English courts, contain statements which indicate that any representation sufficient to convey the idea of the new appearance would comply with this requirement. Thus in Harrison *v.* Taylor (1859), 4 H. & N. 815, Crompton, J.: (821) "A design means something in the nature of a drawing, picture, or diagram, applicable to the ornamentation of some article of manufacture. . . . When we look at a picture or drawing we can say whether it is an original design or the same as one which has been already painted or drawn." And in Gorham Mfg. Co. *v.* White (1871), 14 Wall. 511, Strong, J.: (526) "Mere difference of lines in the drawing or sketch . . . if insufficient to change the effect upon the eye will not destroy the substantial identity." And since, unless the design derives some of its essential characteristics from the qualities of the substance on which it is imposed, the impression made upon the eye by drawings and sketches may be as accurate and complete as by any other way, and thus bring the design fully to the tests of novelty and utility, reason would indicate that any of those methods would answer the provisions of the law.

composed are not necessarily present to his mental vision. All its essential characteristics, whether of form or ornament, must indeed enter into his conception, but the lines and their arrangement by which these essential characteristics are imparted to the physical substance are obviously matters of second thought, perhaps of long study and experiment. All modes of fashioning by which the essential characteristics of the design can be produced thus lie open to employment by the inventor. His use of one is legally equivalent to the use of all, and hence his patent for the design, expressed in any mode, covers the same design by whatever other elements or arrangement it can be produced.

SECTION VI.

OF AN IMPROVEMENT.

§ 210. "Improvement" Defined.

An improvement is an addition to or alteration in some existing means, which increases its efficiency without destroying its identity.[1] It includes two necessary ideas: first, the idea of a complete and practically operative art or instrument, either natural or artificial, as the original to be improved; and second, the idea of some change in such art or instrument, not affecting its essential character, but enabling it to produce its appropriate results in a more perfect or a more economical manner. When such a change involves the exercise of the inventive faculties it is a true invention and is known as an improvement.[2]

§ 210. [1] In Geiger *v.* Cook (1842), 3 Watts & Serg. 266, Sergeant, J.: (269) "When there is an addition to an old machine or parts of a machine, or a mere alteration in some of its subordinate parts, the claim may be for an improvement only; but where the whole mode of forming the thing, and its effect are new, it may be claimed as new." See also §§ 307–313 and notes, *post*.

[2] In his commentary on the stat. Jac. I. Sir Edward Coke declared, upon the authority of Bircot's Case, E. T. 15, E. 4, in the Exchequer, that "if the substance was *in esse* before, and a new addition thereunto, though that addition made the former more profitable, yet it is not a new manufacture in law." 3 Inst. 184.

In Morris *v.* Bramsom (1776), Buller, N. P. 76; 1 Abb. P. C. 21, Lord Mansfield discarded this doctrine and held

§ 211. Improvement Implies an Original.

An improvement is thus neither the creation of a means entirely new nor a mere formal variation of the old. It occupies an intermediate position; yet often practically it approaches so nearly to the one or to the other that the line of demarcation becomes quite obscure. An inaccurate use of language adds to this obscurity; for in the title and specification of a patent an entirely new means is often described as an "improvement;" and even courts have said that an "improved machine" and an "improvement in a machine" are phrases expressive of the same idea. But in theory, at least, the distinction is always clear, and an examination of the principles which underlie this theory will furnish rules by which the separation of the three may generally be accomplished.[1]

that an addition or improvement was a good subject-matter for a patent. This decision was followed in Boulton *v.* Bull (1795), 2 H. Bl. 463; 1 Abb. P. C. 59; Hornblower *v.* Boulton (1799), 8 T. R. 95; 1 Abb. P. C. 98; Lister *v.* Leather (1858), 8 El. & B. 1004.

In this country the patentability of an improvement has never been doubted. In Kirby *v.* Dodge & Stevenson Mfg. Co. (1872), 10 Blatch. 307, Woodruff, J.: (318) "Invention may be as necessary to reform or adapt an existing machine to the performance of work which it would not, as originally constructed, perform as it is to make a new machine; and whether this is done by removing a device or by adding one, by removing a bolt or by inserting a bolt, by making an apparently great mechanical change or a small one, the principle governing the subject is the same. The change being a substantial one, and producing a different result, may, if it be new, be the subject of a new patent," &c. 3 O. G. 181 (185); 6 Fisher, 156 (172).

See also Barrett *v.* Hall (1818), 1 Mason, 447; 1 Robb, 207; Seymour *v.* Osborn (1870), 11 Wall. 516.

§ 211. [1] Confusion on this point may be avoided by distinguishing between an improvement and an independent invention on another ground. An independent invention always stands alone, or as a separable element in a combination. An improvement is always relative to an original, and, as an improvement, cannot be contemplated by the mind apart from that original. At the same time any art or article may occupy both of these positions. Considered by itself it may be an independent invention and may be used for numerous purposes. Considered as inserted into or conjoined with other inventions it may develop their ideas of means, and as applied to them be an improvement. Thus a new instrument may be in its own nature a new manufacture and patentable as such; but when introduced into a machine as an integral part thereof, it may be an improvement in the machine; and if its introduction be the result of inventive skill, it may, in its new relation, be patented as an improvement. Combinations may also be improved by substituting for an existing element an improved element of the same character, although the improvement in the element is a distinct patentable invention.

§ 212. Improvement not a Mere Variation in the Mode of Reducing to Practice.

We have already seen that the inventive act consists in the conception of an idea of means and in the reduction of that idea to practice; that when the idea of means has been conceived it may be reduced to practice either by the inventor himself or by any other person to whom he has communicated his idea; and that in whatsoever form he first embodies it, all other forms are merely imitations of his own. A variation, therefore, in the method of reducing an idea to practice can never require an exercise of the inventive faculties. It is, at most, a change of form; not an invention, not even an improvement.

§ 213. Improvement a Development of, but not a Departure from, the Original Idea of Means.

The change which enters into an improvement must thus be a change in the idea of means as conceived by the original inventor. Although this idea must be complete, and capable of embodiment in a practically operative means, before any act of invention can be said to be performed, it is not essential that it be developed to its highest degree of efficiency and usefulness. Vast possibilities may still reside in the same idea, which can be actualized only by some further effort of inventive skill; and in the discovery of these possibilities, and the contrivance of a method for employing them, lies the field of improvement as distinguished from original invention. But inasmuch as no improvement can subsist without an original on which to rest, this development must always leave the essence of the original invention unimpaired.[1] Whenever, in extending the efficiency of an idea of means, the line which separates that means from every other is crossed, through any change in its essential characteristics, identity is lost, the idea of the original invention is excluded, and the result of the inventive act becomes a new and substantive invention.

§ 213. [1] In Evans *v.* Eaton (1818), 3 Wash. 443, Washington, J.: (453) "An improvement necessarily implies an original; and unless the patentee is acquainted with the original, which he supposes he has improved, he must talk idly, when he calls his invention an improvement." 1 Robb, 193 (205).

See also Page *v.* Ferry (1857), 1 Fisher, 298.

§ 214. Improvement is a Change in, but not a Change of, the Essential Factors of the Idea of Means.

Again, we have seen that every idea of means embraces three subordinate ideas: the force employed, the method of its application, and the object upon which it acts; and that the identity of an invention is destroyed either by the introduction of a different force, or of a different object, or of a different mode of application. Hence an improvement, being a variation in the idea of means, necessitates a change either in the force, the object, or the mode of application, yet such a change as leaves all their essential characteristics unimpaired. Thus any increase in the efficacy or availability of the force, or in the susceptibility or retentive powers of the object, or in the completeness or economy of the mode of application, unless accomplished by such obvious changes as are presumed to be within the mechanical skill of all persons familiar with the art to which the invention pertains, is a true improvement and has all the attributes of an invention. In theory, therefore, an improvement is not a new art or instrument, nor yet a formal and mechanical alteration in an old one; it is a new development of an old idea embodied in some change effected in an existing operative means.[1]

§ 215. Improvement how Distinguished from Change of Form and from Independent Invention.

Practically, changes in an art or instrument are effected either by the addition of new elements, or by a withdrawal of existing elements, or by an alteration in their qualities or arrangement, or by the substitution of a new element for one previously employed. Each of these changes may be a mere change of form, or may result in an improvement of the old invention, or may create a new invention. If it involves only a variation in the method of reducing the original idea to practice, or if, while varying the idea of means, it neither changes its essential character nor gives substantial increase to its practical efficiency, it is a mere change of form, requir-

§ 214. [1] That an improvement is identical with its original in general construction, arrangement, principles of operation, and results, though in some respects better, see Aspinwall Mfg. Co. *v.* Gill (1887), 40 O. G. 1133.

ing no invention. If the change indicates the introduction into the idea of means of a different force, a different object, or a different mode of application, it is more than a change of form, more even than an improvement; it is a separate invention. If it preserves the essential characteristics of the original invention, applying the same force to the same object by the same method, but accomplishing results with higher excellence or with greater economy of time or power, and is not the product of mechanical skill alone, it is an improvement.

§ 216. Improvement Indicated by its own Character, its mode of Operation, or its Effects.

The tests by which the character of these changes is to be ascertained are the same as those employed in reference to independent and original inventions. Where the apparent variation in the original invention produces no change in its effects or in the economy of time or power, if the factors and the mode of operation of the original and improved inventions are the same, the variation must be in embodiment alone; if different, the inventions are entirely independent of each other. Where the effects produced by the invention in its changed condition differ in nature from those accomplished by it in the old, the change has passed beyond the limits of a mere improvement and has resulted in a new invention. If the effects, although the same in nature, are so enhanced in excellence that the original idea of means, in no form of embodiment, could have produced them, the change is more than formal, but may be either an improvement or a new original invention. In this case, as in that wherein no change occurs in the effects, the original and improved inventions must be compared as operative means, and examined in their mode of action as well as in the subordinate ideas of which each is composed. If this examination discloses a substantial difference either in the nature or the operation of the means, the two inventions are distinct; otherwise the later is a mere improvement on the earlier.

§ 217. Improvements in Simple Inventions and in Combinations.

In applying any of these principles and tests to actual inventions it is necessary to distinguish between simple inventions and combinations. In a simple invention the identity of the invention as a whole does not depend upon the identity of the individual elements of which it is composed; and any substantial change in these is only an improvement of the invention as a whole, unless its entire character is also changed. Thus in an art consisting of a single act, no alteration in the mode or instruments of its performance which does not vary the essential nature of the act itself is more than an improvement. Or in a manufacture or machine, composed of elements which in themselves are not independent manufactures or machines, a variation in the number, qualities, or arrangement of these elements, if neither merely formal nor destroying the identity of the entire machine or manufacture, is only an improvement.[1] But in a combination the identity of the invention as a whole does depend upon the identity of its subordinate means. The idea which it embodies involves the idea of a group of elements, each being in itself an independent means, and the idea of a law or method of co-operation by which these independent elements become united in a means entirely new. The identity of the combination remains undisturbed only while both of these essential ideas are preserved. Different elements co-operating according to the same law, or the same elements co-operating according to a different law, constitute different combinations. A change in any one of these subordinate elements, other than a mere change of form, either develops the idea of means which it embodies or alters the essential character of that idea itself. If it does the first it is an improvement, both as to the subordinate means and the whole combination; but if it does the last the combination is entirely new. A change in the ar-

§ 217. [1] That a change in the shape of parts of a machine may be a patentable improvement, see Williams *v.* Barker (1879), 18 O. G. 243; 2 Fed. Rep. 649.

That a device may be improved in structure without changing its capacity, see Sinclair *v.* Backus (1880), 17 O. G. 1503; 4 Fed. Rep. 539; 5 Bann. & A. 81.

That cheapness may indicate improvement, see Cornish *v.* Keene (1835), 1 Web. 501; 2 Abb. P. C. 139.

rangement of these elements is either the imposition upon them of a new law of co-operation or the more perfect and effectual application of the existing law, — in the former case producing a new combination; in the latter an improvement of the old.[2] Thus in an art consisting of a series of acts each of which is a subordinate art, the addition of any new act which is itself a means, or the withdrawal of one heretofore employed, or the substitution for it of a different act, or any change in the order of their performance introducing a new method of co-operation, is a new invention, not a mere improvement. So also in a composition of matter or a design, and in such a manufacture or machine as is a true combination, a change in any of its elements or in their arrangement is an improvement only when, not being merely formal, it yet leaves undisturbed the identity of each of its subordinate means and also of their co-operative law. The field of improvement in combinations is, therefore, much narrower than in simple inventions, — an apparently far slighter change sufficing to destroy the identity of the combination and to substitute a different invention in its place.

§ 218. Improvement a Unit: its Essential Attributes.

Although an improvement implies the existence of an original on which it rests, it is a complete invention in itself, and has a unity and an identity of its own.[1] Its essence consists

[2] In Bliss *v.* The City of Brooklyn (1873), 10 Blatch. 521, Benedict, J.: (523) "An added element, which increases the efficiency of a combination of itself effective, is of the nature of an improvement; but when the added element is essential to the production of any useful result, such an addition is not an improvement, but its use gives birth to the only patentable, because the first useful, combination." 8 O. G. 269 (270); 6 Fisher, 289 (292).

See also Rheem *v.* Holliday (1851), 16 Pa. St. 347.

That an improvement may be made in a combination by changes either in the elements themselves or in their arrangement, see Foxwell *v.* Bostock (1864), 12 W. R. 723; 10 L. T. N. S. 144.

That a substantial change in the nature of the elements is not a mere improvement but a new combination, see Hale *v.* Stimpson (1865), 2 Fisher, 565.

That to improve the form or capacity of the elements is invention, and may make an improvement or a new combination, see Sharp *v.* Tifft (1880), 17 O. G. 1282; 18 Blatch. 132; 2 Fed. Rep. 697; 5 Bann. & A. 399.

§ 218. [1] That the original and improvement are two separate inventions, and that the latter does not include and

in that particular extension or development of the original idea of means which finds expression in the specific change introduced into the actual invention. It is entirely independent of all other extensions or developments that may be given to the same idea, and is to be distinguished from them by the application of the same tests which are employed in discriminating between original inventions. It may become, in its turn, the basis for further improvements by the same process of development through which it was evolved from its original. But from whatever past improvement it has grown, and to whatever new improvements it may lead, it is still distinct from both. It is not an "improved invention," nor an "original invention with improvements;" it is simply "an improvement," a separate, complete, and definite result of the inventive act.

§ 219. Improvement not Complete until Reduced to Practice.

The method by which the idea of means embraced in an improvement is reduced to practice depends upon the nature of the original invention. Its practical utility must be in some manner demonstrated, and its availability for immediate public use be made apparent.[1] If the original invention is one whose actual employment in the arts, or whose subjection to specific tests, alone can satisfy this obligation, the improvement must be submitted to the same ordeal. And on the other hand, if the mere inspection of the original invention, in connection with the improvement, is sufficient to disclose its character as an operative means, embodiment in tangible materials, in a condition suitable for an immediate use, fulfils the requirements of the law.

protect the former after the patent for the former expires, see Plimpton *v.* Winslow (1880), 3 Fed. Rep. 333.

That no improvement upon an old invention can make the whole invention new, see Carstaedt *v.* U. S. Corset Co. (1876), 10 O. G. 8; 13 Blatch. 371; 2 Bann. & A. 331. See also §§ 892–896 and notes, *post*.

That the inventor of an improvement acquires no rights in the original, see Leach *v.* Dresser (1879), 69 Me. 129.

That slight improvements do not affect the rights of inventors, see Cowan *v.* Dodd (1866), 3 Cold. 278.

§ 219. [1] That reduction to practice is as essential in the case of improvements as of other inventions, see Judson *v.* Bradford (1878), 16 O. G. 171; 3 Bann. & A. 539.

§ 220. Improvement Reducible to Practice in many Forms: all Identical Inventions.

As in all other inventions, the idea which constitutes the essence of an improvement may often be embodied under several different forms. In such cases these various forms are substantially the same, however they may differ in appearance.[1] All shapes, materials, sizes, and arrangements, which can express the peculiar extension given by the inventor of the improvement to the original idea of means, are his as truly as is the specific size, arrangement, shape, or material that he has employed, and all are alike covered by the patent he obtains.

§ 220. [1] That a patent for an improvement to one machine covers it in its application to all other machines, see Burke *v.* Partridge (1878), 58 N. H. 349.

CHAPTER III.

OF THE NOVELTY OF INVENTIONS.

§ 221. Novelty and Utility Requisite to Patentability.

An inventor does not become entitled to a patent merely by exercising his creative faculties in the production of an art or instrument. The consideration for the grant of his exclusive privilege is the benefit which he confers upon the public by placing in their hands a means through the use of which their wants may be supplied. If the same means has been already made accessible to them by the inventive genius of a prior inventor, or if though they receive it first from him it is incapable of useful application, no benefit results to them from his inventive act and there is no consideration for his patent. When this want of consideration becomes apparent before a patent has been granted it will be refused; when afterward, the patent is defeated. In order, therefore, that an invention may be patented or protected by a patent, it must be *new*, that is, bestowed for the first time upon the public by the patentee; and *useful*, that is, capable of such employment as results in practical advantage. Of Novelty and Utility, as two essential requisites of every patentable invention, it is thus our next duty to inquire.

§ 222. "Novelty" Defined.

Legal novelty may be predicated of an invention whenever it is new to the public as a practically operative means. Every invention which is not already accessible to the public is regarded in law as new to the public, and no invention is accessible to the public until it is perfected and communicated to them in a practically available form. Novelty, therefore, exists unless the invention is already in the possession of the

public as an operative art or instrument, and this occurs only when the invention itself is a matter of existing public knowledge, or is derivable from what is known without the further exercise of inventive skill. In other words, as every variation of form, as distinguished from variation in substance, is considered as effected by the imitative faculties, novelty consists in the substantial variation of the invention in question from all inventions which in contemplation of law are already open to the public.[1]

§ 223. Novelty formerly Absolute and Universal.

Formerly, the novelty required as a condition of patentability was absolute both as to place and time. If the invention were known anywhere before the date of the letters-patent, it was regarded as having become public property and no longer entitled to protection. The statute of James I. authorized the granting of a patent only for some "new manufacture which others, at the time of making such Letters Patents and Grants, did not use." By the act of 1790 Congress limited the privilege to inventions "not before known or used," and by the act of 1800 expressly excluded from the provisions of the law every invention which had been previously known and used in this or any foreign country.[1] But such

§ 222. [1] In Whitney *v.* Emmett (1831), Baldwin, 303, Baldwin, J.: (311) "The novelty of the invention is either the manufacture produced, or the manner of producing an old one; if the patent is for the former it must be for something substantially new, different from what was before known; if the latter, the mode of operation must be different, not a mere change of the form and proportions; if both are the same in principle, structure, mode of operation, and produce the same result, they are not new, though there may be a variance in some small matter for the purpose of evasion, or as a color for a patent." 1 Robb, 567 (579).

That novelty is essential difference from what was before known, and this must be evidenced by the invention itself, not by the degree of inventive skill exercised in producing it, see Wood *v.* Packer (1883), 17 Fed. Rep. 650.

§ 223. [1] In Whitney *v.* Emmett (1831), Baldwin, 303, Baldwin, J.: (311) "As to the novelty of the invention the rule is this, 'It must be new to all the world, not the abstract discovery, but the thing invented, not the new secret principle, but the manufacture resulting from it; it must be new at the time of the application for the patent, in the words of the law; 2 Peters 20, 22; but it will be considered as new then, if the application is within a reasonable time after the discovery, if the patentee has not sold or permitted the use of the invention.'" 1 Robb, 567 (578).

restrictions were soon seen to be disastrous to inventors and needless to the public. The most meritorious of discoverers might be deprived of his reward if it appeared that in some distant corner of the earth the same invention had been in a single instance practically employed before his own discovery had been given to the public, although such use were utterly unknown in his own country until long after the issue of his patent, and though the public for whose benefit he labored had received their only knowledge of the art or instrument from him. And on the other hand, since the existence of such use and knowledge in one nation did not necessarily render the invention accessible to any other, especially in periods of limited commercial intercourse, the prohibition of a patent to an original domestic inventor on account of such foreign use, so far from promoting the public welfare by securing to them the unrestricted enjoyment of the invention, tended rather to deprive them of it altogether, either by discouraging the efforts of that inventor through whom alone they could receive it, or by compelling him to place his discoveries before the public prematurely and in such an imperfect condition as to seriously impair their usefulness. Hence, though the letter of the law carried its restrictions to the last extremity, the courts, as usual, found methods of interpreting it in harmony with the true interests both of inventors and the public; and these interpretations, adopted or ratified by subsequent legislative action, have now become permanently incorporated in the law.

§ 224. Novelty, under the English Law, is Novelty "within the Realm."

The English judges, taking advantage of a phrase occurring in another connection in the statute, early held that prior use and knowledge, to operate against an original inventor, must be "within the realm;" and in this manner they secured the rights of native discoverers.[1] At the same time, by placing the importer of a foreign discovery on an equal footing with domestic inventors, as already noticed, they stimulated the

§ 224. [1] See Edgebury *v.* Stephens 1 Abb. P. C. 8. See §§ 315-324 and (1691), 1 Web. 35; 2 Salk. 447; notes, *post.*

examination of the arts of other nations and the reproduction of the same industries within their own. But though unnecessary restrictions as to place were thus removed, the limitations as to time remained until the act 15 and 16 Vict. (1852), which provided for the filing of a provisional specification by the inventor, whose date instead of that of his patent fixed the time before which use or knowledge must exist in order to prevent or to defeat the patent. Thus under the English law, an invention is considered new unless known or used within the realm before the application of its inventor for a patent.

§ 225. Novelty, under the American Law, is Novelty within the United States.

In this country the restriction as to place continued in full vigor until the act of 1836. Its inconvenience and injustice were always recognized, but the courts were bound by the express language of the statute, and rigidly enforced its provisions. In the revision of the law and the reconstruction of the patent system in 1836, however, knowledge and use in a foreign country was excluded from among the causes which prevent or defeat a patent, and the limitations of our law on that subject as to place were brought into harmony with those of the law of England. The restriction as to time has been more widely modified. The act of 1793 substituted for the phrase "not before known and used," as it occurred in the act of 1790, the words "not known or used before the application," establishing the same rule afterward adopted in the English statute of 1852. But by a strange construction of these words, in connection with other sections of the same act which provided for the repeal of patents fraudulently obtained by others than the real inventor, our courts soon held that "before the application" was to be regarded as synonymous with "before discovery by the patentee," thus recognizing no use or knowledge as anticipating the invention unless it had preceded the inventive act. This construction was accepted by Congress in the act of 1836, and duly formulated as one of the provisions of that statute. According to our present law, therefore, novelty exists unless the knowl-

edge or use of the invention in this country preceded its conception by the patentee.

§ 226. "Knowledge" and "Use" Defined.

Specific interpretations have also been given to the terms "use" and "knowledge," as employed in reference to this subject. In the statute of James I. no mention is made of prior knowledge as a bar to a patent. The courts, however, held that any such knowledge on the part of the English public as put the invention fairly in their possession was equivalent to actual use, making a prior patent or publication within the realm of the same effect as practical employment in the arts. In our own statutes the phrase "known or used" has always been adopted, and the fact that knowledge may exist without use has been recognized.[1] Thus as use necessarily implies knowledge, the proof of use anywhere, before the act of 1836, was sufficient evidence of knowledge everywhere; and if no use could be shown, knowledge might be

§ 226. [1] In Stitt *v.* Eastern R. R. Co. (1884), 22 Fed. Rep. 649, Colt, J.: (650) "By § 4886 of the Revised Statutes, to entitle a person to a patent, the invention must be one 'not known or used by others in this country.' The plaintiff contends that, upon a proper construction of the patent law as a whole, both prior knowledge and use must be proved to negative novelty. We think this statement of the rule somewhat too broad. The prior invention relied upon as a defence must be complete and capable of producing the result to be accomplished. It must not be inchoate or rest in speculation or experiment. Coffin *v.* Ogden, 18 Wall. 120. The evidence is sufficient to support the defence of prior knowledge and use, if it proves the invention was complete and capable of working; if it had been put to use and was known to any considerable number of persons. Judson *v.* Bradford, 16 O. G. 174. If the construction of the prior thing of itself demonstrates that it is within the principle of the patent, then, perhaps, no use need be established, for it might be said to prove itself. Sayles *v.* Chicago & N. W. R. Co., 4 Fisher, 584. It is not necessary that the prior invention should have been actually used for the purpose contemplated, but it must have been capable of such use. Pitts *v.* Wemple, 2 Fisher, 10. . . . The primary inquiry is one of identity between two things. If the identity can only be known by actual use such use should be proved. If the identity is apparent on inspection, it is not necessary to prove actual use. If there is a reasonable doubt as to identity, want of novelty is not made out. Walk. Pat. § 72. By the weight of authority and of reason, it would seem that if the prior invention was the same as that described in the patent; if it was complete, and capable of producing the same result, and was known in this country — it is sufficient to sustain the defence of want of novelty."

inferred from any other evidence. But when the distinction between use at home and use abroad was drawn in that act, and foreign use became no longer evidence of knowledge anywhere, the doctrine of the English courts that public knowledge, though derived from foreign use, is equivalent to use at home, was embraced by Congress, and incorporated in the act. But while the English courts had given to foreign use this significance only when the foreign invention had been patented within the realm, or had been described in some publication accessible to the English public, our legislators enacted that a foreign patent or a foreign publication were to be considered equally within the knowledge of our people, and to constitute the same evidence of prior knowledge as if the invention had been actually employed at home. Thus, as our law now stands, a prior use in this country, or a prior patent or publication either at home or abroad, puts the invention before the public so completely that no subsequent inventor can confer on them that benefit which constitutes the only consideration for a patent.

§ 227. Knowledge, to Defeat Novelty, must be Practical and Complete.

It is to be remembered, however, that "knowledge," in this sense, means such an acquaintance with the invention, on the part of the public, as renders it available to them as a practically operative means. If their knowledge is derived from use in this country, the use must be of such a kind as imparts this information. If it rests on any foreign or domestic patent or publication these must be sufficient to accomplish the same result. In neither of these cases must there be any necessity for the exercise of additional inventive skill, since with the employment of the creative faculties, in the adaptation of any invention to the public use, another obligation is incurred which can only be discharged by protecting that inventor in the exclusive use of the invention. Thus we arrive at a more perfect and exhaustive definition of this attribute of novelty, and see that an invention is to be regarded as new whenever it has not already been brought within the practical knowledge of the public as an operative means, either through

prior use at home, or through a prior patent or a prior publication.

§ 228. Novelty Involves two Questions: Identity and Priority.

It is evident that this attribute of novelty can become a subject for examination only when two or more inventions are presented for consideration, both of which are claimed to be identical in substance, and one of which is said to have been known before the other was invented. In every such case, two questions arise: (1) Are the inventions identical? (2) Was the invention, by whose priority to the other the patentability of the latter is sought to be defeated, in use in this country, or had it been patented or described in a printed publication at home or abroad, before the other was invented? In our discussion of the subject in detail, the same questions will be presented, and the same division will be found both serviceable and sufficient.

SECTION I.

OF THE NOVELTY OF INVENTIONS: IDENTITY: FORM AND SUBSTANCE.

§ 229. Identity is Identity of Idea or Substance, not of Form or Embodiment.

In comparing inventions for the purpose of determining their identity, it is first necessary to ascertain the essential character of each by an examination of the idea of means which it embodies. Two inventions cannot be the same unless the same creative act, resulting in the same idea of means, has been performed by both inventors; and therefore no investigation which stops short of this idea, or which accepts as a basis for its conclusions any conception not involved in this idea, can lead to a reliable decision. Hence the importance, in every such investigation, of constantly distinguishing between those attributes of each invention which relate to its substance, and those which relate merely

to its form.[1] This can be done with entire accuracy only by passing through the tangible and concrete art or instru-

§ 229. [1] This distinction between the substance and the form of the invention was early drawn by the courts, and even in cases where no intelligible rule was suggested for discriminating one from the other. Thus in Brooks *v.* Jenkins (1844), 3 McLean, 432, the court said: (456) "An objection is made to the use of the term 'substantial,' as having no definite signification. It is true the word as applied in this case is not susceptible of an exact definition. But it is generally used in the same sense. No word is more familiar in the action of a court of justice. And in a larger sense it applies to all human affairs. In the exact sciences we look for precision. But beyond the mathematics in human transactions, we may be said to reach the truth more by approximation than by absolute demonstration. A pleading in a civil or criminal case may be substantially good, though it may not be technically formal. An instrument substantially described in a declaration or indictment may be given in evidence. We look more to the substance of things than their forms. In asking you, then, to determine whether the machines are substantially alike or substantially different, you are called to perform only a common duty; not as regards the questions before you so much, as in the discharge of your ordinary duties in life."

Thus also in Walton *v.* Potter (1841), 1 Web. 585, Tindal, C. J.: (586) "Where a party has obtained a patent for a new invention, or a discovery he has made by his own ingenuity, it is not in the power of any other person, simply by varying in form or in immaterial circumstances the nature or subject-matter of that discovery, to obtain either a patent for it himself, or to use it without the leave of the patentee, because that would be in effect and in substance an invasion of the right; and therefore what you have to look at upon the present occasion is not simply whether in form or in circumstances that may be more or less immaterial that which has been done by the defendants varies from the specification of the plaintiffs' patent, but to see whether in reality, in substance, and in effect, the defendants have availed themselves of the plaintiffs' invention. . . . And therefore it will not be immaterial to call to your attention, upon this first head of inquiry, the specification of the plaintiffs, and next that of the defendants' patent, in order that we may compare them together, and see whether there really is that variation in substance so as to give the denomination of a new discovery to what the defendants have done, or whether they are not following out the invention of the plaintiff with some variation in the description which may not allow it the name of a new discovery. . . . (589) Now, what you have to say is, as I before stated, whether you are satisfied that the [article made by defendants] that was produced before you in evidence . . . is a specious variation in form only, an ingenious alteration in the mode of adaptation, or whether it is really and substantially a new discovery on the part of the defendants."

In Morgan *v.* Seaward (1836), 1 Web. 170, Alderson, B.: (171) "Therefore the two machines are alike in principle; one man was the first inventor of the principle, and the other has adopted it; and though he may have carried it into effect by substituting one mechanical equivalent for another, still you are to look to the substance and not to the mere form, and if it is in substance an infringement, you

ment which is presented to the physical senses, and contemplating the idea of means as it lies unembodied in the mind of the inventor.

§ 230. Identity of Idea not Proved by Identity of Embodiment.

For while it is true that almost every idea of means is capable of embodiment in several different forms, it is equally true that the form which is selected for its expression may in some cases also serve as the embodiment of an entirely different idea.[1] Probably no concrete invention has ever so

ought to find that it is so. If in principle it is not the same, but really different, then the defendants cannot be said to have infringed the patent. . . . So you see you ought to look always to the substance, and not to the form." 2 Abb. P. C. 262 (317).

See also Carter *v.* Baker (1871), 1 Sawyer, 512; 4 Fisher, 404; and cases cited under § 236, *post.*

That identity is identity of means, see New American File Co. *v.* Nicholson File Co. (1887), 31 Fed. Rep. 289; Electric R. R. Signal Co. *v.* Hall R. R. Signal Co. (1885), 114 U. S. 87; 31 O. G. 515.

That if the means is different the inventions cannot be identical, see Hall *v.* Stern (1882), 24 O. G. 206; 15 Fed. Rep. 463.

That the same idea must be the same invention, see May *v.* County of Fond du Lac (1886), 27 Fed. Rep. 691.

That identity is identity of means, not of name, see Converse *v.* Cannon (1873), 2 Woods, 7; 9 O. G. 105; Union Sugar Refinery *v.* Matthiesson & Co. (1865), 3 Clifford, 639; 2 Fisher, 600; Howe *v.* Williams (1862), 2 Fisher, 395; Cahoon *v.* Ring (1861), 1 Clifford, 592; 1 Fisher, 397; Cutler's Patent (1839), 1 Web. 418.

That the intention of the inventor to make a different means does not indicate that the means is not identical, see Henderson *v.* Cleveland Co-operative Stove Co. (1877), 2 Bann. & A. 604; 12 O. G. 4.

That similarity in structure, appearance, and effect may indicate identity, see Matthews *v.* Skates (1860), 1 Fisher, 602.

But that such similarity does not constitute identity, see McComb *v.* Ernest (1871), 1 Woods, 195; Howes *v.* Nute (1870), 4 Clifford, 173; 4 Fisher, 263; Cahoon *v.* Ring (1861), 1 Clifford, 592; 1 Fisher, 397.

That similarity in substance is identity, see Union Sugar Refinery Co. *v.* Matthiesson & Co. (1865), 3 Clifford, 639; 2 Fisher, 600.

That identity is identity in the practically operative means, not in the mere theory upon which they operate, see Foss *v.* Herbert (1856), 1 Bissell, 121; 2 Fisher, 31.

That immaterial changes do not affect identity, see Brighton *v.* Wilson (1883), 18 Fed. Rep. 378.

That colorable differences do not show a want of identity, see Byam *v.* Eddy (1853), 24 Vt. 666.

That an invention is the same under every form of embodiment, see Florence Sewing Mach. Co. *v.* Grover & Baker Sewing Mach. Co. (1872), 110 Mass. 70; Blanchard *v.* Beers (1852), 2 Blatch. 411.

§ 230. [1] That the same tangible embodiment may represent two entirely distinct ideas of means, see Newton *v.* Vaucher (1851), 6 Exch. 859.

exactly represented the idea of means conceived by its inventor that when considered by itself, as a mere art or instrument, it communicated that idea, without superfluity or ambiguity, to an observer. Thus an examiner of the concrete invention only is liable to err, either by imputing to the essential character of the invention such attributes as are indifferent and formal, or by discerning in it an idea of means distinct from that which its inventor intended to express.[2] For this reason it is indispensable that the examiner should study the invention from the point of view occupied by the inventor when he first contemplated it as an operative means, and before it became interwoven in his mind with those ideas, derived from his mechanical knowledge, which determined its embodiment in this peculiar form.

§ 231. Identity of Idea to be Examined as the Idea lies in the Mind of the Inventor; the Idea of End the Primary Conception.

Of whatever mental processes an inventor may be conscious, the idea of an end to be accomplished must be regarded as his primary conception. Even where his discovery is the result of accident, he cannot be considered as devising methods of applying forces to their objects, without a previous intention that some particular effect should flow from his endeavors. To feel the pressure of an existing want, to recognize that change in the condition of affairs which will result in its supply, and then to contrive means by which this change may be produced, — this is necessarily the order in which the mental part of the inventive act proceeds, the only order possible to any exercise of the creative faculties. The inventor thus approaches his invention through the end which he designs it to accomplish. To him, its scope and purpose are measured by that end; and its completeness and perfection in his eyes depend on the exactness with which it performs the functions necessary to effect the change pro-

[2] Collender *v.* Griffith (1880), 2 Fed. Rep. 206; 18 O. G. 241; 18 Blatch. 110; is an instance where the same article embodied both the idea of a manufacture and the idea of a design. Other instances noted in the reports will readily suggest themselves.

posed. If in addition to inventive genius he possesses great industrial skill, the concrete form in which his idea is embodied may so nearly coincide therewith in its essential characteristics that in the art or instrument there will be neither element nor quality which does not enter into the operative means, and contribute to the production of the desired result. Or, on the contrary, his carelessness or ignorance as to industrial details may lead him to select a method of expressing his idea in which the essential features of his invention will be overlaid with superfluities of attribute or element, until from every eye except his own its actual character is almost hopelessly concealed. Still, in whatever form embodied, it remains intelligible and distinct to him as a specific agency achieving a particular result; and one who would perceive it as he perceives it must, like him, contemplate it through the end which he intends it to accomplish, and find in the requirements of that end the precise limitations of its means.

§ 232. Ultimate End or Effect Distinguished from Proximate End or Function.

In contemplating an invention through the end which it accomplishes, it is essential to distinguish between the changed condition of affairs resulting from the operation of the means, and the change produced in their condition by the means while actually in operation. The former is the ultimate end proposed by the inventor, the permanent effect on the material world which remains after the means has ceased to act, and which constitutes the condition of a want supplied. The latter is a proximate end lying between the ultimate end and the operative means, a fugitive effect which exists only while the force is acting upon its appropriate object, and which constitutes the operation to which the object is subjected by the means. Considered in itself, this intermediate end is the exact difference between the unchanged and the changed condition of affairs, the addition, alteration, or subtraction through which the object passes on its way from one condition to another. Considered in reference to the object only, it is a true effect produced upon it by the art or instrument

employed. Considered in relation to the means, it is its function, its action on the object while reducing it to the desired condition.

§ 233. Effect the Primary Idea; Function the Secondary; Means the Tertiary and Final.

Of these two ends, the ultimate and permanent is the one first presented to the mind of the inventor. It is the natural and complete antithesis of the want which he perceives, and is inevitably suggested to him by the want itself. The contemplation of this ultimate effect, in connection with the existing condition of affairs, discloses to him the difference between them, and the proximate effect or change through which the object to be acted on must pass in order to attain the new condition he requires. This brings him face to face with his true problem, — the invention of a means by which this change can be effected, — and demands from him the employment of such forces through such modes of application as will produce this intermediate effect and leave the object in the changed condition he desires. Thus, for example, in the invention of the planing machine the inventor first perceived the want arising from the roughness of the lumber, and this suggested to him that smoothness in the lumber would supply the want. Considering smooth lumber in connection with the rough, he saw that the real difference between them consisted in the retention by the one of an uneven surface which had been removed from the other; and this disclosed to him that the change through which the first must pass before it reached the condition of the latter was a change of surface by the obliteration of its inequalities. He then perceived that in order to effect this change he must apply force to the lumber in such a manner as to remove these inequalities; and by the exercise of his creative faculties he brought the required force into contact with the lumber, through his machine, in such a manner that the change was effected, the difference between the roughness and the smoothness of the surface disappeared, and the ultimate and permanent end of his invention was accomplished.

§ 234. Means and End Meet in the Function; Function the Measure of Means.

It is, moreover, evident that the true place of meeting between the end and the means is in the proximate result or function of the means, and that the point from which the examiner must contemplate the means, in order to discover its essential character, is its function, not its ultimate effect. The inspection of lumber in its smoothed condition may not disclose whether that smoothness has been attained by removing former irregularities of surface, or by covering the surface with some foreign substance whose smoothness has concealed the roughness of the wood. Though it appears that actual removal has occurred, there may be nothing to suggest its method, whether by slow, continuous attrition or violent, instantaneous excision; and even when excision is clearly indicated, it may still be impossible to discern whether it was accomplished by one progressive movement of a single knife, or by the swift rotation of a group of blades. But when the function of the means is made the subject of examination, these questions are immediately solved. An inspection of the lumber as it undergoes the changes which result in smoothness, or of the machine while it removes the uneven surface of the wood, brings the mind of the observer to the precise point from which the inventor contemplates his own idea of means, and gives him, in the proximate end which it accomplishes, an exact measure of the scope of that idea.

§ 235. Idea of Means Includes whatever is Essential to Performance of Function; the Rest belongs to Form or Embodiment.

The first duty, therefore, of one who examines an invention for the purpose of determining its essential character is to discover the real nature of the function it performs. Having perceived the want which the inventor has endeavored to supply, and the changed condition of affairs which in the inventor's view supplies the want, he must discern the actual change wrought by the invention on its object while engaged in the production of its ultimate result. Then, since the

means devised by the inventor can be a means only so far as it accomplishes effects, and can exist in his mind only so far as it performs the functions he intends it to discharge, the limits of the means become at once apparent through their correspondence with the functions thus discerned. Applying the same principles to the concrete invention, the tests whereby those of its attributes which relate to substance may be distinguished from those which relate to form are easily discovered. Whatever qualities of any art or instrument are indispensable to its discharge of any of the functions for which it was designed by its inventor enter into its essential character, and thus become matters of substance, not of form;[1] and every part and attribute whose presence is unnecessary to the performance of these functions lies outside of its essence, and is a matter of mere form.

§ 236. Identity of Inventions is Identity of Effect, of Function, and of Means, not Identity of Tangible Embodiment.

These tests are constantly employed by the courts in cases requiring the discrimination of apparent from actual diversities. Whether or not a given diversity in the concrete invention is consistent with identity of essential character must always be determined by a reference of the diversity to the standard here erected for distinguishing the substance or idea of means from its form of embodiment. Inventions cannot be identical unless they are identical in substance; nor can they be identical in substance unless they are identical in effect, in function, and in the means by which their functions are per-

§ 235. [1] In Treadwell *v.* Bladen (1827), 4 Wash. 703, Washington, J.: (706) "What constitutes form, and what principle, is often a nice question to decide; and upon none are the witnesses who are examined in patent causes, even those who are skilled in the particular art, more apt to disagree. It seems to me that the safest guide to accuracy in making the distinction is, first to ascertain what is the result to be obtained by the discovery; and whatever is essential to that object, independent of the mere form and proportions of the thing used for the purpose, may generally, if not universally, be considered as the principles of the invention." 1 Robb, 531 (537).

That the essence or substance of an invention is to be distinguished from its mere form by ascertaining what function it performs and how it performs it, see also Converse *v.* Cannon (1873), 2 Woods, 7; 9 O. G. 105; Cahoon *v.* Ring (1861), 1 Clifford, 592; 1 Fisher, 397.

formed.[1] And when identical in these respects, they are the same invention, whatever differences may exist in the concrete arts or instruments in which they have been reduced to practice.

§ 236. [1] In Adams *v.* Edwards (1848), 1 Fisher, 1; Woodbury, J.: (7) "When we say a thing is substantially the same, we mean it is the same in all important particulars. It must be of the same material, when the material is important; it must be of the same thickness, when thickness is important; it must be applied in the same way, condition, and extent, . . . when either of these circumstances makes an essential difference."

In Gray *v.* James (1817), 1 Peters C. C. 394, Washington, J.: (397) "What constitutes a difference in principle between two machines is frequently a question of difficulty, more especially if the difference in form is considerable, and the machinery complicated. But we think it may safely be laid down as a general rule that when the machines are substantially the same, and operate in the same manner to produce the same result, they must be in principle the same. I say *substantially* in order to exclude all formal differences; and when I speak of the same result, I must be understood as meaning the same kind of result, though it may differ in extent." 1 Robb, 120 (124).

Further, that where two inventions discharge the same function in the same way, they are identical in substance, however they may differ in form, see Shaver *v.* Skinner Mfg. Co. (1887), 41 O. G. 232; Pennsylvania Diamond Drill Co. *v.* Simpson (1886), 29 Fed. Rep. 288; Holly *v.* Vergennes Mach. Co. (1880), 18 O. G. 1177; 4 Fed. Rep. 74; 18 Blatch. 327; Cone *v.* Morgan Envelope Co. (1879), 4 Bann. & A. 107; Brown *v.* Rubber Step Mfg. Co. (1878), 3 Bann. & A. 232; 13 O. G. 369; Collender *v.* Came (1876), 4 Clifford, 393; 10 O. G. 467; Myers *v.* Duker (1874), 1 Bann. & A. 535; Converse *v.* Cannon (1873), 9 O. G. 105; 2 Woods, 7; McComb *v.* Brodie (1872), 2 O. G. 117; 5 Fisher, 384; 1 Woods, 153; Cahoon *v.* Ring (1861), 1 Clifford, 592; 1 Fisher, 397; Lee *v.* Blandy (1860), 1 Bond, 361; 2 Fisher, 89; Judson *v.* Cope (1860), 1 Bond, 327; 1 Fisher, 615; Page *v.* Ferry (1857), 1 Fisher, 298; Smith *v.* Downing (1859), 1 Fisher, 64; Brooks *v.* Bicknell (1844), 3 McLean, 432; Bush *v.* Fox (1856), 5 H. L. 707.

But that if the same function be performed in a different way the inventions are not identical, see Wicke *v.* Ostrum (1881), 103 U. S. 461; 19 O. G. 867; Gottfried *v.* Bartholomae (1878), 8 Bissell, 219; 13 O. G. 1128; Fuller *v.* Yentzer (1874), 6 Bissell, 203; 1 Bann. & A. 520; Morris *v.* Barrett (1859), 1 Fisher, 461; 1 Bond, 254; Heinrich *v.* Luther (1855), 6 McLean, 345; Tatham *v.* Le Roy (1852), 2 Blatch. 474; Hullett *v.* Hague (1831), 2 B. & Ad. 370; 1 Abb. P. C. 452.

That modes of applying an old idea, if differing in operation and result, are not identical, see Field *v.* De Comeau (1881), 116 U. S. 187: 34 O. G. 559.

That changes in an old device, causing a difference in principle and result, render it a different invention, see Parker *v.* Stow (1885), 31 O. G. 1171; 23 Fed. Rep. 252.

That a device which cannot be a substitute in actual use cannot be the same invention, see Crandall *v.* Parker Carriage Goods Co. (1884), 28 O. G. 369; 20 Fed. Rep. 851; Crandal *v.* Watters (1881), 9 Fed. Rep. 659; 20 Blatch. 97.

That when the same means produce the same result the inventions must be the same, see Halliday *v.* Covel (1886), 27 Fed. Rep. 217; 37 O. G. 785.

SECTION II.

OF THE NOVELTY OF INVENTIONS: IDENTITY: DIVERSITIES OF SHAPE, SIZE, CAPACITY, PROPORTIONS, ARRANGEMENT, AND MATERIALS.

§ 237. Diversities of Shape, Size, Capacity, Proportions, Arrangement, and Materials, are sometimes Diversities of Substance, but usually of Form.

The principal diversities manifested by inventions which perform or appear to perform the same functions consist in differences of shape, size, capacity, proportions, arrangement, or materials. Each of these diversities may result from a change in the form of embodiment selected as the external expression of the idea of means, or from a variation in the idea itself, or from the development of that idea by a further exercise of inventive skill. Hence every such diversity may be a new invention, or an improvement on an old invention, or a more formal change; and which of these it is in any given case must be determined by that universal test which serves always to distinguish form and substance. Any diversity which introduces a new function, or a new method of performing the old function, is a new and independent invention. Any diversity which enables the invention to discharge its accustomed functions with greater excellence or economy, and which has been produced by inventive skill, is an improvement. And a diversity which leaves the function and the mode of its performance entirely unaffected, or which did not involve an exercise of the creative faculties, relates only to the method of embodiment, and works no change of substance in the old invention.[1]

§ 237. [1] That changes in the form of embodiment do not affect the identity of the invention, see Theberath v. Rubber & Celluloid Harness Trimming Co. (1883), 15 Fed. Rep. 246; 23 O. G. 1121; Smith v. Nichols (1874), 21 Wall. 112.

That mechanical differences, where the product and mode of construction remain unchanged, do not affect identity, see Collender v. Came (1876), 4 Clifford, 393; 10 O. G. 467.

§ 238. Diversities of Shape.

Except in a design the shape of an invention, or of its integral elements, does not necessarily affect its essential character. In a design the shape is the invention; and hence any diversity of shape which makes a different impression on the eye changes the substance of the invention, and creates a new design. But in the other instruments this attribute is usually of little consequence.[1] Diversities of shape in a

§ 238. [1] In *Ex parte* Grosley (1873), Holmes, 284, Shipley, J.: (286) "Such structural changes of form and proportions, although they improve the operation without changing the mode of operation, and produce a much better result, although one of the same kind, are only different and better forms of embodying the same idea, and illustrate the difference between mechanical skill and inventive genius." 6 Fisher, 575 (581); 4 O. G. 612 (612).

In Winans *v.* Denmead (1853), 15 How. 330, Curtis, J.: (341) "Under our law a patent cannot be granted merely for a change of form. The act of February 21, 1793, § 2, so declared in express terms; and though this declaratory law was not re-enacted in the Patent Act of 1836, it is a principle which necessarily makes part of every system of law, granting patents for new inventions. Merely to change the form of a machine is the work of a constructor, not of an inventor; such a change cannot be deemed an invention. . . . To change the form of an existing machine, and by means of such change to introduce and employ other mechanical principles or natural powers, or, as it is termed, a new mode of operation, and thus attain a new and useful result, is the subject of a patent."

That no change of shape affects the identity of the invention unless it involves a change of function or of mode of operation, see Asmus *v.* Alden (1886), 27 Fed. Rep. 684; 36 O. G. 231; Pennsylvania Diamond Drill Co. *v.* Simpson (1880), 20 Fed. Rep. 288; Fryer *v.* Maurer (1884), 22 Blatch. 208; Hatch *v.* Moffit (1883), 16 Fed. Rep. 252; Lull *v.* Clark (1882), 21 Blatch. 95; 22 O. G. 1535; 13 Fed. Rep. 456; Gosling *v.* Roberts (1882), 100 U. S. 30; 22 O. G. 1785; Putnam *v.* Hutchinson (1882), 11 Bissell, 240; 12 Fed. Rep. 131; Loeriher *v.* Crandal (1881), 11 Fed. Rep. 872; 20 Blatch. 100; 21 O. G. 863; Colligon *v.* Hayes (1881), 8 Fed. Rep. 912; 20 O. G. 447; Singer Mfg. Co. *v.* Stewart Mfg. Co. (1881), 8 Fed. Rep. 920; 20 O. G. 524; Graham *v.* Geneva L. C. Mfg. Co. (1880), 11 Fed. Rep. 138; 21 O. G. 1536; Holly *v.* Vergennes Mach. Co. (1880), 4 Fed. Rep. 74; 18 O. G. 1177; 15 Blatch. 327; Double Pointed Tack Co. *v.* Mann (1880), 5 Bann. & A. 465; American Diamond Rock Boring Co. *v.* Sheldon (1879), 17 Blatch. 208; 4 Bann. & A. 551; Wilson Packing Co. *v.* Clapp (1879), 8 Bissell, 545; 4 Bann. & A. 355; *Ex parte* Greeley (1873), 6 Fisher, 575; Holmes, 284; 4 O. G. 612; King *v.* Louisville Cement Co. (1873), 6 Fisher, 336; 4 O. G. 181; Murphy *v.* Eastham (1872), Holmes, 113; 2 O. G. 61; 5 Fisher, 306; McComb *v.* Brodie (1871), 1 Woods, 153; 5 Fisher, 384; 2 O. G. 117; Taylor *v.* Garretson (1871), 5 Fisher, 116; 9 Blatch. 156; Dennis *v.* Eddy (1871), 4 Fisher, 423; Flood *v.* Hicks (1869), 4 Fisher, 156; 2 Bissell, 169; Potter *v.* Schenck (1866), 1 Bissell, 515; 3 Fisher, 82; Sangster *v.* Miller (1865), 5 Blatch. 243; 2 Fisher, 563; Case *v.* Brown (1862), 1 Bissell, 382; 2 Fisher, 268;

machine, or in its subordinate parts, are merely formal variations, unless they indicate a change in its principle or mode of operation; and similar alterations in a manufacture do not disturb its identity, unless its functions, or its method of performing them, are also changed. Yet in both these classes of inventions, and perhaps even among compositions of matter, there are peculiar cases where the specific shape given to the instrument by the inventor is the only one which can express his idea of means, and can accomplish the result which he desires.[2] In that event, its shape becomes of the

Potter *v.* Wilson (1860), 2 Fisher, 102; Lee *v.* Blandy (1860), 2 Fisher, 89; 1 Bond, 361; Cahoon *v.* Ring (1859), 1 Fisher, 397; 1 Clifford, 592; Latta *v.* Shawk (1859), 1 Fisher, 465; 1 Bond, 259; Conover *v.* Roach (1857), 4 Fisher, 12; Pitts *v.* Edmonds (1857), 2 Fisher, 52; 1 Bissell, 168; Page *v.* Ferry (1857), 1 Fisher, 298; Carr *v.* Rice (1856), 1 Fisher, 198; Allen *v.* Hunter (1855), 6 McLean, 303; Tatham *v.* Le Roy (1852), 2 Blatch. 474; Hall *v.* Wiles (1851), 2 Blatch. 194; Blanchard *v.* Reeves (1850), 1 Fisher, 103; Wilbur *v.* Beecher (1850), 2 Blatch. 132; Wilson *v.* Barnum (1849), 2 Fisher, 635; Parker *v.* Stiles (1849), 5 McLean, 44; Buck *v.* Hermance (1349), 1 Blatch. 398; Parker *v.* Haworth (1848), 4 McLean, 370; 2 Robb, 725; Many *v.* Jagger (1848), 1 Blatch. 372; Wyeth *v.* Stone (1840), 1 Story, 273; 2 Robb, 23; Smith *v.* Pearce (1840), 2 McLean, 176; 2 Robb, 13; Odiorne *v.* Winkley (1814), 2 Gallison, 51; 1 Robb, 52; Woodcock *v.* Parker (1813), 1 Gallison, 438; 1 Robb, 37; Reutgen *v.* Kanowrs (1804), 1 Wash. 168; 1 Robb, 1; Bramah *v.* Hardcastle (1789), 1 Carp. 168; 1 Abb. P. C. 51.

[2] In Winans *v.* Denmead (1853), 15 How. 330, Curtis, J.: (342) "Patentable improvements in machinery are almost always made by changing some one or more forms of one or more parts, and thereby introducing some mechanical principle or mode of action not previously existing in the machine, and so securing a new or improved result. And in the numerous cases in which it has been held that to copy the patentee's mode of operation was an infringement, the infringer had got forms and proportions not described, and not in terms claimed. If it were not so, no question of infringement could arise. If the machine complained of were a copy, in form, of the machine described in the specification, of course it would be at once seen to be an infringement. It could be nothing else. It is only ingenious diversities of form and proportion, presenting the appearance of something unlike the thing patented, which give rise to questions; and the property of inventors would be valueless, if it were enough for the defendant to say: Your improvement consisted in a change of form; you describe and claim but one form; I have not taken that, and so have not infringed. The answer is, my improvement did not consist in a change of form, but in the new employment of principles or powers in a new mode of operation, embodied in a form by means of which a new or better result is produced; it was this which constituted my invention; this you have copied, changing only the form. . . . Undoubtedly there may be cases in which the letters-patent do include only the particular form described and claimed. Davis *v.* Palmer, 2 Brock. 309, seems to

essence of the invention, and cannot be departed from without the introduction of a new and different idea.

have been one of those cases. But they are in entire accordance with what is above stated. The reason why such a patent covers only one geometrical form is not that the patentee has described and claimed that form only; it is because that form only is capable of embodying his invention, and consequently if the form is not copied, the invention is not used. Where form and substance are inseparable, it is enough to look at the form only. Where they are separable, where the whole substance of the invention may be copied in a different form, it is the duty of courts and juries to look through the form for the substance of the invention, — for that which entitled the inventor to his patent, and which the patent was designed to secure; where that is found, there is an infringement; and it is not a defence, that it is embodied in a form not described, and in terms claimed, by the patentee. Patentees sometimes add to their claims an express declaration, to the effect that the claim extends to the thing patented, however its form or proportions may be varied. But this is unnecessary. The law so interprets the claim without the addition of these words. The exclusive right to the thing patented is not secured if the public are at liberty to make substantial copies of it, varying its form or proportions. And therefore the patentee, having described his invention, and shown its principles, and claimed it in that form which most perfectly embodies it, is, in contemplation of law, deemed to claim every form in which his invention may be copied, unless he manifests an intention to disclaim some of those forms."

In Davis *v.* Palmer (1827), 2 Brock. 298, Marshall, C. J.: (310) "It is not every change of form and proportion which is declared to be no discovery, but that which is *simply* a change of form and proportion, and nothing more. If, by changing the form and proportion, a new effect is produced, there is not simply a change of form and proportion, but a change of principle also." 1 Robb, 518 (531).

In all the foregoing extracts the word "form" is used as synonymous with "shape," as well as expressive of "embodiment" in distinction from "substance or idea." It is not, however, difficult to perceive when the one meaning is intended and when the other.

That a change of shape producing a new result is invention, see Sharp *v.* Tifft (1880), 17 O. G. 1282; 18 Blatch. 132; 2 Fed. Rep. 697; 5 Bann. & A. 399; Strobridge *v.* Lindsay (1880), 18 O. G. 62; 2 Fed. Rep. 692; 5 Bann. & A. 411; Miller's Falls Co. *v.* Backus (1879), 17 O. G. 852; 5 Bann. & A. 531; Eppinger *v.* Richey (1877), 12 O. G. 714; 14 Blatch. 367; 3 Bann. & A. 69; Swain Turbine & Mfg. Co. *v.* Ladd (1877), 11 O. G. 153; Aiken *v.* Dolan (1867), 3 Fisher, 197; Wintermute *v.* Redington (1856), 1 Fisher, 239.

That a change in shape increasing utility may be a new invention, see Starrett *v.* Athol Mach. Co. (1883), 23 O. G. 1729; 14 Fed. Rep. 910.

That shape may be of the essence of the invention, see Scott *v.* Evans (1882), 11 Fed Rep. 726; N. Y. Bung & Bushing Co. *v.* Hoffman (1881), 20 O. G. 1451; 9 Fed. Rep. 199; 20 Blatch. 3; Williams *v.* Barker (1880), 18 O. G. 243; 2 Fed. Rep. 649; Swain Turbine & Mfg. Co. *v.* Ladd (1877), 11 O. G. 153; Pearl *v.* Ocean Mills (1877), 11 O. G. 2; 2 Bann. & A. 469; Dennis *v.* Eddy (1871), 4 Fisher, 423.

That where shape is of the essence of the invention, any change of shape is a new invention, see Toepfer *v.* Goetz

§ 239. Diversities of Size.

The size of an invention is also generally a matter of mere form.[1] A mode of operation may be as accurately exhibited

(1887), 41 O. G. 933; Dosh *v.* A. J. Medlar Co. (1887), 40 O. G. 1242; Morley Sewing Mach. Co. *v.* Lancaster (1885), 23 Fed. Rep. 344; Duff *v.* Sterling Pump Co. (1882), 107 U. S. 636; 23 O. G. 1622.

That in a combination, if the elements, their mode of operation, and the result remain unchanged, no change of shape can affect the essence of the combination, see Storrs *v.* Howe (1876), 4 Clifford, 388; 10 O. G. 421; *Ex parte* Greeley (1873), 4 O. G. 612; Holmes, 284; 6 Fisher, 575; Case *v.* Brown (1864), 2 Wall. 320; Howe *v.* Williams (1868), 2 Fisher, 395; 2 Clifford, 245; Foss *v.* Herbert (1856), 2 Fisher, 31; 1 Bissell, 121; Winans *v.* Denmead (1853), 15 How. 330; O'Reilly *v.* Morse (1853), 15 How. 62.

That any alteration in the shape of the elements of a combination enabling it to produce a new result, or an old result in a new method, is invention, see Sharp *v.* Tifft (1880), 17 O. G. 1282; 18 Blatch. 132; 2 Fed. Rep. 697; 5 Bann. & A. 399.

That a change in the shape of the parts of a machine may create a new invention, see Williams *v.* Barker (1880), 18 O. G. 243; 2 Fed. Rep. 649.

But that no change in the shape of the parts will affect the identity of the machine unless the purpose or effect is also changed, see Wilson *v.* Barnum (1849), 2 Fisher, 635.

That a change in the shape of a composition of matter does not affect its identity unless its properties are thereby varied, see Milligan & Higgins Glue Co. *v.* Upton (1874), 4 Clifford, 237; 6 O. G. 837; 1 Bann. & A. 497.

That a change in the shape of a manufacture caused by a peculiar mode of packing may produce a useful result and be an invention, see Eppinger *v.* Richey (1877), 14 Blatch. 307; 12 O. G. 714; 3 Bann. & A. 69.

But that merely to make it attractive to purchasers by changing its shape is not invention, see Reed *v.* Reed (1874), 8 O. G. 193; 12 Blatch. 366; 1 Bann. & A. 515; Langdon *v.* De Groot (1822), 1 Paine, 203; 1 Robb, 433.

That a change of shape producing a new mode of operation creates a different invention, see N. Y. Bung & Bushing Co. *v.* Hoffman, (1881), 20 Blatch. 3; 9 Fed. Rep. 199; 20 O. G. 1451; Strobridge *v.* Lindsay (1880), 5 Bann. & A. 411; 18 O. G. 62; 2 Fed. Rep. 692; Sharp *v.* Tifft (1880), 17 O. G. 1282; 2 Fed. Rep. 697; 18 Blatch. 132; 5 Bann. & A. 399; Willimantic Linen Co. *v.* Clark Thread Co. (1879), 4 Bann. & A. 123; Wilson Packing Co. *v.* Clapp (1879), 4 Bann. & A. 355; 8 Bissell, 545; Thatcher Heating Co. *v.* Carbon Stove Co. (1878), 4 Bann. & A. 68; 15 O. G. 1051; Isaacs *v.* Abrams (1878), 3 Bann. & A. 616; 14 O. G. 861; Pearl *v.* Ocean Mills Co. (1877), 2 Bann. & A. 469; 11 O. G. 2; Union Paper Collar Co. *v.* White (1875), 2 Bann. & A. 60; 7 O. G. 698, 877; 11 Phila. 479.

That a change of shape enabling the instrument to perform new functions is invention, see Wilson *v.* Coon (1880), 19 O. G. 482; 18 Blatch. 532; 6 Fed. Rep. 611; Union Paper Collar Co. *v.* White (1875), 7 O. G. 698, 877; 2 Bann. & A. 60; 11 Phila. 479.

§ 239. [1] In Cahoon *v.* Ring (1861), 1 Clifford, 592, Clifford, J.: (612) "Difference in size and proportions, so long as the construction, arrangement, principles, and mode of operation are substantially the same, is entirely immaterial." 1 Fisher, 397 (411).

That difference in size is not dif-

in a diminutive and fragile model as in a ponderous machine; and all the essential characteristics of a manufacture or a composition or design may subsist equally in its smallest and its largest specimens. The same is true, though with more limitation, in reference to the integral parts both of machines and manufactures, an alteration in the size of which is rarely followed by a change of function, or by a variation in the method in which its functions are fulfilled. Still, instances occur where diminution or increase in this respect affects the mode in which the force employed is brought in contact with its object, changing perhaps the function, perhaps only the means by which it is performed, and producing a diversity of substance which amounts either to a new invention, or to a patentable improvement on the old.

§ 240. Diversities of Capacity.

The capacity of an invention to produce results of greater or less quantity in a given period of time is likewise dependent rather on the mode of its embodiment than upon its essential character.[1] Speed and productive power are gov-

ference in inventions, see Montross *v.* Bullard (1886), 27 Fed. Rep. 64; Asmus *v.* Alden (1886), 27 Fed. Rep. 684; 36 O. G. 231; Baldwin *v.* Haynes (1886), 28 Fed. Rep. 99; 37 O. G. 565; Belt *v.* Crittenden (1880), 2 Fed. Rep. 82; 18 O. G. 191; 1 McCrary, 209; 5 Bann. & A. 131; Double Pointed Tack Co. *v.* Mann (1880), 5 Bann. & A. 465; Glue Co. *v.* Upton (1877), 97 U. S. 3; Phillips *v.* Page (1860), 24 How. 164.

§ 240. [1] In Loom Co. *v.* Higgins (1881), 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. It was certainly a new and useful result to make a loom produce fifty yards a day when it never before had produced more than forty; and we think that the combination of elements by which this was effected, even if those elements were separately known before, was invention sufficient to form the basis of a patent." 21 O. G. 2031 (2035).

In the above case it was the fact that, although it had long been desirable to increase the capacity of the loom, no one had found out how to do it that indicated invention, not the mere increase *per se*.

In Imlay *v.* The Norwich & Worcester R. R. Co. (1858), 1 Fisher, 340, Ingersoll, J.: (349) "Where, in two devices, the end to be accomplished is the same, and the substantial means to accomplish the end are the same, the two devices are identical, though one may accomplish the end more effectu-

erned generally by the degree of force employed, or by the size of the invention through which it is applied. Diversities in these respects, however, may arise from other causes than from changes in the magnitude of the instrument or the degree of force; and in such cases, though the function still remains the same, the variation in capacity may be so great, or hitherto so unattainable, as to denote either the development of the old idea of means or the introduction of a new and independent idea.[3]

§ 241. Diversities of Proportion.

The proportion of one part of an invention to the others is frequently a matter of essential consequence. This is especially the case in chemical compositions, whose entire law of ingrediental co-operation often depends upon the strictest preservation of the due proportions between their several elements. To a less extent it is true also of designs,

ally than the other." 4 Blatch. 227 (237).

That changes in capacity or power do not necessarily affect the identity of an invention, see Brainard *v.* Evening Post Association (1884), 22 Blatch. 61; 19 Fed. Rep. 422; Belt *v.* Crittenden (1880), 18 O. G. 191; 1 McCrary, 269; 2 Fed. Rep. 82; 5 Bann. & A. 131; Planing Mach. Co. *v.* Keith (1879), 101 U. S. 479; 17 O. G. 1031; Stow *v.* Chicago (1877), 8 Bissell, 47; 3 Bann. & A. 83; Putnam *v.* Yerrington (1876), 9 O. G. 689; 2 Bann. & A. 237; Day *v.* Bankers & Brokers Telegraph Co. (1872), 5 Fisher, 268; 9 Blatch. 345; 1 O. G. 551; Roberts *v.* Harnden (1865), 2 Clifford, 500; Forbes *v.* Baratow Stove Co. (1864), 2 Clifford, 379; Cahoon *v.* Ring (1861), 1 Clifford, 592; 1 Fisher, 397; Phillips *v.* Page (1860), 24 How. 164.

That an increase of excellence and convenience do not *per se* change the character of an invention, see Perry *v.* Co-operative Foundry Co. (1882), 12 Fed. Rep. 149; 20 Blatch. 505; 22 O. G. 1624; Guidet *v.* Brooklyn (1881), 105 U. S. 550; 21 O. G. 1692; Putnam *v.* Yerrington (1876), 9 O. G. 689; 2 Bann. & A. 237; Stevens *v.* Pierpont (1875), 42 Conn. 360; Pitts *v.* Wemple (1855), 2 Fisher, 10; 1 Bissell, 87; Tatham *v.* Le Roy (1852), 2 Blatch. 474; Alden *v.* Dewey (1840), 1 Story, 336; 2 Robb, 17.

That a mere increase in simplicity and cheapness may not affect identity, see Evory *v.* Burt (1883), 15 Fed. Rep. 112; 23 O. G. 2121; Odiorne *v.* Denney (1878), 13 O. G. 965.

[3] That changes in capacity or economy of action may sometimes indicate a change in the essence of the invention, see Sharp *v.* Tifft (1880), 17 O. G. 1282; 18 Blatch. 132; 2 Fed. Rep. 697; 5 Bann. & A. 399.

That changes in degree are not invention, see Asmus *v.* Alden (188), 27 Fed. Rep. 684; 36 O. G. 23; May *v.* County of Fond du Lac (1886), 27 Fed. Rep. 691; Guidet *v.* Brooklyn (1882), 105 U. S. 550; 21 O. G. 1692.

and may be so in reference to any manufacture or machine. Wherever the proportions are essential, diversity therein is of course diversity in substance, whether the change results in the ability of the invention to perform new functions, or works an alteration only in its mode of operation. When they are not essential their variations, however great, affect only the form of the embodiment, and leave the identity of the invention undisturbed.[1]

§ 242. Diversities of Arrangement.

The arrangement of the parts of an invention, also, sometimes expresses an essential characteristic of its idea of means.[1]

§ 241. [1] That a mere change of proportions, no new mode of operation being introduced, does not affect the identity of an invention, see Miller's Falls Co. *v.* Backus (1879), 17 O. G. 852; 5 Bann. & A. 53; Roberts *v.* Ryer (1875), 91 U. S. 151; 10 O. G. 204; Tatham *v.* Le Roy (1852), 2 Blatch. 474; Hall *v.* Wiles (1851), 2 Blatch. 194; Parker *v.* Stiles (1849), 5 McLean, 44; Reutgen *v.* Kanowrs (1804), 1 Wash. 168; 1 Robb, 1.

That where the elements, mode of operation, and result of a combination remain the same, no change of proportions can make the combination a new one, see Isaacs *v.* Abrams (1878), 14 O. G. 861; 3 Bann. & A. 616; *Ex parte* Greeley (1873), 4 O. G. 612; 6 Fisher, 575; Holmes, 284; Winans *v.* Denmead (1853), 15 How. 330.

That the same rule applies in chemical processes and compositions, see Rumford Chemical Works *v.* Lauer (1872), 10 Blatch. 122; 5 Fisher, 615; 3 O. G. 349.

§ 242. [1] In Gilbert & Barker Mfg. Co. *v.* Walworth Mfg. Co. (1876), 9 O. G. 746, Shepley, J.: (746) "Mere change of location is not patentable, but where change of location brings into existence a new combination . . . to produce a new and useful result, such new combination is patentable." 2 Bann. & A. 271 (272).

In Marsh *v.* Dodge & Stevenson Mfg. Co. (1873), 6 Fisher, 562, Woodruff, J.: (565) "Is the mere location of devices, such devices not being new, patentable? To this the answer must be that it is not. If the result is the same, and nothing new is required to adapt an apparatus to operate in its new location, nothing has been done which can be called invention. If such change of location produced a new combination of devices, producing a new result, then, indeed, something patentable may have been devised; but mere change of location is not invention. On the other hand, where change of location involves the employment of new devices to adapt an apparatus for use in the new position, and a beneficial result is produced, then this location, in its connection with such new devices, — that is, the means by which the result is produced, and not the result itself, — is patentable. And where such change of location brings into existence a new combination of devices, operating by reason of such new combination to produce a new and useful result, such new combination is patentable." 5 O. G. 393 (399).

That a mere change in the location or arrangement of the parts of an inven-

A process usually consists of a series of acts performed in a certain order. A combination is a group of subordinate

tion, without changing its function or mode of operation, does not affect its identity, see Kirk *v.* Du Bois (1887), 42 O. G. 297; Aron *v.* Manhattan Ry. Co. (1886), 26 Fed. Rep. 314; 34 O. G. 1508; Straw Sewing Mach. Co. *v.* Eames (1880), 19 O. G. 359; 18 Blatch. 520; 6 Fed. Rep. 181; Knox *v.* Great Western Quicksilver Mining Co. (1878), 14 O. G. 897; 6 Sawyer, 430; Pearl *v.* Ocean Mills (1877), 11 O. G. 2; 2 Bann. & A. 469; Adams *v.* Joliet Mfg. Co. (1877), 3 Bann. & A. 1; 12 O. G. 93; Gilbert & Barker Mfg. Co. *v.* Tirrell (1874), 8 O. G. 2; 1 Bann. & A. 315; 12 Blatch. 144; Buerk *v.* Imhaeuser (1874), 1 Bann. & A. 337; 5 O. G 752; Dane *v.* Illinois Mfg. Co. (1872), 2 O. G. 680; 6 Fisher, 124; 3 Bissell, 374; King *v.* Maudelbaum (1871), 8 Blatch. 468; 4 Fisher, 577; Blake *v.* Eagle Works Mfg. Co. (1871), 3 Bissell, 77; 4 Fisher, 591; Brooks *v.* Bicknell (1844), 3 McLean, 432; Bovill *v.* Keyworth (1857), 7 El. & B. 725.

That to change the attachment of one part of a machine to another does not necessarily affect its identity, see Ives *v.* Hamilton (1875), 92 U. S. 426; 10 O. G. 336.

That to reverse the order of parts without changing the idea of the invention does not affect identity, see Minter *v.* Wells (1834), 1 Web. 127; 2 Abb. P. C. 26.

That a change in arrangement by which one part performs a double function, which it before did separately, is not invention, see Adams *v.* Bellaire Stamping Co. (1886), 28 Fed. Rep. 360; 36 O. G. 567.

That a change of arrangement without change of function or result is not invention, see Belle Patent Button Fastener Co. *v.* Lucas (1886), 28 Fed. Rep. 371; 37 O. G. 1004; Hancock Inspirator Co. *v.* Lally (1886), 27 Fed. Rep. 88; 35 O. G. 1001; Adams *v.* Bellaire Stamping Co. (1886), 28 Fed. Rep. 360; 36 O. G. 567.

That to change the location of one element in a combination without change of function or mode of operation does not affect the identity of the combination, even though the change enables the inventor to dispense with other elements whose functions are now performed by the one thus changed, see Dane *v.* Illinois Mfg. Co. (1872), 3 Bissell, 374; 6 Fisher, 124; 2 O. G. 680.

That to change the location of the elements in a combination does not make it a new combination simply because the change enables it to produce a *better* effect, see Adams *v.* Joliet Mfg. Co. (1877), 12 O. G. 93; 3 Bann. & A. 1.

That change in arrangement may be invention, see Brown Mfg. Co. *v.* Deere (1884), 28 O. G. 1187; 21 Fed. Rep. 709; Florence Sewing Mach. Co. *v.* Grover & Baker Sewing Mach. Co. (1872), 110 Mass. 70.

That a change of location of parts producing a *new* result makes a new invention, see Reay *v.* Berlin & Jones Envelope Co. (1884), 28 O. G. 370; 20 Fed. Rep. 506; Barber *v.* Hallett (1881), 20 O. G. 449; 10 Fed. Rep. 130; Gilbert & Barker Mfg. Co. *v.* Walworth Mfg. Co. (1876), 9 O. G. 746; 2 Bann. & A. 271; Carstaedt *v.* U. S. Corset Co. (1875), 13 Blatch. 119; 9 O. G. 151; 2 Bann. & A. 119; Calkins *v.* Bertraud (1875), 6 Bissell, 494; 2 Bann. & A. 215; 9 O. G. 795; Gilbert & Barker Mfg. Co. *v.* Tirrell (1874), 12 Blatch. 144; 8 O. G. 2; 1 Bann. & A. 315.

That to rearrange a well-known article, if changing its idea of means, is to

means, so located with reference to each other that they obey a new law of co-operation. The identity of a design depends upon the place occupied by each line or image in relation to the others. Even a simple machine or manufacture may be unable to discharge its functions, unless the situation of every portion of the instrument remains unchanged. In many of these cases, any variation in arrangement destroys the entire availability of the invention, and renders it incapable of useful action. In others, while it still accomplishes its ends, it does so by a different application of the force which it employs, and thus becomes a different invention. Diversity of arrangement, therefore, though the parts themselves are not affected, is often a diversity of substance, and always must be such when the result of re-arrangement is either a new function or the performance of the old one in a different manner. But when, notwithstanding differences of location or arrangement, the function and the mode of operation are in all respects the same, the diversity is only formal, and the character of the invention is not changed.

§ 243. Diversities of Material.

The materials of which the parts of an invention are composed are not often essential to its identity, except in compositions of matter.[1] In these compositions, the prop-

make a new invention, see Stanley Works *v.* Sargent (1871), 8 Blatch. 344; 4 Fisher, 443.

That to rearrange the elements of a combination, thereby producing a new effect, creates a new combination, see Woodward *v.* Dinsmore (1870), 4 Fisher, 163; Foxwell *v.* Bostock (1864), 12 W. R. 723; 10 L. T. N. S. 144.

And this, though the general principle of the combination remains unchanged, see Zane *v.* Peck (1877), 12 O. G. 518.

And though the action of certain of the elements is unchanged, see Fitch *v.* Bragg (1831), 20 O. G. 1589; 8 Fed. Rep. 588; Adams *v.* Joliet Mfg. Co. (1877), 12 O. G. 93; 3 Bann. & A. 1; Turrill *v.* Illinois Central R. R. Co. (1867), 3 Fisher, 330; 3 Bissell, 66.

§ 243. [1] A "change of material," in reference to an invention, may take place in two ways: (1) By a change in the materials of which the invention itself consists; (2) By a change in the materials of the object upon which the invention is intended to act. Instances of the first change occur where in a process different substances are used, or in a machine or manufacture brass or wood are substituted for iron, &c. Instances of the second change are found where an art or instrument heretofore employed upon one fabric or material is now for the first time directed toward another. These changes

erties of the ingredients are the elemental forces whose union constitutes the new invention; and hence a change which in-

are essentially distinct, and raise entirely different questions in Patent Law. In the former change, these questions relate to the identity of the invention in which the change has taken place, and are answered by determining whether the substitution affects the idea of means previously expressed in the invention. In the latter change, these questions relate to the use of the existing invention, and are answered by determining whether its use upon the new material embodies a new idea of means, involving the exercise of inventive skill, or is a mere analogous or double use. Only the former change and former questions are referred to in this paragraph and the present note. The latter will be found sufficiently discussed in Section IV., §§ 259–271, under the head of "Double Use." Yet in examining the citations and references under both topics, the reader will discover that these two changes are frequently spoken of by the courts as if they were but one, and caution to distinguish what is applicable to each is therefore always necessary.

but 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." 3 Bann. & A. 616 (617).

In Gardner *v.* Herz (1886), 118 U. S. 180, Blatchford, J.: (192) "But a patent cannot be taken out for an article, old in purpose and shape and mode of use, when made for the first time out of an existing material, and with accompaniments before applied to such an article, merely because the idea has occurred that it would be a good thing to make the article out of that particular old material." 35 O. G. 999 (1000).

In Isaacs *v.* Abrams (1878), 14 O. G. 861, Lowell, J.: (862) "It is not invention to change one well-known material for another, or to apply a well-known process, without some adaptation more than every skilled mechanic could apply, to a new art or subject;

In Smith *v.* The Goodyear Dental Vulcanite Co. (1876), 93 U. S. 486, Strong, J.: (496) "The patent in that case [Hotchkiss *v.* Greenwood, 11 How. 248, see *post*] was for an improvement in making door and other knobs for doors, locks, and furniture; and the improvement consisted in making them of clay or porcelain in the same manner in which knobs of iron, brass, wood, or glass had been previously made. Neither the clay knob nor the described method of attaching it to the shank were novel. The improvement therefore was nothing more than the substitution of one material for another in constructing an article. The clay or porcelain door-knob had no properties or functions which other door-knobs, made of different materials, had not. It was cheaper and perhaps more durable; but it could be applied to no new use, and it remedied no defects which existed in other knobs. Hence it was ruled that the alleged improvement was not a patentable invention. The case does decide that employing one known material in place of another is not invention, if the result be only greater cheapness and durability of the product. But this is all. It does not decide that no use of one material in lieu of another, in the formation of a manufacture, can in any case amount to invention, or be the subject of a patent. If such a substitution involves a new mode of construction, or develops new uses and properties of the article formed, it may amount to invention. The substitution may be

troduces different ingredients must be a variation in the substance of the means. But in the other classes of inventions

something more than formal. It may flame of oil to finish cloth. These

require contrivance, in which case the mode of making it would be patentable; or the result may be the production of an analogous but substantially different manufacture. This was intimated very clearly in the case of Hicks *v.* Kelsey (18 Wall. 670), where it was said 'the use of one material instead of another in constructing a known machine is, *in most cases*, so obviously a matter of mere mechanical judgment and not of invention, that it cannot be called an invention *unless* some new and useful result, as increase of efficiency or a decided saving in the operation, be obtained.' But where there is some such new and useful result, where a machine has acquired new functions and useful properties, it may be patentable as an invention, though the only change made in the machine has been supplanting one of its materials by another. This is true of all combinations whether they be of materials or processes. In Crane *v.* Price (1 Webster's Patent Cases, 393), where the whole invention consisted in the substitution of anthracite for bituminous coal in combination with a hot-air blast for smelting iron ore, a patent for it was sustained. The doctrine asserted was that if the result of the substitution was a new, a better, or a cheaper article, the introduction of the substituted material into an old process was patentable as an invention. This case has been doubted, but it has not been overruled; and the doubts have arisen from the uncertainty whether any new result was obtained by the use of anthracite. In Kneass *v.* The Schuylkill Bank (4 Wash. C. C. 9), the use of steel plates instead of copper for engraving was held patentable. So has been the flame of gas instead of the

cases rest on the fact that a superior product has been the result of the substitution, a product that has new capabilities, and that performs new functions." 11 O. G. 246 (249).

In The Goodyear Dental Vulcanite Co. *v.* Smith (1874), Holmes, 354, Shepley, J.: (364) "Strictly speaking, no new manufacture is anything more than a new combination and arrangement of old materials; and whenever such new combination and arrangement produces a new and useful result, there being diversity of method and diversity of result, the invention is patentable." 5 O. G. 585 (589); 1 Bann. & A. 201 (213). In this case also, Hotchkiss *v.* Greenwood, 11 How. 248, is commented on, and explained in accordance with this doctrine.

In Hicks *v.* Kelsey (1873), 18 Wall. 670, Bradley, J.: (673) "The use of one material instead of another in constructing a known machine is in most cases so obviously a matter of mere mechanical judgment, and not of invention, that it cannot be called an invention unless some new and useful result — an increase of efficiency, or a decided saving in the operation — is clearly attained. . . . (674) In Crane *v.* Price (Webster's Pat. Ca. 409), it is true the use of anthracite, instead of bituminous coal, with the hot blast in smelting iron ore was held to be a good invention, inasmuch as it produced a better article of iron at a less expense. But that was a process of manufacture, and in such processes a different article, replacing another article in the combination, often produces different results. The latter case is more analogous to the cases of compositions of matter than it is to those of machinery; and in compositions of

it is seldom necessary that any specific material should be employed. In manufactures and machines, any material ca-

matter, a different ingredient changes the identity of the compound, whereas an iron bar in place of a wooden one and subserving the same purpose, does not change the identity of the machine." 5 O. G. 94 (94).

In Hotchkiss *v.* Greenwood (1850), 11 How. 248, Nelson, J. : (265) "The instruction assumes and, as was admitted on the argument, properly assumes that knobs of metal, wood, etc., connected with a shank and spindle in the mode and by the means used by the patentees in their manufacture had been before known, and were in public use at the date of the patent; and hence the only novelty which could be claimed on their part was the adaptation of this old contrivance to knobs of potter's clay or porcelain ; in other words, the novelty consisted in the substitution of the clay knob in the place of one made of metal or wood, as the case might be. And in order to appreciate still more clearly the extent of the novelty claimed, it is proper to add that this knob of potter's clay is not new, and therefore constitutes no part of the discovery. If it was, a very different question would arise ; as it might very well be urged, and successfully urged, that a knob of a new composition of matter, to which this old contrivance had been applied, and which resulted in a new and useful article, was the proper subject of a patent. The novelty would consist in the new composition, made practically useful for the purposes of life by the means and contrivances mentioned. It would be a new manufacture, and none the less so, within the meaning of the patent law, because the means employed to adapt the new composition to a useful purpose was old or well-known. But in the case before us, the knob is not new, nor the metallic shank or spindle, nor the dovetail form of the cavity in the knob, nor the means by which the metallic shank is securely fastened therein. All these were well known and in common use ; and the only thing now is the substitution of a knob of a different material from that heretofore used in connection with this arrangement. Now it may very well be that by connecting the clay or porcelain knob with the metallic shank in this well-known mode, an article is produced better and cheaper than in the case of the metallic or wood knob ; but this does not result from any new mechanical device or contrivance, but from the fact that the material of which the knob is composed happens to be better adapted to the purpose for which it is made. The improvement consists in the superiority of the material, and which is not new, over that previously employed in making the knob. But this of itself can never be the subject of a patent. No one will pretend that a machine, made in whole or in part of materials better adapted to the purpose for which it is used than the materials of which the old one is constructed, and for that reason better and cheaper, can be distinguished from the old one, or in the sense of the patent law can entitle the manufacturer to a patent. The difference is formal, and destitute of ingenuity or invention. It may afford evidence of judgment and skill in the selection and adaptation of the materials in the manufacture of the instrument for the purposes intended, but nothing more."

That a mere change of the materials of which an invention consists, no new idea of means being thereby expressed, is not invention, see Florsheim *v.* Schilling (1886), 26 Fed. Rep. 256 ;

pable of receiving and retaining the forms of their essential parts is usually sufficient for the performance of their func-

35 O. G. 1435; N. Y. Bung & Bushing Co. *v.* Doelger (1885), 23 Fed. Rep. 191; 32 O. G. 651; 23 Blatch. 167; Palmenbing *v.* Buchholz (1882), 23 O. G. 632; 13 Fed. Rep. 672; U. S. Stamping Co. *v.* King (1879), 17 Blatch. 55; 17 O. G. 1399; 4 Bann. & A. 460; Phillips *v.* Detroit (1879), 4 Bann. & A. 347; 17 O. G. 191; Stow *v.* Chicago (1877), 8 Bissell, 47; 3 Bann. & A. 88; Dalton *v.* Nelson (1876), 2 Bann. & A. 225; 13 Blatch. 357; 9 O. G. 1112; Dunbar *v.* Myers (1876), 94 U. S. 187; 11 O. G. 35; Reckendorfer *v.* Faber (1876), 92 U. S. 347; 10 O. G. 71; Putnam *v.* Yerrington (1876), 9 O. G. 689; 2 Bann. & A. 237; Holbrook *v.* Small (1876), 2 Bann. & A. 396; 10 O. G. 508; Ingersoll *v.* Turner (1875), 2 Bann. & A. 89; 12 O. G. 189; 7 Fed. Rep. 859; Welling *v.* Rubber Coated Harness Trimming Co. (1874), 1 Bann. & A. 282; 7 O. G. 606; Opinion Atty. Gen. (1827), 2 Op. At. Gen. 52; Thompson *v.* James (1863), 32 Beav. 570; Mackelcan *v.* Rennie (1862), 13 C. B. N. S. 52.

That to substitute for any of the materials used in the parts of a machine a new material discovered by the substitutor does not affect the identity of the machine unless its mode of operation be thereby changed, see Bailey Washing & Wringing Mach. Co. *v.* Lincoln (1871), 4 Fisher, 379.

That the fact that the materials are cheaper and better makes no difference, see Florsheim *v.* Schilling (1886), 26 Fed. Rep. 256; 35 O. G. 1435; Putnam *v.* Weatherbee (1875), Holmes, 497; 8 O. G. 320; Hotchkiss *v.* Greenwood (1848), 4 McLean, 456; 2 Robb, 730.

That the fact that the material substituted was never before used for the same purpose is of no consequence, see Rushton *v.* Crawley (1870), L. R. 10 Eq. 522; Jordan *v.* Moore (1866), L. R. 1 C. P. 624.

That the substitution of purer materials, whereby a compound becomes more useful, or useful for additional but analogous purposes, does not affect its identity, see Buchan *v.* McKesson (1880), 7 Fed. Rep. 100; 18 Blatch. 485; 19 O. G. 222.

That where the material is of the essence of the invention, a change in material destroys its identity, see Western & Wells Mfg. Co. *v.* Rosenstock (1887), 30 Fed. Rep. 67; 41 O. G. 354; Aiken *v.* Bemis (1847), 3 Wood. & Min. 348; 2 Robb, 644.

That where the substitution of different materials enables the invention to effect a new result, it may produce substantial change in the invention, see Dalton *v.* Nelson (1876), 2 Bann. & A. 225; 13 Blatch. 357; 9 O. G. 1112; Goodyear Dental Vulcanite Co. *v.* Willis (1874), 1 Bann. & A. 569; 7 O. G. 41; 1 Flippin, 388.

And that such substantial change may be evidenced by the increased efficiency or economy with which the invention operates, see Dalton *v.* Nelson (1876), 9 O. G. 1112; 13 Blatch. 357; 2 Bann. & A. 225; Goodyear Dental Vulcanite Co. *v.* Willis (1875), 7 O. G. 41; 1 Flippin, 388; 1 Bann. & A. 568.

That where the substitution of a different material involves the employment of a different process, such substitution may be an invention, see Goodyear Dental Vulcanite Co. *v.* Davis (1880), 102 U. S. 222; 19 O. G. 543.

That to use an old material for an entirely new purpose may be invention, see Jenkins *v.* Walker (1872), Holmes, 120; Newton *v.* Vaucher (1851), 6 Exch. 859.

That to improve an existing material

tions, and the expression of their ideas of means. A change in such materials may affect the durability of the instrument, or the perfection with which it produces its results, but these attributes relate to the form of embodiment alone, not to the essence of the invention. Yet if diversity of the material employed requires a new mode of construction, or develops new capacities in the invention, as indicated either in the instrument itself or its effects, the change is one of substance, and produces an improvement or a new invention.

§ 244. Degree of these Diversities Immaterial unless they Affect the Substance of the Invention.

It is obvious that neither of these diversities can be accurately judged except by its effect upon the invention as a whole, and that this effect can be ascertained only by studying the art or instrument while in actual operation. However great the apparent magnitude of the diversity, it exists merely in embodiment unless the function or the mode of its performance is also changed. And slight as is the variation to the eye, if a new function is discharged, or if former functions are accomplished by a different force or by different applications of the same force, the variation is essential, and each invention is a distinct and independent means.

SECTION III.

OF THE NOVELTY OF INVENTIONS: IDENTITY: THE DOCTRINE OF EQUIVALENTS.

§ 245. Diversities of Integral Parts are sometimes Diversities of Substance, sometimes of Form.

Inventions which perform the same functions may differ not only in shape, size, capacity, proportions, arrangement, and materials, but also in the individual character of the parts or elements of which they are composed. When such diver-

so as to adapt it to a new use, and then apply it to that use, may be invention, see Hoffman *v.* Aronson (1871), 8 Blatch. 324; 4 Fisher, 456.

sity results in the expression of a different idea of means, the diversity is one of substance, and each of the inventions is distinct from and independent of the other. When the idea of means in both inventions is essentially the same, the variation either indicates a different development of this idea, by which the later invention becomes an improvement on the earlier, or is a simple alteration in the form of its embodiment. The rules which govern these diversities are based on the familiar principles already stated, and taken together, constitute the "Doctrine of Equivalents."

§ 246. "Equivalent" a Term Relating either to Substance or to Form: Equivalence in Form Alone here Considered.

The term "equivalent" is used in Patent Law in two different senses, and in relation to two different subjects. In one sense it denotes the correspondence between agencies which not only perform the same functions, but are in themselves the same operative means. In this sense it is synonymous with "identical;" and can be properly employed only in reference to an invention as a whole.[1] In its second and more

§ 246. [1] The courts, in using this term "equivalent" have not always been careful to distinguish between these two meanings of the word. Thus in Gottfried *v.* Phillip Best Brewing Co. (1879), 17 O. G. 675, Dyer, J.: (685) "To make one mechanical device the equivalent of another, it must appear not only that it produces the same effect, but that such effect is produced by substantially the same mode of operation." 5 Bann. & A. 4 (34).

In Conover *v.* Roach (1857), 4 Fisher, 12, Hall, J.: (26) "It is not enough, in order to show that one mechanical device is the equivalent of another, that it accomplishes the same result; that it produces the same effect unless that effect is produced by substantially the same mode of operation. In other words, the ultimate end and object of a machine may be to produce a fabric or manufacture of a certain kind, and it may well appear in the progress of invention that several different inventors may have invented different machines, producing the fabric or that manufacture by entirely different modes of operation, and in that event each successful inventor might be entitled to his patent. They might perhaps be so entirely distinct and different, and independent in their organization and mode of operation, that a patent for each might stand, covering the whole machine as an entirely distinct and independent organization; . . . or they might stand, one being an improvement on the other. It is not therefore sufficient, in order to authorize the jury to find that one device, or a series of devices all operating to the same end, is or are mechanical equivalents for other devices, unless they effect the same substantial purpose by substantially the same mode of operation."

There can be no question that in

technical sense it signifies the interchangeability of agencies which are known in the arts to be capable of serving the same purpose as integral parts of some particular invention.[2] In this sense it is applicable to the elements or ingredi-

both these decisions the judges used "equivalent" in the sense of "identical;" and were comparing complete inventions as distinguished from integral parts. The doctrine here stated, however, is applicable, as we shall hereafter see (§ 254, *post*), to the elements of mechanical combinations, which cannot be equivalents unless they are identical both in function and in mode of operation.

Another distinction between "equivalence" as predicated of entire inventions, and "equivalence" as used in reference to elements and factors of inventions, is well stated in Johnson *v.* Root (1858), 1 Fisher, 351, by Sprague, J.: (363) "The term 'equivalent,' gentlemen, has two meanings as used in this class of cases. The one relates to the results that are produced, and the other to the mechanism by which those results are produced. Two things may be equivalent; that is, the one equivalent to the other as producing the same result when they are not the same mechanical means. Mechanical equivalents are spoken of as different from equivalents that merely produce the same result. A mechanical equivalent, I suppose, as generally understood, is where the one may be adopted instead of the other by a person skilled in the art from his knowledge of the art. Thus, an instrumentality is used in a mechanism; you wish to produce a pressure downward; it can be done by a spring, or it can be done by a weight. A machine is presented to a person conversant with machines. He sees that the force applied downward in the one before him is by a weight; from the knowledge of his art he can pass at once to another force — the spring — to press it downward, and these are mechanical equivalents. But, gentlemen, there may be equivalents in producing the same results, each of which is an independent matter of invention, and in that sense they are not mechanical equivalents. To illustrate my meaning, suppose, in early days, the problem was to get water from a well to the surface of the earth. One man takes a rope made of grass, and draws up a pail of water; another would see that, as a mechanical equivalent, a rope of hemp would accomplish the same result. But suppose another person comes, and for the first time invents a pump. That is equivalent in the result of bringing the water to the surface of the ground; in that respect it is equivalent in producing that result to hauling it up by a rope, but is not mechanically equivalent; it brings into operation, as you know, very different powers and forces, and would require invention to introduce it."

That an "equivalent" is the identical art or device, see May *v.* County of Fond du Lac (1886), 27 Fed. Rep. 691; Cahoon *v.* Ring (1859), 1 Fisher, 397; 1 Clifford, 592.

That whether two arts or devices are "equivalent" is a question of fact for the jury, see May *v.* County of Fond du Lac (1886), 27 Fed. Rep. 691; Tatham *v.* Le Roy (1852), 2 Blatch. 474; Blanchard's Gunstock Turning Factory *v.* Warner (1848), 1 Blatch. 258.

[2] In the second sense equivalents are defined as "obvious and customary" interchanges, see Smith *v.* Downing (1850), 1 Fisher, 64.

ents by whose union in one art or instrument the inventor has embodied his idea of means. It does not indicate identity either in essential character or individual function, but merely the ability to produce the same effects when brought into connection with the other elements in the invention. It is in this sense that the word is used in speaking of the "Doctrine of Equivalents."

§ 247. "Equivalent" in Form, Defined.

An equivalent is therefore any act or substance which is known in the arts as a proper substitute for some other act or substance employed already as an element in an invention, and whose substitution for that other act or substance does not in any manner vary the idea of means.[1] Thus it possesses three characteristics: (1) It must be capable of performing the same office in the invention as the act or substance whose place it supplies;[2] (2) It must relate to the form of embodiment alone and not affect in any degree the idea of means; and (3) It must have been known in the arts, at the date of the patent, as endowed with this capability, or have subsequently become so known without the further exercise of inventive skill.[3] Each of these requisites demands a more extended explanation.

§ 248. Equivalence Depends on Capability of Substitution in the Concrete Invention.

The first essential attribute of an equivalent is its capability of serving as a substitute for the act or substance in whose

§ 247. [1] That the substitution of equivalents does not vary the idea of means, see Hobbie *v.* Smith (1886), 27 Fed. Rep. 656; Adams *v.* Bellaire Stamping Co. (1886), 28 Fed. Rep. 360; 36 O. G. 567; Brighton *v.* Wilson (1883), 18 Fed. Rep. 378; Putnam *v.* Hutchinson (1882), 11 Bissell, 240; 12 Fed. Rep. 131. See also §§ 253–255, *post*.

[2] That a device must perform the same function, in order to be an equivalent, see Piper *v.* Shedd (1885), 26 Fed. Rep. 151; 35 O. G. 256. See also §§ 248–252, *post*.

[3] That one thing is an equivalent for another when a skilful workman from one would have known the other, see May *v.* County of Fond du Lac (1886), 27 Fed. Rep. 691; Carter *v.* Baker (1871), 4 Fisher, 404; 1 Sawyer, 512.

That equivalence must have been known at the date of the patent, see Gould *v.* Rees (1872), 15 Wall. 187; 6 Fisher, 106; 2 O. G. 624. See also § 256, *post*.

place it is employed. The existence of this capability cannot be ascertained by an examination of the alleged equivalent alone, nor by comparing the two acts or substances in their separated state. It depends entirely upon the relation which each occupies toward the invention into which they enter, and on the manner in which each co-operates in the invention with the other acts or substances to which it is there united. Equivalence can therefore be determined only by contrasting the two acts or substances when associated with the other elements of the invention, and engaged in the performance of the functions which they are intended to discharge. If, when subjected to this test, it is discovered that each so operates in the invention as to perform the precise function of the other, each is, in reference to that particular invention, the equivalent of the other, provided it effects no alteration in the idea of means, and had become known in the arts as such equivalent before the patent for the invention had been granted, or afterwards became known without the exercise of inventive skill.[1]

§ 248. [1] In American Whip Co. *v.* Lombard (1878), 4 Clifford, 495, Clifford, J.: (505) "By an equivalent in such a case, it is meant that the element or ingredient substituted for the one withdrawn performs the same function as the other, and that it was well known at the date of the patent in question as a proper substitute for the one omitted in the patented combination." 3 Bann. & A. 598 (604); 14 O. G. 900 (902).

In Carter *v.* Baker (1871), 1 Sawyer, 512, Sawyer, J.: (516) "When in mechanics, one device does a particular thing, or accomplishes a particular result, every other device known and used in mechanics which skilful and experienced workmen know will produce the same result, or do the same particular thing, is a known mechanical substitute for the first device mentioned for doing that thing, or accomplishing that result, although the first device may never before have been detached from its work and the second one put in its place. It is sufficient to constitute known mechanical substitutes that, when a skilful mechanic sees one device doing a particular thing, he knows the other devices, whose uses he is acquainted with, will do the same thing." 4 Fisher, 404 (409).

In Foss *v.* Herbert (1856), 1 Bissell, 121, Drummond, J.: (126) "The question whether one thing is a mechanical equivalent for another is a question of fact, depending on the testimony of experts, on an inspection of the machines; and it is an inference to be drawn from all the circumstances of the case, by attending to the consideration whether the contrivance used by the defendant is used for the same purpose, performs the same functions, or is applicable to the same object as the contrivance used by the patentee." 2 Fisher, 31 (36).

That an equivalent is such by the effect which it produces as an element in the invention, see Wilt *v.* Grier (1881),

§ 249. Equivalence not Dependent on Identity of Individual Attributes.

Hence it is evident that similarity in individual character does not create, nor does diversity in individual character destroy, equivalence between such acts and substances as are thus capable of substitution for each other.[1] However unlike in name, shape, size, capacity, proportions, arrangement, or material they may appear to be, when studied only in connection with each other, if when brought into their position in the art or instrument their interchangeability is manifest, these individual variations become of no importance. Equivalence resides in use, not in intrinsic attributes; and similarity of use alone is necessary to make one act or substance the equivalent of another.

§ 250. Equivalence not Dependent on Capability of Substitution in other Inventions.

Nor is it of the slightest consequence that in reference to some different invention, of which one of these acts or substances is an essential element, this interchange would be impossible. The function of an act or substance depends not

19 O. G. 427; 5 Fed. Rep. 450; Clarke *v.* Johnson (1880), 4 Fed. Rep. 437; 18 O. G. 1276; 18 Blatch. 450; Smith *v.* Marshall (1876), 10 O. G. 375; 2 Bann. & A. 371; Storrs *v.* Howe (1876), 10 O. G. 421; 4 Clifford, 388.

That nothing can be an equivalent if its substitution produces a substantial change in the result, see Clarke *v.* Johnson (1880), 4 Fed. Rep. 437; 18 O. G. 1276; 18 Blatch. 450.

§ 249. [1] In Blake *v.* Rawson (1873), Holmes, 200, Shepley, J.: (203) "It is not always enough to prove that two combinations of elements are equivalent to show that each element of the combination in one may be regarded under some circumstances as the equivalent of the corresponding element in the other, when the elements are separately considered. If the mechanical combination of the members of the two machines be such that the action and mode of operation differ in the two machines, then one is something more than a mere mechanical equivalent for the other." 3 O. G. 122 (123); 6 Fisher, 74 (80).

That a device, as used in a combination, may be an equivalent for one formerly used, although out of the combination it may be entirely unlike the device for which it is substituted, see Cochrane *v.* Deener (1876), 94 U. S. 780; 11 O. G. 687; Foster *v.* Moore (1852), 1 Curtis, 279.

That equivalence resides in use, not in name, see Graham *v.* Mason (1869), 5 Fisher, 1.

That equivalents may differ in shape, see Graham *v.* Geneva Lake Crawford Mfg. Co. (1880), 21 O. G. 1536; 11 Fed. Rep. 138.

merely on its individual character and mode of operation, but also on the character and operation of the elements with which it is associated, and hence with every change in the association the function of each element may likewise change. Thus where an act or substance is employed in different inventions and fulfils in each a different purpose, the acts and substances which, as to one of these inventions, are its true equivalents, cease to be such when it has been transferred from this invention to another, and a new class of acts or substances become its obvious and customary substitutes. Equivalence resides therefore not only in the use, but in the use in a particular invention, and similarity or diversity of use in one is consequently of little service in determining the interchangeability of use in others.

§ 251. Equivalence Possible though One of the Equivalents Performs Additional Functions.

Again, equivalence is not affected by the fact that the new element performs in the invention some function in addition to the old.[1] While it is necessary that the entire service rendered by the act or substance, whose place another occupies, should be discharged, it is not essential that the operation of the substitute should be confined within the same limits as the former. It is sufficient that it serves the same use; if it serves others also, or better serves the old, it is no less an

§ 251. [1] In Atlantic Giant Powder Co. *v.* Goodyear (1877), 13 O. G. 45, Shepley, J.: (46) "The books are full of cases proving that when a substitute is used for one ingredient in a patented combination which has every property and performs every function of the original in the combination, it does not cease to be an equivalent because in addition it does something more and better." 3 Bann. & A. 161 (164).

See also Loercher *v.* Crandall (1881), 11 Fed. Rep. 872; 20 Blatch. 106; 21 O. G. 863; Wilt *v.* Grier (1881), 5 Fed. Rep. 450; 19 O. G. 427; Crouch *v.* Roemer (1880), 103 U. S. 797; 19 O. G. 1067; Maynadier *v.* Tenney (1877), 2 Bann. & A. 615; Holbrook *v.* Small (1876), 2 Bann. & A. 396; 10 O. G. 508; Carstaedt *v.* U. S. Corset Co. (1876), 2 Bann. & A. 331; 13 Blatch. 371; 10 O. G. 3; Kendrick *v.* Emmons (1875), 2 Bann. & A. 208; 9 O. G. 201; Fisher *v.* Craig (1874), 3 Sawyer, 69; 1 Bann. & A. 365; Sarven *v.* Hall (1873), 4 O. G. 666; 11 Blatch. 295; 6 Fisher, 495; Converse *v.* Cannon (1873), 2 Woods, 7; 9 O. G. 105; Sarven *v.* Hall (1872), 1 O. G. 437; 9 Blatch. 524; 5 Fisher, 415; Wheeler *v.* Clipper Mower & Reaper Co. (1872), 10 Blatch. 181; 6 Fisher, 1; 2 O. G. 442; Foss *v.* Herbert (1856), 2 Fisher, 31; 1 Bissell, 121.

equivalent than if the entire functions of each, as elements in the invention, were identical. One act or substance may thus be the equivalent of another, although the latter, if the former had been first employed, could not have been regarded by itself alone as its complete and perfect substitute in the invention. Yet as to the one use which both alike subserve, they stand on the same footing as if no other use were possible to either, and as to that are interchangeable equivalents.

§ 252. Equivalence not Dependent on the Number of the Substituted Parts.

For this reason any single act or substance may be an equivalent for two or more already used in the invention; and, on the contrary, two or more acts or substances may be together capable of substitution for and so become equivalents of a single one.[1] In both these cases neither member of the group of elements is a perfect substitute for the one element whose function they unitedly perform, although that single element is an entire equivalent for each as well as all the members of the substituted group. Yet, as in each case precisely the same service must be rendered and the same purposes fulfilled, both by the single element and by the group of elements, in spite of the numerical diversity and the want of exact separate correspondence, the essential characteristics of equivalence are still preserved. The same is true of every other possible diversity; if it does not affect the use of the acts or substances in the invention, it has no bearing on the question of equivalence, and furnishes no criterion of interchangeability.

§ 252. [1] That two acts or substances may be the equivalent of one, see Strobridge *v.* Lindsay (1881), 6 Fed. Rep. 510; 19 O. G. 1285.

That one act or substance may be the equivalent of two or more, see Brooks *v.* Norcross (1851), 2 Fisher, 661; Heath *v.* Unwin (1852), 2 Web. 236; Martin & Keating's Patents (1848), 2 Web. 195, n.

That while a single cam may be the equivalent of a single wedge, two cams may not be the equivalent of two wedges, see Gray *v.* Bangs (1887), 31 Fed. Rep. 342.

That a compound may be an equivalent for its elements and *vice versa*, see Heath *v.* Unwin (1852), 2 Web. 236; Martin & Keating's Patents (1848), 2 Web. 195, n.

§ 253. Equivalence Impossible when the Idea of Means is Changed.

The second essential requisite in an equivalent is that its use in the invention must not involve a change in the idea of means. A change in the idea of means is a change of substance, demanding an operation of the creative faculties, and producing either a new invention or an improvement on the old. The substitution of equivalents is, on the contrary, a mere change of form, involving no inventive skill, but suggested by the invention itself to every person familiar with the art to which the invention appertains.[1] Any act or substance, therefore, however accurately it performs the function of the element whose place in the invention it supplies, is not a mere equivalent if in addition it has also introduced a new idea or a development of the old idea of means.[2] While an equivalent may actually accomplish more, or operate to better purpose than the former, its excess of action must be consistent with the unity and identity of the idea embodied in the original invention.

§ 253. [1] In Foster *v.* Moore (1852), 1 Curtis, 279, Curtis, J.: (291) "I do not think the doctrine respecting the use of mechanical equivalents is confined by the Patent Law to those elements which are strictly known as such in the science of mechanics. In the present advanced state of that science there are different well-known devices, any one of which may be adopted to effect a given result according to the judgment of the constructor. And the mere substitution of one of these for another cannot be treated as an invention. It does not belong to the subject of invention, but of construction. One constructor may adopt a spring-catch, another a catch and spring; but whether he takes one or the other is matter of judgment in construction, as long as both are designed to accomplish the same end, and both are in common use to accomplish it."

[2] That where no inventive skill is involved in the substitution, the thing substituted is an equivalent, see Coes *v.* Collins Co. (1882), 9 Fed. Rep. 905; 20 Blatch. 221; 22 O. G 417; Crouch *v.* Roemer (1880), 103 U. S. 797; 19 O. G. 1067; Whittlesey *v.* Ames (1880), 9 Bissell, 225; 18 O. G. 357; 5 Bann. & A. 96; 13 Fed. Rep. 893; Schumacher *v.* Cornell (1877), 96 U. S. 549; Smith *v.* Marshall (1876), 10 O. G. 375; 2 Bann. & A. 371; Fisher *v.* Craig (1874), 3 Sawyer, 69; 1 Bann. & A. 365; Westlake *v.* Cartter (1873), 6 Fisher, 519; 4 O. G. 636; King *v.* Louisville Cement Co. (1873), 6 Fisher, 336; 4 O. G. 181; Taylor *v.* Garretson (1871), 5 Fisher, 116; 9 Blatch. 156; Case *v.* Brown (1864), 2 Wall. 320; Burden *v.* Corning (1864), 2 Fisher, 477; Johnson *v.* Root (1858), 1 Fisher, 351; Tatham *v.* Le Roy (1852), 2 Blatch. 474; Blanchard's Gunstock Turning Factory *v.* Warner (1848), 1 Blatch. 258; Heath *v.* Unwin (1845), 2 Web. 223.

§ 254. Equivalence in Combinations.

In examining alleged equivalents with reference to this second attribute, it is important that the radical distinction between a combination and a simple invention should be constantly remembered; for the same apparent change which, in a simple invention, would be but a substitution of equivalents might, in a combination, introduce a new idea of means. A combination is not a mere union of integral parts into a single art or instrument; it is a grouping of subordinate means, each perfect in itself, each retaining its own individuality of character and function, and each performing its own function by its own peculiar mode of operation, under a common law of action, in obedience to which all the members of the group co-operate in the production of a given result; and its identity depends upon the presence of each one of those specific elemental means, and upon the obedience of all to that co-operative law. The essential nature of this co-operative law being determined by and dependent upon the specific methods in which the individual elements perform their several functions, any variation in the mode in which an individual element operates must produce corresponding variations in the mode in which all co-operate, and must, consequently, subject them to a new co-operative law. Hence the removal of a single one of these subordinate means destroys the combination, and the substitution for the one removed of any element which differs from it in essential character, as a means, is the introduction not only of a different element but of a different co-operative law, and the creation of a new invention. In reference, therefore, to such elements in any combination as constitute its subordinate means, no other elements can be equivalent unless they are equivalent inventions; that is, unless they not merely perform the same functions but perform them by applying the same force to the same object through the same mode of application;[1] in other words,

§ 254. [1] In the Goodyear Dental Vulcanite Company *v.* Davis (1880), 102 U. S. 222, Strong, J.: (230) "When a product arrived at by certain defined stages or processes is patented, only those things can be considered equivalents for the elements of the manufacture which perform the same function in substantially the same way." 19 O. G. 543 (545).

That combination equivalents must not only perform the same function, but

unless they differ from the elements whose place they occupy only in the form in which their several ideas of means have

also perform it in the same way, see Schmidt v. Freese (1882), 12 Fed. Rep. 563; 21 O. G. 1876; Singer Mfg. Co. v. Stewart Mfg. Co. (1881), 8 Fed. Rep. 920; 20 O. G. 524; Merriam v. Van Nest (1878), 13 O. G. 597; Maynadier v. Tenny (1877), 2 Bann. & A. 615; Westlake v. Cartter (1873), 4 O. G. 636; 6 Fisher, 519; Roberts v. Roter (1872), 5 Fisher, 295; Crompton v. Belknap Mills Co. (1869), 3 Fisher, 536; Roberts v. Harnden (1865), 2 Clifford, 500; Eames v. Godfrey (1863), 1 Wall. 78; Conover v. Rapp (1859), 4 Fisher, 57; Cahoon v. Ring (1859), 1 Fisher, 397; 1 Clifford, 592.

The reason for this distinction is stated in Crompton v. Belknap Mills (1869), 3 Fisher, 536, to be as follows: that in a combination the mode of operation of the combination as a whole is not covered by the patent, — only the union of certain elements in a mode of operation; and that the substitution of a different element, though in the same mode of operation, affects the substance of the invention, not its mere embodiment, as in the case of a machine whose mode of operation as a whole is covered.

Notwithstanding the clearness of this doctrine, both on principle and on authority, cases are to be found in which this peculiarity of combination equivalents is not noticed, even by judges who in other cases have distinctly recognized it. But this omission evidently results from an incompleteness of the definition attempted, not from a difference in doctrine. For instances of this see Potter v. Stewart (1881), 19 O. G. 997; 7 Fed. Rep. 215; 18 Blatch. 561; Babcock v. Judd (1880), 17 O. G. 1351; 1 Fed. Rep. 408; 5 Bann. & A. 127; American Whip Co. v. Lombard (1878), 14 O. G. 900; 4 Clifford, 495; 3 Bann. & A. 598; Webster v. New Brunswick Carpet Co. (1874), 5 O. G. 522; 1 Bann. & A. 84; Welling v. Rubber Coated Harness Trimming Co. (1874), 1 Bann. & A. 282; 7 O. G. 606; Rees v. Gould (1872), 15 Wall. 187; 2 O. G. 624; 6 Fisher, 106; Sands v. Wardwell (1869), 3 Clifford, 277. In several of these cases the courts speak of a "new" device as not an equivalent, and also say that, to be an equivalent, the device must have been known at the date of the patent. If "new" is not synonymous with "not before known," in these instances it may mean "essentially different," and thus put even these cases in harmony with the true doctrine.

In applying this doctrine to compositions of matter, however, a new difficulty arises. These are always true combinations, of which the ingredients are the constituent elements; and hence it should be true of these also that no element can be the equivalent of another unless it performs the same function in the same way. But in most chemical compositions, and in some mechanical ones, it is impossible to ascertain by what methods the elements do perform their respective functions; and the courts are compelled either to regard them as non-equivalents — for want of sufficient proof of identity of method, even although each is a well-known substitute for the other — or to accept the fact that each fulfils the same office as proof that the methods in which they fulfil it are the same. In this dilemma the latter mode has been adopted, and it is held that in such combinations elements are equivalents if they discharge the same function and were so known at the date of the patent, — thus returning in such cases to the practical rule which governs simple inventions.

This exception to the law of combination equivalents is admirably dis-

been expressed. But other changes, not affecting the identity of these subordinate means, such as the changes in their own

cussed by Pollock, C. B., in Stevens *v.* Keating (1847), 2 Web. 181. He says: (188) "It has been said that this borax which the defendant uses is a chemical equivalent. I may say that I do not quite go along with the doctrine of equivalents in chemistry, applied in the same way as in mechanics and those matters to which you can apply the principles of the exact sciences. If a man discovers a machine that can be successfully used to produce any effect, whether to print a newspaper, to make a stucco, to light an apartment, or to do any process whatever, it is well known that if he uses a crank there are two or three substitutes for a crank; if he uses one mode of changing the direction of motion there are three or four perfectly well-known means of doing that; and if he puts in a specification, describing his machine, and somebody comes and instead of a crank substitutes something else; or if instead of a pulley to change motion he substitutes a wheel or some adaptation of wheels to change the motion, — everybody will at once see that to be an evasion of the patent, and for this plain reason, that all these equivalents are perfectly well known; they are just as well known as that 10 added to 6 makes 16, and that 8 added to 8 makes also 16. In the mechanical sciences, or wherever you can apply the exact sciences, you can frequently predict the results without the slightest difficulty, and with the same certainty as that with which a skilful arithmetician can tell you what will be the amount of certain numbers added together, and that a certain other set of numbers apparently differing from them altogether will, when added together, produce the same result. With precisely the same certainty a skilful mechanic will tell you that such and such a combination will produce a result, and that such and such another combination, to the ordinary eye apparently totally different, will produce precisely the same result, but looked at with the experienced eye of a mechanic he would say, Yes, there appears to be a great difference; here is a lever instead of an inclined plane, a pulley instead of two wheels to change the motion, and so on; but a skilful mechanic will say, The general expression in all these might be put down as exactly the same; so that, however different they may appear to the eye, they are to the mind precisely the same. I do not think that doctrine applies altogether to the case of chemistry, because, although you can predict with confidence in mechanics in some instances, and in some cases where mathematics can be applied, in chemistry you almost entirely fail. You cannot, because sulphuric acid will succeed, tell at all that nitric acid will succeed, or that any other acid will succeed until you have tried. They do not exist in any relation to each other as numbers do, or as mechanical science presents to you the different mechanical powers. You cannot anticipate the result, — it is a mere question of result upon experiment."

In this country the same exception has been admitted, in reference to chemical compositions, in Tyler *v.* Boston (1868), 7 Wall. 327.

But that as to mechanical compounds, in which the mode of operation of the elements can be detected, the general rule of combination equivalents is adhered to, see Atlantic Giant Powder Co. *v.* Dittmar Co. (1881), 9 Fed. Rep. 316; 20 O. G. 1380; Atlantic Giant Powder Co. *v.* Mowbray (1876), 12 O. G. 111; 2 Bann. & A. 442.

In some cases the courts have en-

integral parts or in the non-essential elements of the combination, follow the usual rule, and are but substitutions of equivalents if the same functions are performed by both.

§ 255. Equivalence in Simple Inventions.

In simple inventions, on the other hand, identity depends only upon the mode of operation of the art or instrument considered as a whole, and any change in the integral parts consistent with the preservation of this mode of operation is only change of form. The function of these individual parts,

deavored to draw a distinction between combinations of old elements and combinations in which the elements themselves are new, and to make this distinction the basis of another difference in the application of the doctrine of combination equivalents. See Sands *v.* Wardwell (1869), 3 Clifford, 277; McCormick *v.* Talcott (1857), 20 Howard, 402, etc. From such an endeavor only confusion is likely to result. Every combination, considered as a combination, occupies precisely the same legal status, whether its elements are new or old. It is a complete invention, an entirety, a unit; and its unity is destroyed by any substitution of elements not performing the same office in the same way, while the substitution of elements which do fulfil the same purpose in the same manner does not affect the substance of the invention, but its form only. If the elements are old, and such of their individual characteristics as are involved in the performance of their functions were well known, the scope of the inventive act is limited to the union of these elements under their co-operative law. But if the elements are wholly new, or if although old in themselves their qualities which are now serviceable in the combination have been discovered and applied by the combiner, an additional inventive act has been performed, which, if properly claimed, should be protected by a patent. Still, as inventions, these are distinct from the combinations in which they are now united; and any subsequent inventor, who produces acts or substances discharging the same functions in the same manner, must be regarded as a mere imitator and infringer of the former. Now, when the courts undertake to establish one rule of equivalents where the elements are old, and another where the elements are new, what is it but an endeavor to protect the rights of the inventor of the new element in an indirect manner, instead of requiring him to protect himself by claiming the new element in his patent in the usual mode? And if by describing and not claiming it he has abandoned it to the public, has he not reduced himself to the position of the inventor of an ordinary combination (that is, of the union of certain elements under a co-operative law); and how can he, under color of equivalents, reclaim the idea of means embodied in the element abandoned? The symmetry and precision of the law can be preserved only by keeping things distinct which are legally or naturally independent of each other. The combination is an invention by itself. Its essence is the union of several elemental means in one co-operating means; and whether the inventor of the combination is the inventor of the elemental means or not cannot vary any of the rules by which the identity of the combination is to be determined.

therefore, alone becomes important, and everything which performs in the same function when incorporated into the invention conduces equally to the attainment, through the same method, of the ultimate result. The field of equivalents is thus far wider in regard to these inventions than with reference to combinations. In these a substitute, in order to escape equivalence, must differ in its function, not merely as a means, and must subvert or modify the principle of the entire invention, while any substitution in the essential elements of a combination which affects either the means or function of the single element passes beyond the region of equivalents into the sphere of substantive invention.

§ 256. Equivalence Impossible if the Alleged Equivalent has been Invented since the Original Invention was Patented.

The third essential attribute of an equivalent is that it must have been known as such at the date of the patent, or have since become known without the exercise of inventive skill.[1]

§ 256. [1] In Crompton *v.* Knowles (1881), 7 Fed. Rep. 199, Lowell, J.: (203) "That doctrine [known substitutes], first announced by Mr. Justice Clifford, and often applied by him, is that one who has invented and patented a new combination, however small and easy, if it be patentable at all, may treat as an infringement anything which is a purely colorable variation of his invention, obtained by substituting one well-known part or ingredient for another equally well-known, and fully understood, by persons skilled in the art, to be exchangeable in similar combinations for the part or ingredient which it replaces. It is a doctrine of very limited application, and as a formula, is perhaps rather misleading. The true question always is whether the defendant uses anything which the plaintiff invented."

In Imhaeuser *v.* Buerk (1879), 101 U. S. 647, Clifford, J.: (656) "Patentees of an invention consisting merely of a combination of old ingredients are entitled to equivalents; by which is meant that the patent in respect to each of the respective ingredients comprising the invention covers every other ingredient which, in the same arrangement of the parts, will perform the same function, if it was well known as a proper substitute for the one described in the specification at the date of the patent." 17 O. G. 795 (795).

In Gill *v.* Wells (1874), 22 Wall. 1, Clifford, J.: (15) "Old ingredients known at the date of letters-patent granted for an invention consisting of a new combination of old ingredients, if also known at that date as a proper substitute for one or more of the ingredients of the invention secured by the letters-patent, are the equivalents of the corresponding ingredients of the patented combination. Such old ingredients, *so known* at the date of the letters-patent granted, are the equivalents of the ingredients of the patented combination, and no others; and it may be added that *that*, and that only, is what is meant by the rule that inventors

The substitution of one equivalent for another is a change in the form of embodiment only; and as all forms of embodiment

of a new combination of old ingredients are as much entitled to claim equivalents as any other class of inventors." 6 O. G. 881 (881).

In Unwin *v.* Heath (1854), 5 H. L. 505, Williams, J.: (523) "Though the use of a chemical or mechanical substitute which is a known equivalent to the thing pointed out by the specification and claimed as the invention amounts to an infringement of the patent, yet if the equivalent were not known to be so at the time of the patent and specification, the use of it is no infringement." Parke, B.: (538) "The specification must be read as persons acquainted with the subject would read it at the time it was made; and if it could be construed as containing any chemical equivalents, it must be such as are known to such persons at that time; but those which are not known at the time as equivalents, and afterwards are found to answer the same purpose, are not included in the specification. They are new inventions." Pollock, L. C. B.: (541) "The patent . . . covers and protects not only the process actually specified, but any process with chemical equivalents known as such at the date of the patent, but not chemical equivalents discovered afterwards; for this would be giving the patentee not only the benefit of his own discovery, but the benefit of the discoveries of other persons subsequently to the date of the patent. The process used by the defendant was not known as a chemical equivalent at the date of the patent. . . . Then assuming it to be a chemical equivalent . . . it is not a chemical equivalent that was known to scientific persons at the date of the patent, and it stands, therefore, on the footing of an entirely new discovery."

In Heath *v.* Unwin (1852), 2 Web. 236, Coleridge, J.: (243) "The specification, to be perfect, must be taken to specify impliedly all the chemical equivalents of those chemical means expressly stated for producing the promised result which were at the time of specifying known to ordinarily skilled chemists or to the patentee himself. . . . (244) If that equivalent were known at the date of the specification . . . then it is within the specification, and the use of it is an infringement. If not, the contrary conclusion follows, and the use of it is an improvement in virtue of a new discovery; and the knowledge I speak of is, of course, . . . the knowledge that the component parts thus applied were equivalents to the thing itself, applied according to the specification for producing the desired result." . . . In the same case Alderson, B.: (245) "But it may be that there are equivalents, mechanical or chemical, existing, but previously unknown to ordinarily skilful mechanics or chemists. These are not included in the specification but must be expressly stated therein. These are, in fact, new discoveries, in themselves wholly independent of the specification which omits them, and for these there is no specification or patent at all. They may be used by all persons without infringing the patent. . . . (246) If the equivalent be not before known, he who discovers *de novo* the equivalent, if it be better than the original for which it was the equivalent, has by the use of the equivalent improved upon, not infringed, the original invention."

That the equivalent must have been known as such at the date of the patent, see also Rowell *v.* Lindsay (1885), 113 U. S. 97; 31 O. G. 120; Kuhl *v.* Mueller (1884), 21 Fed. Rep. 510; 28 O. G. 541; Rowell *v.* Lindsay (1881), 19 O. G. 1565; 10 Bissell, 217; 6 Fed. Rep. 290; Babcock *v.* Judd (1880), 17 O. G.

known in the arts are presumed to have been also known to the inventor and to have been open to his selection, his choice of one and its employment points out the mode of using all the rest, and thus renders every other an imitation of his own. But acts and substances which have been invented, or whose availability for the embodiment of his idea of means has been discovered and applied by the exercise of additional inventive skill, since he completed his invention and bestowed it on the public by his patent, are not imitations of the elements in which he has embodied his idea. Their creation or discovery, and their adaptation to the purposes of his invention have resulted from a subsequent and separate inventive act, — an act performed after the completion and publication of his invention, and hence, though capable of exact substitution for the acts or substances he has employed, they are not true equivalents whose use causes a mere diversity of form, but new inventions expressing a diversity of substance. The attribute of knowledge, at the point of time when the inventor's right received the positive sanction of the law, thus enters into the character of an equivalent. If then known as a substitute, the substitution is an alteration in the form of the embodiment, a simple equivalent and nothing more. If then unknown, its subsequent creation and adaptation to the invention, by the exercise of inventive skill, if not resulting in an essential alteration in the idea of means, is at least a development of that idea, and constitutes an improvement.[2]

1351 ; 1 Fed. Rep. 408 ; 5 Bann. & A. 127 ; Wicke *v.* Ostrum (1880), 103 U. S. 461; 19 O. G. 867 ; Colgate *v.* Law Telegraph Co. (1880), 5 Bann. & A. 437 ; Fuller *v.* Yentzer (1876), 94 U. S. 299 ; 11 O. G. 597 ; Welling *v.* Rubber Coated Harness Trimming Co. (1874), 7 O. G. 606; 1 Bann. & A. 282 ; Smith *v.* Woodruff (1874), 4 O. G. 635 ; 1 MacArthur, 459 ; 6 Fisher, 476 ; King *v.* Louisville Cement Co. (1873), 4 O. G. 181 ; 6 Fisher, 336 ; Gould *v.* Rees (1872), 15 Wall. 187; 2 O. G. 624 ; 6 Fisher, 106 ; Woodward *v.* Morrison (1872), Holmes, 124 ; 5 Fisher, 357 ; 2 O. G. 120 ; Heath *v.* Unwin (1852), 2 Web. 236.

In a very few cases doubt has been expressed whether the date at which the equivalent must have been known is not the date of the invention rather than that of the patent (see Goodyear Dental Vulcanite Co. *v.* Preterre (1878), 14 O. G. 346 ; 15 Blatch. 274 ; and cases there referred to). But on principle, as explained in the text, and on the authorities above cited, there can be no serious question but that the date of the patent is the true one.

[2] It may well be questioned whether

§ 257. **All Equivalents Covered by the Patent.**

As the substitution of equivalents works no variation in the substance of an invention, so all equivalents, whether this portion of the doctrine of equivalents has not often been pressed far beyond its legitimate scope and been made the basis for conclusions which it does not justify. Its first appearance in the law was as a rule governing the construction of a patent; and it was then formulated in the proposition that a patentee, having specified certain acts or substances as capable of expressing his idea of means, might treat all other acts or substances then known in the arts to be equally capable of expressing that idea, as identical with those which he employed, and consequently as covered by his patent. This proposition is incontrovertible, and had the doctrine been limited to this, no doubt as to its truth could ever have arisen.

But, as has often happened in reference to other subjects, the courts assumed that an exclusive form of statement must be equally correct with the inclusive, and hence declared that no act or substance could be legally the same as that employed in the patented invention unless it were known in the arts as practically the same at the date of the patent. This proposition they supported partly on the ground that the new act or substance not being known when the patent was granted, it cannot be supposed to have been claimed by the patentee, and partly on the ground that the inventor of the new act or substance is entitled to its exclusive use and its protection by a patent. And hence they have inferred that the use of such new act or substance, as a substitute for those described in the patent, is not forbidden by that patent, and that the practice of the invention with such substitution is not an infringement.

Whatever judicial authority may be urged in defence of these positions, they cannot stand the test of logical or scientific inquiry. Where an act or substance not known in the arts at the date of the patent afterwards becomes known, its introduction into the arts is either the result of an inventive act or the consequence of that gradual extension of human knowledge to whose exclusive benefits no individual can lay claim. In the first case the inventor of the new act or substance is entitled to protection in its use, even though in its use it is an exact substitute for acts or substances previously employed, and therefore the inventor of the invention in which the new act or substance could be thus substituted has no right to adopt it in the embodiment of his idea of means. But it does not thence follow that the inventor of the new act or substance, can appropriate to himself the idea of means conceived by the former inventor. Unless the substitution of the new act or substance essentially changes that idea of means, in which case there is no question of equivalence or substitution, it either develops that idea or leaves it wholly undisturbed. If it develops the idea the substitution is an improvement. If it leaves the idea wholly undisturbed the change is a mere change of form. But whether an improvement or a mere change of form, the substitution does not enlarge the privileges of the substitutor nor curtail those of the original inventor, and any use of the invention with the substitution, unless consented to by the original inventor, must be an infringement.

In the second case, where the new acts or substances are not inventions but become known through the gradual development of human information, the rights of the original inventor are no

actually known to the inventor or not, are covered by his patent.[1] To reproduce his idea, in an art or instrument

less extensive and secure. His idea to embrace the idea of means expressed

of means is equally unaffected by any substitution of such acts or substances, and those who employ that idea expressed through the new acts or substances equally invade the exclusive privileges which his patent has conferred upon him. Though by such substitution that idea is carried forward to a wider application or more excellent result, the substitution is at best a mere improvement, and the improver, here as in the former case, is guilty of infringement if he uses the invention without the permission of the original inventor.

From these considerations it is evident that the second proposition is not correct either in its statement, or the grounds on which it rests, or the conclusions to which it has led. It is not correct in statement, because although such acts or substances as were not known at the date of the patent express a diversity of substance wherever they have resulted from an inventive act, if they have simply become known through the development of human information, and no inventive skill has been exercised in substituting them for the acts or substances formerly employed, the sole change that has taken place in the invention is a change of form, and the new act or substance is as truly an equivalent as if it had been known before the issue of the patent. It is not correct in the grounds on which it rests because, firstly, the patentee never claims nor does his patent cover any form of embodiment new or old, but the idea of means or essence of the invention in whatever acts or substances it may be capable of embodiment; and secondly, the right of the inventor of the new act or substance to the exclusive use of his invention can never be extended in the original invention, nor so exercised as to restrict the rights of the original inventor. It is not correct in the conclusions to which it has led, because no change in the embodiment of an idea of means, whether the substituted acts or substances are new or old, or are new inventions or are mere discoveries, can evade the prohibition of the patent or enable an unauthorized employer of the idea of means to escape the penalty of his infringement.

The doctrine to which this inquiry leads, and which must sooner or later receive recognition from the courts, may be thus stated: —

I. That every act or substance which is known at the date of the patent as an obvious and customary substitute for any act or substance employed by the inventor for the expression of his idea of means is its true equivalent, whose use creates a mere diversity of form and not of substance.

II. That any act or substance which without the exercise of inventive skill subsequently becomes known as such substitute, and is introduced into the invention, is also a mere equivalent, producing only a diversity of form.

III. That where the new act or substance, or its introduction into the invention, is due to the exercise of the inventive faculties, its creator or introducer has effected an improvement in the original invention which can be protected by a patent.

IV. That neither the creation nor the introduction of the new act or substance confers upon its introducer or creator any right to use the original invention, or to apply its idea of means in any form of embodiment whatever.

§ 257. [1] That all equivalents are covered by the patent, see Reay *v.* Ray-

composed of different integral parts, is no less imitation than if the tangible embodiment had been an exact copy

nor (1884), 22 Blatch. 13; 26 O. G. 1111; 19 Fed. Rep. 308; Clough *v.* Barker (1882), 106 U. S. 166; 22 O. G. 2157; Wilt *v.* Grier (1881), 5 Fed. Rep. 450; 19 O. G. 427; Babcock *v.* Judd (1880), 5 Bann. & A. 127; 1 Fed. Rep. 408; 17 O. G. 1351; Megraw *v.* Carroll (1880), 5 Bann. & A. 324, Ready Roofing Co. *v.* Taylor (1878), 15 Blatch. 94; 3 Bann. & A. 368; American Whip Co. *v.* Lombard (1878), 4 Clifford 495; 14 O. G. 900; 3 Bann. & A. 598; Union Metallic Cartridge Co. *v.* U. S. Cartridge Co. (1877), 11 O. G. 1113; 2 Bann. & A. 593; Storrs *v.* Howe (1876), 10 O. G. 421; 2 Bann. & A. 420; 4 Clifford, 388; Gould *v.* Rees (1872), 15 Wall. 187; 2 O. G. 624; 6 Fisher, 106; Sayles *v.* Chicago & Northwestern R. R. Co. (1871), 3 Bissell, 52; 4 Fisher, 584; Roberts *v.* Harnden (1865), 2 Clifford, 500; Burden *v.* Corning (1864), 2 Fisher, 477; Pitts *v.* Edmonds (1857), 2 Fisher, 52; 1 Bissell, 168; Ryan *v.* Goodwin (1839), 3 Sumner, 514; 1 Robb, 725; Bateman *v.* Gray (1853), Macrory's P. C. 93.

That the same rule obtains in patents for chemical combinations, see Matthews *v.* Skates (1860), 1 Fisher 602; and for combinations in general, see Dederick *v.* Whitman Agricultural Co. (1886), 26 Fed. Rep. 763; 36 O. G. 570; Dederick *v.* Cassell (1881), 20 O. G. 1233; 9 Fed. Rep. 306; Gill *v.* Wells (1874), 22 Wall. 1; 6 O. G. 881; Rees *v.* Gould (1871), 15 Wall. 187; 2 O. G. 624; 6 Fisher, 106.

That a pioneer combination patent covers all equivalent constructions producing the same results by using the same mechanical equivalents, see Tarrant *v.* Duluth Lumber Co. (1887), 39 O. G. 1425; 30 Fed. Rep. 830.

The patentee cannot, however, invoke the doctrine of equivalents beyond the scope of his invention, as indicated by the character of the idea which it embodies. This idea may either be that of an entirely new means accomplishing an entirely new result, or an entirely new means producing an old result, or the improvement of an existing means. In the former the scope of the invention is the widest possible; in the latter, the narrowest; and equivalents in one, therefore, necessarily embrace a far broader field than in the other, although the tests by which equivalence is determined always remain the same. This difference is clearly stated in Curtis *v.* Platt (1863), cited in a note to Adie *v.* Clark (1876), L. R. 3 Ch. 134, where Woods, V. C., says: (136) "Where the thing is wholly novel and one which has never been achieved before, the machine itself which is invented necessarily contains a great amount of novelty in all its parts, and one looks very narrowly and very jealously upon any other machines for effecting the same object, to see whether or not they are merely colorable contrivances for evading that which has been before done. When the object itself is one which is not new, but the means only are new, one is not inclined to say that a person who invents a particular means of doing something that has been known to all the world long before has a right to extend very largely the interpretation of those means which he has adopted for carrying it into effect. Because otherwise that would be to say that the whole world is to be precluded from achieving some desirable and well-known object which everybody has had in view for years. In such a case it may be said that the means taken are simply mechanical equivalents for the means previously adopted for arriving at the same object. One looks more jealously

of his own. By his inventive act he has discovered and declared the usefulness, in his invention, of all industrial appliances which had been recognized before the granting of his patent as endowed with qualities enabling them to serve for the expression of some part of his idea; and the appropriation to him of the use of all, in this particular association, is justified by the same principles that warrant the protection of his exclusive rights in that idea.

§ 258. Doctrine of Equivalents Applicable to all Inventions.

The doctrine of equivalents applies alike to all classes of inventions, and to all inventions of whatever class. Equivalents in an art or process are such acts as, in accordance with preceding rules, are interchangeable with those which the inventor has himself employed. In a machine or manufacture, any known agency which can be substituted for one or more of the integral parts of which the instrument consists, without affecting the idea of means, is a mechanical equivalent.[1] In compositions of matter, substances which at the granting of the patent were known as capable of serving the same purpose in the composition as the ingredients actually employed become thereby their chemical equivalents. In a design, the use of other lines or images, impressing the eye in the same manner as the old when grouped with other elements in the design, and known as able to produce the same effect, are mere equivalents. And in improvements, any substitution of an act or substance which

at the claims of inventors seeking to limit the rights of the public at large for effecting that which has been commonly known to all the world long ago. Of course no patent can be taken out for effecting this as a new object, but only for effecting it by a new means."

See also Singer *v.* Walmsley (1860), 1 Fisher, 558.

§ 258. [1] That a mechanical equivalent is any mechanical appliance which will produce the same effect in the invention, and was so well known at the date of the patent that it would naturally have been applied to the same purpose by a person skilled in the art, without the exercise of his own inventive powers, see Wilt *v.* Grier (1881), 19 O. G. 427; 5 Fed. Rep. 450; Smith *v.* Marshall (1876), 10 O. G. 375; 2 Bann. & A. 371; Burden *v.* Corning (1864), 2 Fisher, 477; Johnson *v.* Root (1858), 1 Fisher, 351; Blanchard's Gun Stock Turning Factory *v.* Warner (1848), 1 Blatch. 258.

would be an equivalent if the improvement were an independent art or instrument will occupy toward it the same relation.[2]

SECTION IV.

OF THE NOVELTY OF INVENTIONS: IDENTITY: DIVERSITIES OF USE: THE DOCTRINE OF DOUBLE USE.

§ 259. Diversity of Use sometimes a Diversity of Substance, sometimes of Form.

The diversities heretofore discussed have arisen out of real or apparent variations in the art or instrument itself. There is, however, a diversity occasioned by the use of the invention under different circumstances, or in reference to different objects, which presents difficulties of a similar character and of equal moment.[1] To almost every operative

[2] That the doctrine of equivalents applies to improvements as well as to original inventions, see Forbes *v.* Barstow Stove Co. (1864), 2 Clifford, 379; McCormick *v.* Talcott (1857), 20 How. 402.

That the field of equivalents in an improvement is necessarily very narrow, and that any change introducing a different development of the original idea of means is not a mere substitution of equivalents, is self-evident. In the attempt to formulate this proposition it has sometimes been stated that the rule governing equivalents in improvements is different from the general rule. The true doctrine is nevertheless apparent even in these statements, as in the following example.

In Morley Sewing Mach. Co. *v.* Lancaster (1885), 23 Fed. Rep. 344, Colt, J.: (345) "When an invention is simply an improvement on a known machine by a mere change of form or combination of parts, the inventor is only entitled to the specific form of device which he produces, and he cannot invoke the doctrine of equivalents to suppress other improvements which are not colorable invasions of his own. But where an inventor precedes all the rest, and his machine performs a function never performed by any earlier machine, the court will treat as infringers all who accomplish the same result by substantially the same, or substantially equivalent, means. In the one class of inventions slight differences may avoid infringement. In the other class there must be substantial difference to escape such a charge." Yet here the court apparently uses the word "equivalent" in its technical sense in reference to improvements, and in its general sense in reference to machines.

§ 259. [1] The subject of "Double Use" may be considered from several points of view, most, if not all, of which may be reduced to two: viz. (1) The rights of the inventor of the invention used; and, subject to these, (2) The rights of the alleged inventor of the use. As to the first, it is an undisputed proposition that the discovery of new

means uses are possible which depart from the inventor's method of employing it in such essential particulars that

uses for a patented invention cannot under any circumstances confer upon their discoverer a right to use the invention without the consent of the patentee. This is the meaning of the *dicta* and decisions of the judges that "all uses of an invention belong to the inventor;" that "the inventor is entitled to all the benefits derivable from his invention, whether known or unknown to him," etc. Thus a machine devised for one purpose remains the same machine, no matter for what purpose it may be employed; and whoever uses it uses the invention of the creator of the machine, and if he does this without his consent is guilty of an infringement of his patent. The cases to this point are very numerous.

Thus see Byerly *v.* Cleveland Linseed Oil Works (1887), 31 Fed. Rep. 73; Union Stone Co. *v.* Allen (1882), 15 Phila. 508; 14 Fed. Rep. 353; California Artificial Stone Paving Co. *v.* Perine (1881), 20 O. G. 813; 7 Sawyer, 190; 8 Fed. Rep. 821; Stow *v.* Chicago (1881), 104 U. S. 547; 21 O. G. 790; Eagleton Mfg. Co. *v.* West, Bradley & Cary Mfg. Co. (1880), 17 O. G. 1504; 18 Blatch. 218; 2 Fed. Rep. 774; Tinker *v.* Mower & Reaper Mfg. Co. (1880), 1 Fed. Rep. 138; 5 Bann. & A. 92; Woodbury Patent Planing Mach. Co. *v.* Keith (1879), 4 Bann. & A. 100; Stow *v.* Chicago (1877), 8 Bissell, 47; 3 Bann. & A. 83; Putnam *v.* Yerrington (1876), 2 Bann. & A. 237; 9 O. G. 689; Roberts *v.* Ryer (1875), 91 U. S. 150; 10 O. G. 204; Wells *v.* Jacques (1874), 5 O. G. 364; 1 Bann. & A. 60; Ingels *v.* Mast (1873), 6 Fisher, 415; McComb *v.* Brodie (1872), 2 O. G. 117; 1 Woods, 153; 5 Fisher, 384; Woodman *v.* Stimpson (1866), 3 Fisher, 98.

And that this is true though the possibility of such uses were unknown to the inventor, see Woodbury Patent Planing Mach. Co. *v.* Keith (1879), 4 Bann. & A. 100; Roberts *v.* Ryer (1875), 91 U. S. 150; 10 O. G. 204; Welling *v.* Rubber Coated Harness Trimming Co. (1875), 7 O. G. 606; 1 Bann. & A. 282; McComb *v.* Brodie (1872), 1 Woods, 153; 5 Fisher, 384; 2 O. G. 117.

Conceding, then, that no discovery of a new use for an invention can confer the right to use it without the consent of its inventor, what are the rights, if any, of the discoverer of the use? Has he an exclusive right to the use which he has discovered, and can he protect it by a patent, or have others the same right to enjoy it as himself? This question is determined by the nature of the use as compared with other uses to which the invention was applied or was known to be applicable at the date of his discovery of the use. If the alleged new use so nearly resembles these that it might have been suggested by them to persons skilled in the art, the new use is regarded as resulting from an exercise of the imitative not the creative faculties, and hence is not an invention in which the discoverer can have an exclusive right. If, on the other hand, the new use is so unlike in its essential character to the preceding ones that it required an exercise of inventive skill to produce it, then the use is a new invention and is patentable. The courts and text-writers have expressed this distinction by the terms "analogous use" and "non-analogous use." An analogous use is one suggested by former uses; a non-analogous use is one not so suggested but originating in an inventive act. The former is the true double use, and of course is not an invention. The latter is not double use, but a new means, employing it is true a former means, but embodying new ideas and accomplishing either new results or old

they could only have originated in an inventive act distinct from and posterior to his, and thus, as uses, constitute sep-

results in an essentially different manner. Whether or not the use is analogous — that is, whether an inventive act was necessary to produce it — is to be ascertained in the same manner as in other cases of invention, as described in Sec. III. of Ch. I.

The authorities upon the points involved in this view of the subject are as follows :—

That an analogous use is one suggested by former uses :—

In Penn *v.* Bibby (1866), L. R. 2 Ch. Ap. 127, Chelmsford, L. C.: (136) "In every case of this description one main consideration seems to be whether the new application lies so much out of the track of the former use as not naturally to suggest itself to a person turning his mind to the subject, but to require some application of thought and study."

In Harrison *v.* Railway Co. (1860), 6 Jur. N. S. 993, Cockburn, C. J.: (995) "Conceding that the authorities establish that a person cannot use the same mechanical contrivance for the same purpose, and that that principle is extended to the application of the same mechanical contrivance to purposes so nearly cognate and similar as that the application in the one case naturally leads to its application when required in some other, yet, if there be that which substantially is a distinct purpose, although it may have the appearance at first sight of being in some degree connected, the question must be one of the degree of affinity or similarity which exists between the two given purposes, and by that the question whether the invention is sufficiently meritorious to be deserving of a patent must be determined."

See also Vinton *v.* Hamilton (1882), 104 U. S. 485; 21 O. G. 557; Horton *v.* Mabon (1862), 12 C. B. N. S. 437.

That a non-analogous use, or one requiring inventive skill, is not double use but a new invention, see the following :—

In Crandal *v.* Watters (1881), 20 Blatch. 97, Blatchford, J. : (102) "Almost all inventions at this day that become the subjects of patents are the embodiment and adaptation of mechanical appliances that are old. In that consists the invention. When the thing appears it is new and useful. No one saw it before, no one produced it before, it supplies a need, it is at once adopted, all in the trade desire to make and use it, yet it is said to have been perfectly obvious and not to have been patentable. Where an article exists in a given form and applied to a given use, and is taken in substantially the same form and applied to an analogous use, so as to make a case of merely double use, there is no invention. But it is very rarely that a thing of that kind secures a patent." 21 O. G. 945 (946); 9 Fed. Rep. 659 (663).

In *Ex parte* Arkell (1879), 15 Blatch. 437, Shipman, J.: (439) "The application of an old contrivance to a new purpose is not patentable when the old and new purposes, and the objects to which the contrivance is applied, are merely analogous. If the use of an old contrivance produces a new effect, the new manufacture or process may be patentable, because the new use is not analogous to the former one; but if the new use is simply upon a new occasion, not producing a new effect, the use is analogous to what had been done before. . . . (440) If the effect of the old contrivance when applied to the new object is simply a better and therefore more useful accomplishment of the old effect, in an analogous object, by the use of precisely the same means,

arate inventions. And there are other uses, even more widely different from his in their appearance, which nevertheless

the application of the new use is not patentable." 4 Bann. & A. 80 (82).

See also Strauss *v.* King (1880), 2 Fed. Rep. 236; 18 Blatch. 88; 17 O. G. 1450; 5 Bann. & A. 338; Wisner *v.* Grant (1880), 5 Bann. & A. 215; 17 O. G. 447; 7 Fed. Rep. 485; Megraw *v.* Carroll (1880), 5 Bann. & A. 324; Gottfried *v.* Philip Best Brewing Co. (1879), 5 Bann. & A. 4; 17 O. G. 675; Union Paper Collar Co. *v.* White (1875), 2 Bann. & A. 60; 7 O. G. 698, 877; 11 Phila. 479; Fuller *v.* Yentzer (1874), 1 Bann. & A. 520; 6 Bissell, 208; Minter *v.* Wells (1834), 1 Web. 134; 2 Abb. P. C. 47.

That an analogous or cognate use of an invention is mere double use is affirmed in the following cases: —

In Pennsylvania R. R. Co. *v.* Locomotive Truck Co. (1884), 110 U. S. 490, Gray, J.: (494) "It is settled by many decisions of this court, which it is unnecessary to quote from or refer to in detail, that the application of an old process or machine to a similar or analogous subject, with no change in the manner of application and no result substantially distinct in its nature, will not sustain a patent, even if the new form of result has not before been contemplated." 27 O. G. 207 (208).

See also Celluloid Mfg. Co. *v.* Noyes (1885), 25 Fed. Rep. 319; Royer *v.* Chicago Mfg. Co. (1884), 20 Fed. Rep. 853; Collins Co. *v.* Coes (1884), 28 O. G. 1010; 21 Fed. Rep. 38; Spill *v.* Celluloid Mfg. Co. (1884), 21 Fed. Rep. 631; 22 Blatch. 441; Howe Mach. Co. *v.* National Needle Co. (1884), 21 Fed. Rep. 630; American Iron Co. *v.* Anglo-American Roofing Co. (1883), 21 Blatch. 324; 24 O. G. 1274; 16 Fed. Rep. 915; Slawson *v.* Grand St., Prospect Park, & Flatbush R. R. Co. (1883), 107 U. S. 649; 24 O. G. 99; Palmenbing *v.* Buchholz (1882), 23 O. G. 622; 13 Fed. Rep. 672; Gottfried *v.* Crescent Brewing Co. (1882), 22 O. G. 497; 9 Fed. Rep. 762; Vinton *v.* Hamilton (1881), 104 U. S. 485; 21 O. G. 557; Crandal *v.* Watters (1881), 20 Blatch. 97; 21 O. G. 945; 9 Fed. Rep. 659; Western Electric Mfg. Co. *v.* Ansonia Brass & Copper Co. (1881), 20 Blatch. 170; 9 Fed. Rep. 706; Judd *v.* Babcock (1881), 8 Fed. Rep. 605; 23 O. G. 92; Rowell *v.* Lindsay (1881), 6 Fed. Rep. 290; 10 Bissell, 217; 19 O. G. 1565; Knox *v.* Quicksilver Mining Co. (1880), 4 Fed. Rep. 809; Adams *v.* Loft (1879), 4 Bann. & A. 495; Couse *v.* Johnson (1879), 4 Bann. & A. 501; 16 O. G. 719; Jordan *v.* Moore (1866), L. R. 1 C. P. 624; Brooks *v.* Aston (1859), 5 Jur. N. S. 1025; Patent Bottle Envelope Co. *v.* Seymer (1858), 5 C. B. N. S. 164; North *v.* Williams (1870), 17 Grant Ch. (Can.), 179; Abell *v.* McPherson (1870), 17 Grant Ch. (Can.), 23; Waterous *v.* Bishop (1869), 20 C. P. (Can.) 29.

For particular applications of these doctrines to specific inventions, see also the following: —

I. The Use a New Invention: —

That where inventive skill is exercised the use is not double use, see Penn. Salt Mfg. Co. *v.* Thomas (1871), 5 Phila. 144; 5 Fisher, 148.

That a new use not analogous to the old is a new invention, see Union Paper Collar Co. *v.* White (1875), 11 Phila. 479; 7 O. G. 698, 877; 2 Bann. & A. 60.

That to put an old process or device into use in such a manner as to accomplish a result which could not have been accomplished by using the same process or device in any manner heretofore known is not double use but invention, see Campbell *v.* Mayor of New York (1881), 20 O. G. 1817; 20 Blatch.

are, in their essence, merely imitations of his own, and therefore are embraced in his invention. This latter class

67 ; 9 Fed. Rep. 500 ; Colgate *v.* Western Union Telegraph Co. (1878), 14 O. G. 943 ; 15 Blatch. 365 ; 4 Bann. & A. 36 ; Roberts *v.* Dickey (1871), 1 O. G. 4 ; 4 Fisher, 532 ; 4 Brews. 260.

That though new means is used in carrying out an old process its discoverer has no right to use the process if patented, see Tilghman *v.* Mitchell (1864), 2 Fisher, 518.

That the use of a device may be new though the device itself be old, and is then a new application of a known force, see Dunbar *v.* Marden (1842), 13 N.H. 311.

That to use the same article in a different situation may be invention, see Nickels *v.* Ross (1849), 8 C. B. 679.

That the application of old devices with alterations and adaptations may be a new invention, see Crandal *v.* Watters (1881), 21 O. G. 945 ; 20 Blatch. 97 ; 9 Fed. Rep. 659.

That to use an old device as before used is double use, but to rearrange and connect it so as to adapt it for use as an element may be a new invention, see Mundy *v.* Lidgerwood Mfg. Co. (1884), 27 O. G. 718 ; 20 Fed. Rep. 114.

That the use of old materials with a new effect is a new invention, see Geiger *v.* Cook (1842), 3 Watts & Serg. 266.

II. The Use a Double Use : —

That the use for all purposes like the old to which the invention can be applied is mere double use, see Blake *v.* San Francisco (1885), 113 U. S. 679 ; 31 O. G. 380.

That the application of an old invention to an analogous use with no change in the mode of applying it and no new result, is double use, though the result be in a form never before contemplated, see Miller *v.* Foree (1885), 116 U. S. 22 ; 33 O. G. 1497 ; Pennsylvania R. R. Co. *v.* Locomotive Engine Safety Truck Co. (1884), 110 U. S. 490; 27 O. G. 207.

That where no new mode of adapting the old invention to the new use is employed, the use is double, see Smith *v.* Elliott (1872), 1 O. G. 331 ; 9 Blatch. 400 ; 5 Fisher, 315 ; Merriam *v.* Drake (1872), 9 Blatch. 336 ; 5 Fisher, 259.

That a use may be analogous though it improve the thing to which it is applied, or carry the use beyond any formerly known, see Putnam *v.* Yerrington (1876), 9 O. G. 689 ; 2 Bann. & A. 237 ; Roberts *v.* Ryer (1875), 91 U. S. 150 ; 10 O. G. 204 ; Horton *v.* Mabon (1862), 12 C. B. N. S. 437.

That to apply an old process to an old material to obtain an old result, is double use, see Gardner *v.* Herz (1882), 22 O. G. 683 ; 20 Blatch. 538 ; 12 Fed. Rep. 491.

That the use of an old process in the same way, or on the same subject, and with the same result, is double use, see Western Electric Co. *v.* Ansonia Co. (1885), 114 U. S. 447 ; 31 O. G. 1305.

That the new use of an old process is double use even if the new form of result was never before contemplated, see Spill *v.* Celluloid Mfg. Co. (1884), 22 Blatch. 441 ; 21 Fed. Rep. 631.

That to apply the same plan to the same purpose, though varying the details of the process, is mere double use, see Sewall *v.* Jones (1875), 91 U. S. 171 ; 9 O. G. 47.

That to use an old process or device, without material change in a way which, though not heretofore employed, is well known, is not a new invention, see Couse *v.* Johnson (1879), 16 O. G. 719 ; 4 Bann. & A. 501 ; Dunbar *v.* Myers (1876), 94 U. S. 187 ; 11 O. G. 35 ; Brown *v.* Piper (1875), 91 U. S. 37 ; 10 O. G. 417 ; Roberts *v.* Ryer (1875), 91 U. S. 150 ; 10 O. G. 204.

That to apply an old form of a

of uses long ago received the name of "Double Uses;" and the rules by which they are distinguished from the former are known as the "Doctrine of Double Use."

§ 260. Diversity of Use is not Diversity in the Invention Used.

In the opinions of the courts, as well as in the dissertations of text-writers, this doctrine is needlessly confused by the introduction of language applicable only to diversities in the art or instrument, whose use alone is properly the matter for consideration. All those decisions which declare, in any form of words, that double use does not consist in such employment of the invention as indicates a change in its idea of means are foreign to this subject.[1] A new effect, depend-

hand tool to a corresponding machine is double use, see Busell Trimmer Co. *v.* Stevens (1886), 28 Fed. Rep. 575; 37 O. G. 1249.

That to discover that a particular advantage may be obtained by using a known thing in a known way is not invention, but mere double use, see Tetley *v.* Easton (1857), 2 C. B. N. S. 706.

That a patent for the use of an article already known and used in the same manner, is void, see Brown *v.* Texas Cactus Hedge Co. (1885), 64 Tex. 396.

That the mere use of a known substance in a known form for any purpose is not invention, see Tarr *v.* Webb (1872), 2 O. G. 568; 10 Blatch. 96; 5 Fisher, 593.

That the application of an old material to an analogous use is not invention, see Palmenbing *v.* Buchholz (1882), 13 Fed. Rep. 672; 23 O. G. 632.

That the use of an old material in an old way to accomplish an old result, is double use, see Celluloid Mfg. Co. *v.* Tower (1885), 26 Fed. Rep. 451.

That the doctrine of double use applies to designs, see Western Electric Mfg. Co. *v.* Odell (1883), 18 Fed. Rep. 321; Neidringhaus *v.* Com. (1875), 2 MacArthur, 149; 8 O. G. 279.

From this sketch of the practical side of the subject it is apparent that the doctrine of double use is simple enough when its several propositions are logically arranged, and their distinctions apprehended. In the text I have endeavored to go deeper and present the ultimate reasons on which the doctrine is based, and from which all the tests in cases of novel application must be drawn. The practical view is, however, as might be expected, the one most fully occupying the attention of the courts, and hence most largely discussed in the decisions.

§ 260. [1] As many of the difficulties which have surrounded the doctrine of double use and its application have arisen from the inconsiderate adoption, as rules of law, of the casual expressions of former judges, it may serve a useful purpose to examine some of the principal decisions in detail, in order to discriminate between the principles announced and the misleading *dicta* in which the errors have originated.

In Bean *v.* Smallwood (1843), 2 Story, 408, the claim of the patent was for the application to a chair of an apparatus which had long been in use in other articles for similar purposes. The facts make a clear case of double or au-

ont on substantial variation in the art or instrument itself, cannot result from any use of the original invention, whether

alogous use. Judge Story, in deciding the case, said: (411) "Now I take it to be clear that a machine or apparatus, or other mechanical contrivance, in order to give the party a claim to a patent therefor, must in itself be substantially new. If it is old and well known, and applied only to a new purpose, that does not make it patentable. A coffee-mill applied for the first time to grind oats or corn or mustard, would not give a title to a patent for the machine. A cotton-gin applied without alteration to clean hemp, would not give a title to a patent for the gin as new.. A loom to weave cotton yarn would not, if unaltered, become a patentable machine as a new invention by first applying it to weave woollen yarn. A steam-engine if ordinarily applied to turn a grist-mill, would not entitle a party to a patent for it if it were first applied by him to turn the main wheel of a cotton factory. In short, the machine must be new, not merely the purpose to which it is applied. A purpose is not patentable, but the machinery only, if new, by which it is to be accomplished. In other words, the thing itself which is patented must be new, and not the mere application of it to a new purpose or object." 2 Robb, 133 (135).

This statement evidently embraces two propositions: (1) That the new use of an invention does not make the invention itself new; (2) That a new use is not of itself the subject-matter of a patent. The first proposition is undoubtedly correct. The latter is as evidently false unless qualified by the condition that the new use, as in the case at bar, is analogous to former uses. The last two sentences of the opinion, as quoted, are therefore wrong. A purpose in the sense of a use may be patentable as a process; and the mere application of a thing to a new purpose or object, if the application involve inventive skill, does constitute a new invention.

In Conover *v.* Roach (1857), 4 Fisher, 12, the court had occasion to discuss this doctrine, and said *per* Hall, J.: (16) "In connection with this question of invention it is proper to state to you, that the mere application of an existing machine or organization to a new use is not the subject-matter of a patent. If a party finding a machine calculated and intended for the accomplishment of one purpose, discovers or conceives that it is able to accomplish another purpose, and that purpose can be accomplished by the organization which has before been produced, he can have no patent for the application of this old machine to a new use. In other words the invention patented, when a patent is taken out for a machine, is the machine itself — the mechanical means and devices by which certain results in the operation of the machine can be obtained; and when the inventor has obtained a patent for his invention he is entitled to the exclusive use of it, if that invention is a machine, for all the uses and purposes to which that machine, without the exercise of any inventive power, can be usefully applied. In other words, when he patents a machine he cannot patent either a purpose or an effect, but the mechanical means, devices, and organization which his machine embodies, and when these means, devices, and organization are patented, the patentee is entitled to the exclusive use of this mechanical organization, device, or means, for all the uses and purposes to which they can be applied, to every function, power, and capacity of his patented machine, with-

the use itself be new or old. It will assist us in our own investigation of this doctrine to remember: (1) That in all

out regard to the purposes to which he supposed originally it was most applicable, or to which he supposed it was solely applicable, if such were his original view."

In this passage the learned judge confuses the two opposite points of view from which, as we have seen in the note to § 259, the doctrine of double use may be regarded. So much as states that the inventor of a patented machine has the sole right to use it for any purpose is true. So much as states that the application of an old machine to a new use is not patentable is not true, unless qualified in the manner previously indicated. But in the second and third sentences he treats these two propositions as synonymous, as if the declaration that "the application of an old machine to a new use is not patentable," were equivalent to the declaration that "an inventor of a machine is entitled to all the uses which can be made of it," which is clearly wrong. In the latter part of the third sentence, however, there is a single clause which may have been intended to, and if understood in a proper sense, certainly does make the whole statement correct. He says "he is entitled to the exclusive use of it . . . for all the uses and purposes to which that machine, *without the exercise of any inventive power*, can be usefully applied." If by this he meant inventive power *exercised upon the machine*, changing its character as an operative means, the error before pointed out is still inherent in the statement. If he referred to inventive power *exercised in applying the existing machine to the new purpose*, the passage, though obscure for want of separation between its different ideas, is on the whole correct.

In Bray *v.* Hartshorn (1860), 1 Clifford, 538, Clifford, J.: (540) "Invention or discovery is required as the proper foundation of a patent, and where both are wanting the applicant cannot legally secure the privilege. Consequently where the claim rests merely upon the application of an old machine to a new use or to a new purpose, or upon the application of an old process to a new result, the patent cannot be sustained, because the patentee under those circumstances has not invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement on any art, machine, manufacture, or composition of matter not known or used by others, for which alone a patent can be legally granted. Judge Story held, nearly twenty years ago, in Bean *v.* Smallwood, 2 Story, 408, that the application of an old machine to a new purpose was not patentable; and the same principle has since been adopted in the highest court in England, and by the Supreme Court of the United States. Kay *v.* Marshall, 8 Cl. & Finn. 245; Phillips *v.* Page, 24 How. 167. New contrivances, though applied to old objects, are patentable; but old contrivances, whether the objects to which they are applied are new or old are not patentable, because the mere application of the contrivance, without more, involves neither invention nor discovery, and when both those elements are wanting, no patent issued under existing laws can have any validity. Particular changes, however, 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 and could not be applied without those changes; and under these circumstances and conditions, if the machine as changed and modified produces a new

cases turning on diversity of use it is assumed that the identity of the invention used remains entirely undisturbed;

and useful result, it may be patented and upheld under existing laws. Losh *v.* Hague, Web. Pat. Cas. 207; Hindm. on Pat. 95. Such change in an old machine may consist alone of a new and useful combination of the several parts of which it is composed, or it may consist of a material alteration or modification of one or more of the several devices which enter into its construction, or it may consist in adding new devices; and whether it be one or another of the suggested modifications, if the change of construction and operation actually adapt the machine to a new and valuable use, not known before, and to which the machine had not been applied, and without the change suggested was not in any degree fitted to be applied, and actually produces a new and useful result, then the case falls within the rule already laid down, and a patent may be granted for the same and be upheld."

Taken as it reads, this decision denies the patentability of new applications of existing inventions *in toto*. It places the denial on the ground that "the mere application of the contrivance, without more, involves neither invention or discovery," etc., and then declares that only by some change in the existing invention itself, producing a new result, can inventive skill be manifested and patentability attained. Here again the error is in the use of too general language, though the qualifying phrase "without more," hints at the possession by the learned judge of a perception of the true limits of his statement, had he seen fit to express them. But his assertion that "the application of an old machine to a new use or to a new purpose," or "the application of an old process to a new result," is not a "new and useful art," etc., is neither correct in principle nor borne out by the cases cited. What the decision of Judge Story in Bean *v.* Smallwood really was, we have already seen, as well as that his *dictum* was too broad in itself, and went altogether beyond the requirements of his case. In Kay *v.* Marshall it was not held that an application of an old machine to a new purpose was not patentable, but that such an application did not change the essential character of the machine and render it patentable as a new machine; and in discussing this question it was distinctly stated that the new process growing out of the new use of the machine was patentable. (See note to § 266, *post.*) In Losh *v.* Hague (1837), 1 Web. 202; 2 Abb. P. C. 501, the English court fell into numerous errors of language, if not of doctrine, although in some respects its opinion, as a whole, was extraordinarily luminous and correct in view of the general confusion then existing in regard to this subject. (See note to § 271, *post.*) But the opinion, truly understood, does not sustain the position of Judge Clifford in denying the patentability of a new use, however it may support his affirmation that a change in the machine itself may render it a new invention. The state of learning and opinion in this country in reference to double use, at the date of this decision (1860), is rather remarkable, when in this English case (decided in 1838) Lord Abinger had clearly announced the true principle, "that you cannot have a patent for applying a well-known thing . . . to an operation which is exactly analogous to what was done before;" and Mr. Webster, in a note on page 229 of the volume referred to by the American judge, gives numerous instances in which a new, or non-analogous, use was regarded as patentable, and declares that "the novelty or invention will then

and (2) That the real question is, whether the changed employment of the unchanged invention involves an exercise of

consist in the simple use and application of that substance." See note to § 266, *post*. As examples of the more recent statements by our own courts the following are cited : —

In Gottfried *v.* The Phillip Best Brewing Co. (1879), 17 O. G. 675, Dyer, J. : (684) "It is an elementary principle that the mere application of an old thing to a new use is not patentable, or, as the court says in Smith *v.* Nichols (21 Wall. 119), 'A mere carrying forward or new or more extended application of the original thought ; a change only in form, proportions, or degree ; the substitution of equivalents doing substantially the same thing in the same way by substantially the same means, with better results, — is not such invention as will sustain a patent.' And again, in Roberts *v.* Ryer (1 Otto, 157) it is said : 'It is no new invention to use an old machine for a new purpose, and the inventor of the machine is entitled to the benefit of all the uses to which it can be put, no matter whether he had conceived the idea of the use or not.' It is not understood, however, that these principles are to be so applied as to deny patentability to improvements which disclose inventive skill and produce new and useful results. It is true, it may be said, that the several parts which make up complainant's mechanism are old ; but as is stated by the court in Strong *v.* Noble (3 Fish. 589), 'There is scarcely a patent granted that does not involve the application of an old thing to a new use, and that does not, in one sense, fail to involve anything more ; but the merit consists in being the first to make the application, and the first to show how it can be made, and the first to show that there is utility in making it.' . . . And again, with reference to the application of old means to a new use, as is stated in one case cited on the argument : '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 and could not be applied without those changes; and under these circumstances and conditions, if the machine as changed and modified produces a new and useful result, it may be patentable and uphold under existing laws.'" 5 Bann. & A. 4 (33, 34).

Here the court seems inclined to modify the sweeping statements indulged in by its predecessors and to bring their general assertions within the proper limits by applying to all cases the infallible test of the presence or absence of inventive skill. Though the precision of the rule given by the English bench, and at this date (1879) adopted and fully explained by the leading American authority (Curtis §§ 55–66), is not observed, it is evident that the incorrectness of the older decisions was perceived and the true doctrine substantially defined.

In Dunbar *v.* Albert Field Tack Co. (1879), 4 Bann. & A. 518, Lowell, J.: (519) "If an old machine or process is put to a new use, invention is positively excluded, although the new use may apparently be very remote from the old, requiring experiment to ascertain its practicability ; and though the actual operation of the machine or process may not be exactly the same in the new as in the old application, provided no new means are, in fact, employed." 4 Fed. Rep. 543 (544).

This language is accurate only when understood as applying to the process or machine employed, and not to the art resulting from a new use of such process or machine. No use of the old invention, however remote, can change the character of the invention itself.

the creative powers, and introduces a new idea of means, not into the art or instrument itself, but into the manner of its use, and so makes the new mode of its employment a new and separate invention. The answer to this question must be sought by applying to the use of the invention the same principles in which we have already found a solution for so many interesting and important problems.

§ 261. Distinction between an Invention and its Use.

And in the first place it is necessary to clearly draw the line between an invention and its use. This is sometimes extremely difficult, even in mental contemplation, but becomes still more so when the art or instrument itself is submitted to immediate inspection. It is, however, the only method by which diversity of use, as distinguished from diversity of means, can be made the subject of investigation; and by descending into those fundamental truths which underlie the idea of means we shall probably be able to discover where the means ceases and the use begins. The

This is a proposition axiomatically correct. But that any use of it, apparently near or remote, which on account of the novelty of the force which it employs, or the object to which it is applied, involves the exercise of inventive skill in the discovery of the qualities of such force or object and the application thereto of the old invention, is a new and independent invention is a proposition equally established. Thus the same judge alludes to the true rule, though in somewhat doubtful phraseology, in Moffitt *v.* Rogers (1881), 8 Fed. Rep. 147, (148) "I am not aware that a patent has ever been sustained for a process or method which consisted of employing an old machine for the very purpose for which it was made. If any person discovers how to use an old machine to the best advantage, he is only a skilful workman not an inventor. . . . (149) I do not mean to say that a patent cannot possibly be supported for a process or method which consists only of applying an old machine to a new use. Many of the ablest writers and jurists assert that such a claim is possible. I have never seen a case in which a patent of this sort has been sustained, and there are some in which it has been rejected. If one is ever supported, it will be when the new use is so remote from the old use that a court or jury can say that a new idea has been discovered."

The cases here discussed are not, by any means, all that are open to criticisms of the same general character. But they show the current of opinion and expression on this subject, and are sufficient to indicate the sources from which mistakes have originated, and to point out the dangers which are encountered in following too closely the language of judges, who viewing a doctrine from one side only make statements which are erroneous when considered from a different standpoint. They afford another illustration of the necessity of studying cases in the light of the law rather than the law in the light of the cases.

same research will demonstrate that this line is differently drawn in different inventions, enlarging or contracting the sphere of use, and correspondingly increasing or diminishing the scope of the invention.

§ 262. Essential Differences between a "Force Applied," a "Mode of Application," and a "Specific Treatment of a Specific Object."

Every idea of means embraces three subordinate factors, — the force, the object, and the mode of application. The inventive act which results in the conception of that idea consists either in the discovery of a force and its adaptation to an existing object through an existing mode of application, or in the discovery of a mode of application and its adaptation to an existing force and object, or in the discovery of an object and its adaptation to an existing force and mode of application, or in two or more of these discoveries and adaptations.[1] Inventions, when regarded from this point of view, are of three classes: (1) Where the force is new, the object and the mode of application being new or old; (2) Where the mode of application is new, the force and object being new or old; (3) Where the object is new, the force and mode

§ 262. [1] It will be observed that in each of these three groups of inventions one factor, to wit, the mode of application, is always present. It may embrace the entire concrete invention, as in the second class; or may be joined with a specific force, as in the first; or with a specific force and object, as in the third. This factor is the most tangible and apparent to the sense of any contained in the invention. In a process it is expressed by the act or instrument through which the force is applied. In many machines and manufactures it is alone represented in the substantive invention itself. In compositions of matter it resides in the physical compound in which the chemical or mechanical forces inhere. This element is thus a constant quantity, incapable of material variation without destroying the essence of the invention. Other forces may be applied through it to other objects without changing its character as a mode of application, and hence, in inventions of the second class, without disturbing the identity of the invention. But in itself the mode of application can never be subjected to essential alteration without a departure from the original idea of means and the introduction of new elements requiring a new exercise of the inventive powers. In determining whether any given diversity is a diversity of invention or a diversity of use, this element is the first, therefore, to be examined, and often settles the whole question without further inquiry.

For a discussion of the matters stated in this paragraph, see also §§ 91–108, *ante*.

of application being new or old. In the first class the aim of the inventor is to utilize his new force; and when he has found for it a mode of application, his invention is complete without reference to the object upon which it acts. In the second class it is his purpose to discover and adapt a mode of application or an intermediate agency by which forces may be united to their objects; and when he has brought his mode of application into practice in connection with one force and object, his invention is complete as to all other forces and their objects. In the third class the sole endeavor of the inventor is to render useful to himself and to the public some object of whose properties he is the first discoverer, by so directing force upon it as to develop or employ its newly recognized susceptibilities; and his invention is complete when he has subjected this object to the action of some specific force in such a manner as to render its new properties available. The first invention is a force applied; the second is a mode of application; the third is the subjection of a specific object to a specific application of specific forces, producing in the object a certain specific result.

§ 263. Dividing Line between Invention and Use Different in Each of these Three Groups of Inventions.

In each of these three classes the character of the use is indicated by the scope of the invention. As in the first class the invention is a force applied, so the direction of that force to any object upon which it can act through this mode of application is the use of the invention. Thus, for example, in a chemical composition, in which a specific force inheres and through which it acts, the use consists in bringing any substance upon which the composition can exert its force within its sphere of operation. Or in a process, where certain forces are applied through certain acts or instruments, the invention passes from inaction into use when any object upon which it can operate is submitted to its influence. In the second class, as the invention is a mode of application, its use consists in bringing any force into connection with any object through its means. Thus in some machines and manufactures the invention is the same by whatever force it is im-

pelled and on whatever object it may act; and hence its union with any force or any object belongs to the domain of use, and not of invention. In the third class, as the invention consists in the subjection of a specific object to the influence of a specific force acting through a specific mode of application, there is no use which can be severed, even in thought, from the invention. Thus in those processes where the entire art consists in treating some particular material in some special method, the inherent qualities of the object, as well as the specific force and the specific mode of application, are essential to the existence of the idea of means, and the invention cannot be conceived of otherwise than as effecting its specified result. In each of these three classes the scope of use is, therefore, widely different. Inventions of the third class are incapable of any use except the one to which they were originally applied by their inventor, unless employed as elements in a new combination. Those of the second are available for as many different uses as there are forces which can operate through them, or objects upon which the operation of such forces can be directed. While an invention of the first class occupies an intermediate position, and may be used in as many different methods as there are objects upon which its inherent force can, through its peculiar mode of application, be determined.

§ 264. Four Diversities of Use Possible: Use with Different Force; Use with Different Object; Use in a Different Combination; Use out of Combination.

With these distinctions between inventions and their uses clearly understood it becomes far less difficult to separate the uses which involve inventive skill from those which are mere imitations or double uses. In each of the three groups of inventions the mode of application is an essential factor, and hence no substitution of one mode of application for another can ever be a mere diversity of use, but must destroy the identity of the invention. The only possible diversities of use are, therefore, these: (1) Use with a different force; (2) Use with a different object; (3) Use in a different combination; (4) Use out of combination. Each of these four

diversities of use is related to the three groups of inventions in a different manner.

§ 265. Use with New Force can be Diversity of Use only in Reference to a "Mode of Application:" When Double Use.

It is apparent that in no invention either of the first class or the third can the first diversity be a diversity of use alone. In such inventions the specific force employed by the inventor is of the essence of the invention, and any variation of that force destroys the identity of the invention, and substitutes for it a different means.[1] Inventions of the second class are, however, capable of this diversity of use. Being mere modes of application, any force which can be directed through them may be substituted for the one employed by the inventor, thereby introducing an apparently new use of the invention without affecting its essential character. Whether or not the use is really new depends upon the nature of the substituted force, and its relation in the arts to that whose place it fills. If its capability of application through this intermediate agency were first discovered and employed by him who makes the substitution, the use is new; for the union of the old mode of application with this new force involves an exercise of creative skill, expresses a new idea of means in which the mode of application, still unchanged, becomes an element, and constitutes, therefore, a new invention belonging to the first class, or a force applied. But if the force

§ 265. [1] 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."

In Household Co. *v.* Neilson (1843), 1 Web. 673, Hope, J.: (690) "Even if the principle had been a known principle, still if it is for the first time applied by mechanical contrivance and apparatus to certain processes, in which it had not been previously used as an agent, the patent would be good."

See also Jenkins *v.* Walker (1872), 1 O. G. 359; Holmes, 120; 5 Fisher, 347; Poillon *v.* Schmidt (1869), 6 Blatch. 299; 3 Fisher, 476; 37 How. Pr. 77.

were known in the arts before the substitution, as capable of union with its objects through this mode of application, the force is not new; the use of the invention for directing it demands no other than constructive skill, is a mere imitation of its use by the inventor, and falls within the definition of a double use.

§ 266. Use with New Object can be Diversity of Use only in Reference to a "Force Applied" and a "Mode of Application:" When Double Use.

The second diversity of use is impossible in all inventions of the third class. In these inventions the object is an essential part of the idea of means, and the substitution for it of a different object is a substantial change in the invention. If the inventor has employed a single object in the original invention, all other objects which are known in the arts as susceptible in the same manner to this specific application of this specific force are identical with the original object; and their employment, therefore, does not vary either use or means. If a new object is discovered, or some new qualities in an existing object which render it susceptible to the same application, the union of this force and mode of application with this new object is a new inventive act, and produces, not a change of use, but a new and independent means. But in the first and second classes this diversity of use often appears.[1] One object may be substituted for another with-

§ 266. [1] That a new use constituting a new invention may consist in the novelty of the object upon which, in the new use, the old invention is employed, is clearly recognized in Harwood *v.* Railway Co. (1865), 11 H. L. 654. The patent was for the use of "fishes and fishjoints" for connecting the rails of railways. The fishes themselves were old. It was conceded that they had been used for various purposes before; but that their use for this purpose originated with the patentee. The case was tried in the Queen's Bench, then in the Court of Exchequer Chamber, and finally in the House of Lords. The patent was held invalid on the ground of double use. All the judges concur in the statement of the doctrine of double use as follows, — in the words of Blackburn, J.: (667) "A mere application of an old contrivance in the old way to an analogous subject without any novelty or invention in the mode of applying such old contrivance to the new purpose, is not a valid subject-matter of a patent." See opinions of Channel, J. (673), of Westbury, L. C. (682), of Lord Cranworth (684), and of Lord Wensleydale (686). Double use thus exists wherever the invention used is old, the mode of use is old, and the ob-

out affecting the idea of means embodied in the old invention, though creating an apparent variation in its use; a

ject upon which it is used is old, — that is, known as susceptible to such use from its analogy to other objects on which the same invention has been already used in the same manner. *Per contra*, a new use exists when a known invention is applied in a known manner to an object not heretofore known to be susceptible to such application from its analogy to other objects, but whose susceptibility has been discovered by the inventor of the use.

One of the most instructive cases on this subject is the "Spent-Madder Case," so called, or Steiner *v.* Heald (1851), 6 Exch. 607. In this case the invention used was old, and the only novelty possible was in the object to which the invention was applied. In reference to the patentability of such an application, Patterson, J., says: (620) "Here is no new contrivance, for the process used under the plaintiff's patent with 'spent madder' is the same as that previously used with 'fresh madder;' neither is the product new, for the garancine produced from the one and the other appears to have precisely the same qualities. If, therefore, the patent be good, it must be on account of the old contrivance being applied to a new object, under such circumstances as to support the patent. Now 'spent madder' might be a very different thing from 'fresh madder' in its properties, chemical or otherwise. Or it might be, in effect, the same thing as 'fresh madder' in its properties, chemical and otherwise, with the difference only that part of its coloring-matter had been already extracted. Again, the properties, chemical and otherwise, of both might or might not have been known to chemists and other scientific persons, so that they could tell whether 'fresh madder' and 'spent madder' were different things, or substantially the same thing. These points appear to us to be questions of fact, and materially to affect the validity or invalidity of the patent."

In the argument of this case, Watson, with whom was Webster, to an objection by Maule, J., that this was nothing but a double use of an old process, replied: "Where the process is old, but the combination of the materials upon which the process is brought to bear is new, the patent is sustainable. Here the plaintiff has introduced a new element;" and instanced Crane *v.* Price (1 Web. 377); Cornish *v.* Keene (1 Web. 501); and Hill *v.* Thompson (1 Web. 232).

In another case — Muntz *v.* Foster (1844), 2 Web. 96 — the inventor had discovered that plates composed of an alloy of zinc and copper in certain proportions, if applied to the sheathing of vessels, answered an important purpose, since the oxidation which then took place upon the surface of the plates kept the bottom of the vessel free from impurities. The plates themselves were old, but the application to vessels was new. It was held that the application to this new object was a new use of the plates, developing new utility therein and constituting a new invention. Thus Tindal J.: (103) "I look upon it that there is as much merit in discovering the hidden and concealed virtue of a compound alloy of metal, as there would be in discovering an unknown quality which a natural earth or stone possessed. We know by the cases that have been determined that where such unknown qualities have, from the result of experiments, been applied to useful purposes of life, that such application has been considered as the ground and a proper ground of a patent; and there-

variation which is merely double use when the substituted object was known in the arts as capable of subjection to

fore, when . . . they seek to show this is not so because these metal plates have been invented before, — that is, persons have used them before, — in my judgment it will not go far enough, unless they can show there has been some application of them before to this very useful purpose." Was not this invention really the discovery of a new *force*, and thus a "force applied" through an old mode of application ?

The case of Kay *v.* Marshall (1835), 2 Web. 36, has sometimes been regarded as having a reference to the doctrine of double use, and as confirming the position that the application of an old contrivance to a new object is not patentable. Kay had discovered a process by which flax could be treated in a manner hitherto unknown, with results vastly beneficial to the trade. His process consisted in macerating the flax and spinning it at a reach of two and a half inches. Maceration, as a process, was old. Spinning was old also. The machine employed by him was well known, was capable of adjustment at different reaches, and had been used to spin at various distances. But Kay was the first to discover that flax possessed such peculiar properties that if macerated and spun at this exact distance certain effects could be produced. Thus his real invention was the application of a known force, through a known mode, to a new object, — that is, to an object in which new susceptibilities had been discovered. This was a true process, and was patentable as such. But in his patent Kay declared the nature of his invention (34) "to consist in new machinery for macerating flax and other similar fibrous substances previous to drawing and spinning it, which process I call preparing it ; and also in improved machinery for spinning the same after having been so prepared." In claiming his invention he covered only the macerating-vessels, a trough for holding the rovings, and the adjustment of the spinning machine at a certain reach. The specification was evidently drawn under the impression that the patent must be for some vendible substance, to wit, for the machinery employed in the process or for the product resulting from the process (neither of which was the true invention here), and the draughtsman chose the former. The court properly decided that no new invention was claimed and protected by the patent, since the new use of old machinery does not constitute a new machine. In the trial at law, Parke, B., perceived the real nature of the invention, and held that the discovery of these properties of flax and the application of the machinery to flax for the purpose of rendering its properties available was new and patentable, reserving the validity of the patent for the consideration of the court above. The judgment there was adverse to the patent, on the ground before mentioned. Finally, in the House of Lords, the same view of the patent was taken, and its validity denied for the reason that the invention was not an improved machine.

In a note to this case, on p. 84, Mr. Webster says that the judgment of the court is an authority to show that "the spinning of macerated flax by known machinery would have been the subject-matter of valid letters-patent, if the title and specification had been properly adapted thereto ;" and that "the flax so spun would be a new manufacture both in respect of the method and result ; spun flax had not been obtained in that manner, even if spun flax of similar properties and quality had been

the operation of the means, but which becomes a new use and a substantive invention if the object, or its capability

obtained before." Then he proceeds: "The invention in such cases is the special manufacture, by means of the use of the particular machine or substance, and is clearly distinguishable from cases which are not any manner of manufacture, as the new use of a medicine to cure diseases for which it had not been previously adopted, or the use of a paint to a new cement, or the use of a broom to sweep a new description of carpet or tapestry, or the use of a spoon to eat a particular description of food; applications or uses of the latter class have never been supposed to constitute any manner of manufacture, whereas applications and uses of the former class are the essence of the greatest improvements in the manufactures of the country."

To avoid the danger of being misled by these illustrations, not entirely apt to the subject illustrated, it must be remembered that Mr. Webster, as well as the judge from whom he borrows them, assumes that the above uses were strictly analogous. Suppose a method of curing diseases and alleviating pain were patentable (*see per contra* Morton *v.* N. Y. Eye Infirmary, 5 Blatch. 116; 2 Fisher, 320), can it be doubted that one who discovered that consumption might be cured by existing remedies could patent the use of these remedies for that purpose, although the remedies were already covered by a patent? Such a use of the remedies is not a double or analogous use, — its non-patentability rests on entirely different grounds. So with the discoverer that a species of carpet or tapestry hitherto believed to be unsweepable could be swept with a broom if used in a specific, though not necessarily a new, manner; or one who has contrived or adapted a method of eating with a spoon certain articles of food previously unknown as possessing that susceptibility (if such an invention is supposable); is there not in each case an exercise of the inventive faculties, perceiving new attributes in the object, and rendering them available by adapting to them some existing force and mode of application; and wherever the law undertakes to protect such classes of inventions are they not truly patentable? The logical position would be to deny their patentability on the ground that the statute did not include inventions of this nature, not on the ground that they were double uses, and therefore not the products of inventive skill.

Instances in which the application of an old contrivance to a new object was recognized by the courts as a substantive invention were quite numerous in the earlier history of the Patent Law. Mr. Webster, in a note to Hill's Patent, (1 Web. 229), thus refers to several: "They would appear to be more appropriately described as the use and application of a known substance for a specific purpose; which general description is in practice limited and defined by the condition of novelty which is essential to and implied in the term 'invention.' The substance itself may be old and well known; the manner in which it is used and applied also old and well known; the specific result or purpose old and well-known; the novelty or invention will then consist in the simple use and application of that substance. Of this class are Dudley's, for the use of pit or sea coal instead of charcoal in the manufacture of iron; Mansell's, for the use of coal instead of wood in the manufacture of glass; Hall's, for the use of gas in singeing lace; Derosne's, for the use of charcoal in filtering sugar; Crane's, for the use of anthracite in the

of use, is first discovered by the alleged inventor of the use.

manufacture of iron, . . . instead of other coal or coke; . . . Hartley's, for the use of iron plates to prevent fire; Forsyth's, for the application of detonating powder in the discharge of fire-arms; Neilson's, for the hot blast; . . . Buck's, for melting down iron and other metals with stone coal and other coals, without charking, etc." As to most of these inventions Mr. Webster concedes patentability on the ground of the novelty and utility of the vendible substance in which they result, but admits that as to some, for instance to Hartley's, Forsyth's, and Neilson's, this test will not apply. He also adopts concerning them the description given by Lord Eldon in Hill *v.* Thompson (1 Web. 229), and affirmed by Tindal, C. J., in Crane *v.* Price (1 Web. 393), which classes them among combinations of materials. But is it not evident that all these new inventions were true arts or processes; that the inventive act consisted in applying an existing human contrivance to an object whose susceptibilities to the action of this old contrivance had just been discovered; that the old contrivance was a force applied, now united with an object hitherto unknown as capable of being subjected to its operation; and that the new invention was an art consisting of the application of a known force through a known mode of application to a new object? Thus in Dudley's patent, the old contrivance was the process of smelting iron in a blast furnace; the object in which new susceptibilities had been perceived was pit or sea coal; the utility was in the saving of the wood formerly consumed in making charcoal for the same purpose. In Mansell's, the old contrivance was the process of making glass; the new discovery was that pit or sea coal had the same qualities as wood in reference to this particular manufacture; and the utility, here as in Dudley's patent, was the saving of the wood. Not to multiply words, was not the new object in Hall's patent the lace, now for the first time found capable of treatment by the Argand gas flame; in Crane's, the anthracite whose susceptibility to the action of the hot blast he had discovered; in Neilson's, the contents of the smelting-furnace, by him found to be subject to the action of the long-known heated air? Numerous other examples, in addition to those given by Mr. Webster, might be cited in which, in spite of the loose language and false theories of the courts, the character of the invention, and the true ground of its patentable merit become apparent the moment it is placed before the eye as the discovery of new susceptibilities in the object, made available by directing upon them known forces through well-known modes of application, which, though a use of the old contrivance in the same manner as of old, is not a double or analogous use, because requiring an inventive act for its production.

The following are selected from among the numerous cases confirming and illustrating the proposition that the discovery of new objects or new susceptibilities in old objects, and subjecting them to the action of old inventions is not double use:

In Union Paper Collar Co. *v.* White (1875), 11 Phi . 479, McKennan, J.: (479) "It is true that paper and muslin or linen cloth were before united, and used as a fabric for maps, etc.; but this was not analogous to the use to which Hunt adapted them, nor was it in any wise suggestive of his invention. He was the first to discover the adaptability of this material to a use not cognate to

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The third diversity of use arises where the entire invention is employed as a subordinate means in a true combination.

any to which it had before been applied, and by appropriate manipulation, to give it a useful and practical form. He thus not only supplied the public with a new article of manufacture, but he demonstrated unknown susceptibilities of the material out of which it was made. This is something more than the mere application of an old thing to a new purpose. It is the production of a new device, by giving a new form to an old substance, and by suitable manipulation making its peculiar properties available for a use to which it had not before been applied, thereby distinguishing it from all other fabrics of the class to which it belongs. This seems to me to involve an exercise of the inventive faculty, and in view of the great practical benefits resulting from it, to invest the product with special patentable merit." 2 Bann. & A. 60 (61); 7 O. G. 698 (698), 877 (877).

That unless inventive skill is necessary to apply an old invention to a different object, the application is not an invention, see Reed *v.* Reed (1874), 12 Blatch. 366; 8 O. G. 193; 1 Bann. & A. 515; Gallahue *v.* Butterfield (1872), 10 Blatch. 232; 6 Fisher, 203; 2 O. G. 645; Bray *v.* Hartshorn (1860), 1 Clifford, 538; Ames *v.* Howard (1833), 1 Sumner, 482; 1 Robb, 689.

That to apply an old process to a different object, producing a new result in that object, is invention, see Whitney *v.* Mowry (1867), 2 Bond, 45; 3 Fisher, 157.

That to apply the same process to the same materials for a different purpose is invention, though the former purpose be incidentally accomplished, see Higgs *v.* Goodwin (1858), E. B. & E. 529.

That the new application of an old process with a new result, dependent on newly discovered susceptibilities in the object, is not double use, see Cary *v.* Wolff (1885), 32 O. G. 257; 23 Blatch. 92; 24 Fed. Rep. 130.

That to discover that an invention can be applied to other and different machines may be a new invention, see Holmes *v.* Plainville Mfg. Co. (1881), 20 Blatch. 123; 9 Fed. Rep. 757.

That to discover unknown susceptibilities of a material and make it useful by old appliances is invention, see Union Paper Collar Co. *v.* White (1875), 2 Bann. & A. 60; 7 O G. 698, 877; 11 Phila. 479.

That putting a known material to a known use is not double use, if its capability of use in that way depends on its possession of newly discovered qualities, see Celluloid Mfg. Co. *v.* Tower (1885), 26 Fed. Rep. 451; Celluloid Mfg. Co. *v.* Pratt (1884), 21 Fed. Rep. 313.

That the use of a substance whose properties were heretofore unknown in reference to this particular use is invention, see Dalton *v.* Nelson (1876), 2 Bann. & A. 225; 13 Blatch. 357; 9 O. G. 1112.

That to so improve on an existing material as to adapt it to a new use, and then apply it to that new use, is invention, see Hoffman *v.* Aronson (1871), 8 Blatch. 324; 4 Fisher, 456.

That to apply a known process to a known material to make a known article, is not invention, though the material was never before used for the same purpose, see Hotchkiss *v.* Greenwood (1850), 11 How. 248; Rushton *v.* Crawley (1870), L. R. 10 Eq. 522.

That the use of the same material, in

Here the original use of the invention remains unchanged, but it is made to serve additional uses in its influence upon the action of the other members of the combination or in its co-operation with them on their common object. In this diversity there can be no question of an imitative or double use. The union of this invention with the others, and the new uses to which it is thereby devoted, are the result of an inventive act, producing a new means essentially distinct from each and all of the subordinate inventions from whose combination it arises.

the same manner, for another and analogous purpose, is not invention, see Jordan *v.* Moore (1866), L. R. 1 C. P. 624.

That though the user of an old material may have discovered some new value (not new property) in it, yet if used in the same way for the same purpose it is not invention, see The Bailey Washing & Wringing Machine Co. *v.* Lincoln (1871) 4 Fisher, 379.

That when an old material is used for a new purpose, it may be an invention, see Jenkins *v.* Walker (1872), Holmes, 120; 5 Fisher, 347; 1 O. G. 359.

That to apply the general principles of mechanics to a manufacture to which they had not before been applied, for a particular purpose and with a beneficial result, is invention, see Dangerfield *v.* Jones (1865), 13 L. T. Rep. N. S. 142.

That the use of a well-known substance whose capability of such use was hitherto unknown is invention, see Walton *v.* Potter (1841), 1 Web. 597.

That to ascertain by experiment that certain well-known materials, if subjected to certain known processes, will yield useful products is invention, see Young *v.* Fernie (1864), 4 Giffard, 577.

But that to apply an old contrivance to an object to which it was never before applied, there being no novelty either in the object or the mode of application, is not invention, see Pow *v.* Taunton (1845), 9 Jur. 1056.

That a new use, without new means or new effect, is only double use, see Sawyer *v.* Bixby (1872), 1 O. G. 165; 9 Blatch. 361; 5 Fisher, 283.

The cases cited under § 243 in reference to change of material may also be consulted. Such as relate to variations in the materials of which the invention used is composed are not germane to the present subject. Such as discuss the effect upon patentability of a change in the material upon which the invention is employed are directly in point. But in examining these, especially the earlier cases, caution is required in distinguishing between the rule laid down and its application to the facts; the latter being often erroneous even where the language of the former is correct. An example may be found in Howe *v.* Abbott (1842), 2 Story, 190, 2 Robb, 99, where the invention claimed was the application to palm-leaf of a process formerly in use in preparing hair for mattresses, etc. Judge Story assumed that the use was analogous, and decided the question from that point of view. But the real issue was one of fact, whether the application to palm-leaf was an analogous use; that is, whether the applier had discovered some new susceptibility in palm-leaf and made it available through the use upon it of this known process, — an issue which should have gone to the jury as in Steiner *v.* Heald, *ante*, and other cases. See a similar avoidance of the question in Klein *v.* Russell (1873), 19 Wall. 433.

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The fourth diversity of use occurs when the original invention is a combination, capable of separation into several independent means. Whatever be the uses which these members serve in their co-operation with each other, the use of less than all must be a different use from that which they performed in the original invention. Here also there can be no question of a double use. The severed element or elements, acting apart from any of their previous associations, become different means; their independent use, when not suggested by their use in combination, involves a separate inventive act; and though this act, in practice, usually precedes the one in which the combination has its origin, it is always possible that the inventor of the combination may not have perceived the character of the subordinate means which he employs, or the co-operative capabilities of a less number than the whole, and that he thus has left new fields of invention open among the very elements which he has combined. Hence to break up existing combinations into independent means, or into lesser combinations, is a new use of their subordinate elements, and when for the first time performed, becomes a new invention.

§ 269. Diversity of Use when a New Invention.

To sum up the results of this investigation we may formulate the following rules: —

I. Where an invention consists of a specific force applied in a specific manner to a specific object, no diversity of use is possible, except when the invention is employed as an element in a new combination, and if diversity of use apparently exists, the real diversity is in the invention.

II. Where an invention consists of a specific force applied in a specific manner, but without reference to specific objects, diversity of use may arise from a change of objects, the diversity being double use if the substituted object were already known as capable of substitution, but being a new invention if this susceptibility of that object were first discovered by its user.

III. Where an invention consists only of a mode of application, without reference to specific forces or specific objects, diversity of use is possible both in regard to forces and to objects,—being a double use when the substituted force or substituted object was previously known as capable of such substitution, but a new use, and hence a new invention, when the capabilities of either force or object were first discovered by the alleged inventor of the use.

IV. The use of an invention as an element in a new combination, or the separate use of an invention previously known only as a member of a combination, is not double use, but the creation of a new and independent means.

§ 270. New Inventions consisting in Diversity of Use Belong to what Classes of Inventions.

The new invention resulting from diversity of use is often of a different species from the original invention in whose employment it consists. If the original invention is a force applied, to whichsoever of the five species of inventions it belongs, the new invention created by its use is generally a process. Thus an art applied to a new object is still an art, although a different one from the old; but the new use of a machine or manufacture, when they express the idea of a force applied, or of a composition of matter in which a specific force always resides, is not a new composition, or a new manufacture or machine, but a new process for effecting in the new object some desired result.[1] When the original inven-

§ 270. [1] As the third class of inventions, namely, the subjection of a new object to an old force applied in a known manner, is incapable of any diversity of use except by introduction into or severance from a combination, its legal character and that of its use must always be the same. But in the other two classes, while the new mode of use does not affect the character of the invention used, so neither does the character of the invention used determine that of the new invention which consists in this new use. To this effect are various decisions.

Thus that the application of an old device to a new use does not constitute a new device, see Yuengling *v.* Johnson (1877), 3 Bann. & A. 99; 1 Hughes, 607; Northwestern Fire Extinguisher Co. *v.* Philadelphia Fire Extinguisher Co. (1874), 1 Bann. & A. 177; 6 O. G. 34; 10 Phila. 227.

See also §§ 259, 260, and notes, *ante*.

That a new mode of using old instru-

tion is a mode of application the same consequences follow; whether it be an art, or manufacture, or machine, its employment in connection with new forces or new objects is usually an act applying force or influencing objects, and not another instrument.[2] But in diversities of use, created by combining elements or by disrupting combinations, the result is different. Here the new invention does not vary in its species. The union or the severance of arts produces only arts; the combination or the dissociation of instruments brings forth new instruments of the same order as the old.

§ 271. Doctrine of Double Use Unnecessarily Confused.

From this discussion of the principles which underlie the doctrine of double use it is obvious that the subject in itself is not obscure, and that its difficulties have arisen mostly from the failure to distinguish properly between inventions and their uses, and between the different diversities of use which are possible to different classes of inventions.[1] If the decis-

ments may be a new art, see Lawther *v.* Hamilton (1888), 42 O. G. 487; Roberts *v.* Dickey (1872), 4 Brews. (Pa.) 260; 1 O. G. 4; 4 Fisher, 532; Smith *v.* Frazer (1872), 3 Pittsb. 397; 5 Fisher, 543; 2 O. G. 175.

That a new use of a composition of matter is not a new composition of matter, see U. S. & Foreign Salamander Co. *v.* Haven (1875), 3 Dillon, 131; 9 O. G. 253.

[2] That a new use of old instruments may result in a new manufacture, see Judd *v.* Babcock (1881), 8 Fed. Rep. 605; 23 O. G. 92; Union Paper Collar Co. *v.* White (1875), 2 Bann. & A. 60; 7 O. G. 698, 877; 11 Phila. 479.

§ 271. [1] In Boulton *v.* Bull (1795), 2 H. Bl. 463, the origin of many of the difficulties which have attended the doctrine of double use may be traced to that erroneous idea of the real nature of "a manufacture" from which so many other perplexities have also arisen. If an invention must be a vendible substance, — that is, either a machine for making or a thing made, — it is evident that no use of an invention can ever be the subject of a patent. Every use, therefore, to which an invention can be put, without changing its essential character and thus creating a different substance, must be an analogous or double use, whether the new mode of use require inventive skill either in itself or in its adaptation of the invention to the newly discovered qualities of the object acted on. This doctrine is stated by Buller, J., in his opinion in this case, illustrating his argument by reference to medical compounds, and declaring that any new use of such compounds, though involving the highest skill and productive of the greatest benefit, could not be a new invention. Thus he says: (487) "The medicine is the manufacture, and the only object of a patent; and as the medicine is not new, any patent for it, or for the use of it, would be void." He also instances the water-tabbies, where the

ions of the courts are examined in the light of these principles, it will be found that in most cases the result arrived

patentee had discovered that by mixing water with oils and colors in a certain manner peculiar effects could be produced, but had patented only certain vendible substances obtained by that method, and continues: (488) "Suppose painted floor-cloths to be produced on the same principle, yet as the floor-cloth and the tabby are distinct substances, calculated for distinct purposes, and were unknown to the world before, a patent for one would be no objection to a patent for another;" the statement of another strange doctrine, though a true logical result of his fundamental proposition, that when a mere method of producing a thing is invented each separate vendible substance produced in that method may, if a new substance, be patented. Thus every application of a method to a new object is a new use of the method, resulting in a new patentable substance. But no application of a patented substance to a new object, though producing new effects therein, can be the subject of a patent unless the object so affected becomes also a new substance. 1 Abb. P. C. 59 (82, 83).

The same idea is expressed in Bush *v.* Fox (1852-6), Macrory's P. C. 152, where Pollock, C. B., in directing the jury denies that any application of an old invention can be patented, and affirms that if a new application results in a new product, the new product only is the subject of a patent. Thus he says: (163) "An invention must be a production of something that can be used or sold or made use of for some purpose, or some method which results in something of the same sort. And I think that a man cannot, if he has applied . . . an old invention . . . to a new purpose, obtain a patent for such an application. Now if [this contrivance] is to be looked upon as old, and the object of the patent is for applying it to a new purpose, that is not a manufacture, and the application is such an operation . . . that nothing new which results from it can, I think, be the subject of a patent." In the Exchequer Chamber, this direction was held correct, taking into consideration the evidence in the cause, and was affirmed on the same ground in the House of Lords (5 H. L. 707).

In Losh *v.* Hague (1838), 1 Web. 202, Abinger, C. B.: (207) "The learned counsel has stated to you, and very properly, and it is a circumstance to be attended to, that Mr. Losh has taken out his patent to use his wheels on railways. Now, he says, the wheels made by Mr. Paton, or by the other workmen who were called as witnesses, were never applied to railways at all. That opens this question whether or not a man who finds a wheel ready made to his hand, and applies that wheel to a railway, shall get a patent for applying it to a railway. There is some nicety in considering that subject. The learned counsel has mentioned to you a particular case, in which an argand lamp burning oil having been applied for singeing gauze, somebody else afterwards applied a lamp supplied with gas for singeing lace (Hall's Patent, 1 Web. 97), which was a novel invention, and for which an argand lamp is not applicable because gas does not burn in the same way as oil in an argand lamp. But a man having discovered by the application of gas he could more effectually burn the cottony parts of the gauze by passing it over the gas, his patent is good. That was the application of a new contrivance to the same purpose; but it is a different thing when you take out a patent for applying a new contrivance to an

at has been in the main correct; and if their language be amended by excluding all phrases which confound diversity

old object, and applying an old contrivance to a new object; that is a very different thing; if I am wrong, I shall be corrected. In the case the learned counsel put, he says, 'If a surgeon goes into a mercer's shop and sees the mercer cutting velvet or silk with a pair of scissors with a knob to them, he seeing that would have a right to take out a patent, in order to apply the same scissors to cutting a sore, or a patient's skin.' I do not quite agree with that law. I think if the surgeon had gone to him and said, 'I see how well your scissors cut,' and he said, 'I can apply them instead of a lancet by putting a knob at the end,' that would be quite a different thing, and he might get a patent for that; but it would be a very extraordinary thing to say that, because all mankind have been accustomed to eat soup with a spoon, that a man could take out a patent because he says you might eat peas with a spoon. The law on the subject is this; that you cannot have a patent for applying a well-known thing, which might be applied to fifty thousand different purposes, for applying it to an operation which is exactly analogous to what was done before. Suppose a man invents a pair of scissors to cut cloth with; if the scissors were never invented before, he could take out a patent for it. If another man found he could cut silk with them, why should he take out a patent for that? I must own, therefore, that it strikes me if you are of opinion this wheel has been constructed according to the defendant's evidence, by the persons who have been mentioned, long before the plaintiff's patent, that although there were no railroads then to apply them to and no demand for such wheels, yet that the application of them to railroads afterwards by Mr. Losh will not give effect to his patent, if part of that which is claimed as a new improvement by him is in fact an old improvement invented by other people and used for other purposes." 2 Abb. P. C. 501 (508).

As this case, and the propositions above quoted from the learned judge who presided at its trial, may perhaps be regarded as the first clear recognition and explanation of the doctrine of double use, it deserves a careful examination; but especially from the fact that in the language of the judge are found the seeds of several of the most important errors and mistakes that have arisen in reference to this doctrine. The statement that "you cannot have a patent for applying a well-known thing . . . to an operation *which is exactly analogous* to what was done before," is undoubtedly correct. Such an application can, in the nature of things, be nothing but a repetition and imitation of some previous application, and necessarily excludes the exercise of any inventive skill in the applier, as well as any novelty in the application. But in referring the facts in the case at bar to this rule, the judge assumes that the use, for railroad purposes, of an old wheel invented before railroads were known, must be an analogous use, without directing the jury to inquire whether the patentee had been the first to discover the requirements of a successful railroad-wheel, to perceive in this wheel a capability of satisfying those requirements, and to adapt the wheel to its more recent uses; but leaving them to decide the cause upon the question whether or not the wheel itself was new, thus making all uses of an instrument analogous where the instrument itself remains unchanged. This error resulted, in part at least, from the old idea, not yet entirely expunged

of use with diversity of means, they would become, almost without exception, intelligible and harmonious.

from the English mind, that a patentable invention must have some tangible, permanent manifestation, — either being in itself a vendible substance or resulting in the production of a vendible substance; the court here perceiving that the only vendible substance was the wheel, and presuming that if this were old nothing could be new. Mr. Webster, in a note to this part of the decision, says: (208) "It is at once evident that applications of this nature cannot be said to be 'any manner of new manufacture;' they may be called inventions, in one sense of the term, inasmuch as something may be said to have been found out, some discovery may be said to have been made; but they are not such as can be the subject-matter of letters-patent. Suppose any one to have discovered that a medicine known as a valuable specific in one class of complaints, fevers for instance, had also great efficacy for curing consumptions, the application of that medicine to such a new purpose would not be the subject-matter of letters-patent. The medicine is a manufacture, and the making or compounding it might be the subject of a patent; but the medicine being known, the discovery of any new application is not any manner of manufacture. Cases of this kind are well described by the term 'double use;' and under such circumstances it is truly said there cannot be a patent for a double or new use of a known thing, because such use cannot be said to lead to any manner of new manufacture. There is, however, a large class of cases in which a new use of a known thing is the substance or essence of the invention, as the use of gas in improving lace, or the use of charcoal in filtering sugar; but in all these and similar cases a new manufacture is the result, and if the invention or discovery be examined according to this test, no difficulty can arise in determining whether the new case is such as can be protected by letters-patent."

As stated by the court in the case at bar, and explained in Mr. Webster's note, the new use of a known thing is thus an analogous or double use when it does not result in a new vendible substance, and is not an analogous or double use when it does result in a new vendible substance. The use itself may be as new in the one case as in the other; it may require as much invention, and may be as beneficial to the public; but whether it is "analogous" and "double" depends not on its similarity or dissimilarity to any former use, but on the patentability of its result as a "new manner of manufacture." In other words, the character of the use is determined not by anything in the use itself, nor in the nature of its effect, but by its capability of being classified under either of the species of inventions mentioned in the statute. The absurdity of this position is evident, and its adoption can be accounted for only by remembering the ease with which even the legal mind falls into confusion when fundamental distinctions are once ignored. To have said that an analogous use is a use similar to and suggested by the old, — as the illustrations given by Lord Abinger clearly show, — and to have held, that even a new use is not patentable unless producing a new vendible substance, would have been a position consistent with itself although erroneous in law, and would have preserved subsequent generations of jurists from innumerable perplexities.

An instance of the facility with which mistakes in the use of language have been made and propagated in the history of Patent Law occurs in the same

SECTION V.

OF THE NOVELTY OF INVENTIONS: TESTS OF IDENTITY IN SIMPLE INVENTIONS AND IN COMBINATIONS.

§ 272. Identity a Question of Fact.

Subject to the foregoing rules the question of the identity or diversity of two inventions is a question of fact, to be determined by industrial research and discrimination.[1] Every controversy in reference to inventions relates not only to their legal *status* but to their actual *status* in the arts, and is decided by the application both of principles of law and principles of science. The decisions of the courts in cases of this character therefore serve two important purposes. They declare the doctrines of the law concerning inventions in general; they also propound and explain those scientific truths in view of which the doctrines of the law must be applied to individual inventions. Having examined them in both these aspects, and formulated our results in certain rules, it now becomes

decision and in reference to the same subject. The learned judge says: "It is a different thing when you take out a patent for applying a new contrivance to an old object, and applying an old contrivance to a new object." Here note the equivocal use of the word "new." In reference to "contrivance," it means "newly invented," "never before known;" in reference to "object," it means "another" simply, not "newly invented" or "hitherto unknown." All the examples cited by the court show this, and on principle the statement is correct only when these different meanings are given to the word in its different connections; since it is as truly an invention to apply a known contrivance to an object whose susceptibilities are just discovered, as to apply a newly invented contrivance to a known object, — both standing on the same footing as results of an inventive act. Yet without distinguishing this double meaning of the adjective, this proposition has been taken as declaring that every application of an old contrivance to any object, whether old or new, was necessarily a "double use," devoid alike of inventive skill and patentable merit; and has thus been a stumbling-block to lawyers, authors, and judges during the past fifty years. See Coryton, 66; Lund, 17; Norman, 13; Curtis, §§ 55, etc.

§ 272. [1] That where two inventions are identical in fact they are also identical in law, see *In re* Merrill (1874), 1 MacArthur, 301; 5 O. G. 120.

That identity is a question of fact, see Tillotson *v.* Ramsay (1878), 51 Vt. 309; Stevens *v.* Fierpont (1875), 42 Conn. 360; Morgan *v.* Seaward (1835), 1 Web. 167; 2 Abb. P. C 113.

necessary to discuss those rules in their application to concrete arts and instruments.

§ 273. Two Inventions are either Identical, or Diverse, or related as an Original and an Improvement.

Whenever two inventions are compared, they are seen to occupy toward each other one of three relations: either (1) They are identical, each possessing every essential characteristic of the other, and the later thus a reproduction of the earlier; or (2) They are entirely independent, differing in the ideas of means which they express, and tracing their origin to separate inventive acts; or (3) The later is an improvement on the earlier, identical with it up to a certain point beyond which a new exercise of the creative faculties has developed the original idea, making the difference a new and substantive invention. To ascertain in which of these relations the inventions stand is the purpose both of science and the law.

§ 274. Identity of Inventions Impossible without Identity of Function.

The first decisive test to be applied is that afforded by the functions performed by the inventions. As diversity of ends cannot result from uniformity of means, if the functions of the two inventions are essentially distinct the inventions also must be independent of each other, and the question of identity is thus immediately settled. But if their functions are essentially the same, the question is still open, since similar effects may be accomplished by the use of very different means.[1] In this event additional tests, derived from an examination of each invention as an operative means, are necessary.

§ 275. Identity of Inventions Independent of Diversities of Form.

In order to apply these further tests, each of the two inventions must be contemplated as the embodiment of its idea of means, and as that alone. Formal diversities of every kind must be excluded from consideration. The equivalence of different elements must be detected. Essential variances in

§ 274. [1] That identity of function does not show identity of inventions, see Bruff *v.* Waterbury Buckle Co. (1886), 29 Fed. Rep. 214. See also §§ 117, 236, and notes, *ante*.

employment must be distinguished from mere double use, and the intrinsic character of each invention, stripped of all adventitious attributes, be made apparent to the mental vision. This being done, the two inventions are in a position to be accurately compared in respect to those essential qualities in which the identity of each consists.

§ 276. Identity of Inventions is Identity of Essential Factors.

The qualities essential to an invention depend on the relation of the inventive act to its subordinate ideas. This principle has already been sufficiently considered, and in connection with the present subject may be disposed of in a single proposition: Where the inventive act has been concerned in the discovery and adaptation of a force, an object, a mode of application, or two or more of these, the essential qualities of such new force or object or mode of application thereby become essential qualities of the invention, and any difference in this respect between the two inventions is a difference in the idea of means. In applying this principle, and in considering the identity of force with force, of object with object, and especially of one mode of application with another, it will avoid confusion to examine separately each of the six species of inventions. And since in every species there are combinations whose essential qualities are controlled by rules which are peculiar to themselves, and at the same time are additional to those which govern simple arts and instruments, the explanation of these rules will naturally precede an inquiry into the individual characteristics of particular species, and being apprehended here will simplify the questions then to be discussed.

§ 277. Identity of Combinations, how Tested.

A combination is a group of elements united in a method of co-operation. In its identity two subordinate identities concur: identity of elements; identity in the mode of their co-operation.[1] The essential qualities of a combination thus include the essential qualities of each of its constituent ele-

§ 277. [1] That combinations are identical only when their elements and modes of combination are the same, see Electric R. R. Signal Co. *v.* Hall R. R. Signal Co. (1885), 114 U. S. 87; 31 O. G. 515; Gill *v.* Wells (1874), 22 Wall. 1; Gould *v.* Rees (1872), 15 Wall. 187; 6 Fisher, 106; 2 O. G.

ments, the essential qualities of their method of co-operation, and the essential qualities resulting from the union of these elements under this co-operative law. Hence in determining the identity of a combination the investigator meets, and is required to answer, the four following questions: (1) What are its constituent elements? (2) What are the essential qualities of each? (3) What is the nature of its co-operative law? and (4) What are the new intrinsic attributes resulting from the combination of the old?

§ 278. Identity of Combinations: "Elements of Combination" Defined.

The constituent elements of a combination are those subordinate arts or instruments by whose co-operation the functions of the combination are performed.[1] A combination may, and often does, embrace other substances or acts, whose presence is not necessary to its integrity; but these are accidents of

624; Seymour *v.* Osborne (1870), 11 Wall. 516; Prouty *v.* Ruggles (1842), 16 Pet. 336; 2 Robb, 92.

That combinations composed of the same or equivalent elements, combined in the same way and operating in the same manner, are identical, see American Box Mach. Co. *v.* Day (1887), 32 Fed. Rep. 585. See also cases cited in § 155, note 2, *ante*.

That all elements which aid in producing the general result enter into the combination, see Shaver *v.* Skinner Mfg. Co. (1887), 41 O. G. 232.

That though the product while in the machine aids the machine in performing some special functions, it does not thereby become an element in the combination constituting the machine, see Dederick *v.* Cassell (1881), 20 O. G. 1233; 9 Fed. Rep. 306.

That a part not indispensable, though serviceable, is not an element, see Bradley *v.* Dull 1884), 27 O. G. 625; 19 Fed. Rep. 913.

Where a combination has been patented, and in the patent is described and claimed as consisting of certain elements, each of such elements is thereby made an essential feature of the combination, whether necessary to the performance of its functions or not, and cannot be repudiated by the patentee. Hence in comparing a patented combination with an infringing or prior combination, the comparison must not be instituted between the two concrete inventions as they actually exist in the

§ 278. [1] That such parts of any combination as are not essential to the performance of its functions, according to the method of co-operation devised by its inventor, are immaterial and may be discarded without changing the character of the combination, see McWilliams Mfg. Co. *v.* Blundell (1882), 11 Fed. Rep. 419; 22 O. G. 177; Stow *v.* Chicago (1877), 8 Bissell, 47; 3 Bann. & A. 83; Smith *v.* Fay & Co. (1873), 6 Fisher, 446; Carlton *v.* Bokee (1873), 17 Wall. 463; 6 Fisher, 40; 2 O. G. 520; Waterbury Brass Co. *v.* Miller (1871), 5 Fisher, 48; 9 Blatch. 77; Rich *v.* Close (1870), 8 Blatch. 41; 4 Fisher, 279; Hale *v.* Stimpson (1865), 2 Fisher, 565; Sellers *v.* Dickinson (1850), 5 Exch. 312.

construction, not embodiments of an idea. Among these are those parts of the invention which have no special function to discharge, those tributary devices which do not influence the operation of the constituent elements, and those objects upon which the combination acts when practically employed although they aid the combination in its operations. Diversity in these does not affect the identity of the combination, and they must, therefore, be excluded from the mind whenever its essential qualities become the subject of investigation.

§ 279. Identity of Combinations: Subcombinations to be Resolved into Elements.

In order that the essential qualities of a constituent element may be discovered, it is necessary that this element should be a simple means. An element itself is sometimes a combination, formed by the union of subordinate arts or instruments under its own peculiar method of co-operation. The intrinsic character of such an element or sub-combination depends upon the nature of its integral elements and of their co-operative law; and it must, therefore, be resolved into its several members, and if these members are true combinations still further resolution must occur, until each element can be examined as a simple art or instrument, expressing a distinct idea of means.[1] When this reduction is accomplished, the

arts, but between the prior or infringing combination and the description and claims of the patent. Under this rule the patent may, of course, fail to protect the invention of the patentee, or may be held invalid on account of the apparent, though unreal, identity of his invention with the prior combination. But the fault is his own, and by its consequences he must abide. See Royer *v.* Schultz Belting Co. (1886), 28 Fed. Rep. 850; Fay *v.* Cordesman (1883), 109 U. S. 408; Coolidge *v.* McCone (1874), 2 Sawyer, 571; 5 O. G. 458.

§ 279. [1] It is essential to the idea of a combination that its elements should be, in themselves, operative means, and hence that their identity should depend, not merely upon the function which they perform, but upon the manner in which they perform it. This is exemplified in the doctrine of combination-equivalents, § 254, *ante*, and in many other propositions having reference to this class of inventions. When, therefore, an element in a combination is itself a combination, its character cannot be determined by its mere function (except in chemical compositions), but the method in which it performs its functions must also be examined. This necessitates an inquiry into the nature of its elements and of their co-operative law. It is not until each element is thus reduced to its simplest terms that the identity of one element with another can be safely asserted or denied.

simple elements, whether subordinate or principal, may be subjected to a final and decisive scrutiny, in which the force, the object, and the mode of application which each represents become apparent, and the essential qualities of each are thus disclosed.

§ 280. Identity of Combinations: "Co-operative Law" Defined.

The co-operative law of a combination is incapable of definition, or even of exact description. It embodies a complete idea of means, embracing the subordinate ideas of force, of object, and of mode of application. Its force includes all the forces employed by each of the constituent elements, not united into a new and homogeneous force, but remaining separate from each other as though the elements were still distinct. Its object comprehends every constituent element whose natural activities are influenced by the forces of the other elements, as well as that remoter substance toward which the energies of the whole combination are directed. Its mode of application is that method of arrangement, that adjustment of each element with reference to every other, by which the force of each is enabled so to act upon the others and their common object that the intended functions of the combination are performed. Thus in a chemical composition, for example, the co-operative law expresses the idea of the forces represented by the properties of each ingredient, operating upon the properties of every other ingredient, as well as on the substances to which the combination is to be applied, through that mode of application which is adopted when the several ingredients are intermingled in such order, method, and proportions, as permits the exercise of this reciprocal and joint activity. Thus, also, in a process, it is that relation of each art toward the others which is created by performing every art in a specific time and method, whereby the force of each acts in a certain manner on the forces of the others and on the common fabric or material. This co-operative law is sometimes ascertainable from an immediate inspection of the combination, and sometimes from the permanent effects which follow its employment, but far more accurately and reliably from an examination of it while in actual opera-

tion, when its subordinate forces are applied to its subordinate objects in that degree or measure which produces its peculiar ultimate results.

§ 281. Identity of Combinations: Essential Attributes of Combinations.

A combination, as a whole, possesses attributes distinct from those of its constituent elements and of their co-operative law. It represents an independent and original idea of means. Its force is a resultant from the union of the individual forces of its elements. Its object is the material on which its functions are performed. Its mode of application is the method in which the co-operating action of its elements directs its force upon their common object. The inventive act by which it is created may manifest itself in the production of a new force by the union of the old, as in a chemical combination; or in the subjection of a new object to the co-operative forces of its elements, as in some special arts; or in the contrivance of a new method for applying these united forces to their object, as in many forms of manufactures and machines. But on whichever one of these subordinate ideas the genius of the inventor is exerted, each is, in its relation to the combination, distinct from the corresponding ideas which underlie the individual elements or their co-operative law; and the essential qualities of each, whether they differ from or are identical with those out of whose union they arise, are equally essential to the identity of the combination. These are the substance of the combination, taken as a whole, — the attributes by which it is enabled to perform its functions in the mode designed by its inventor, and which results from the possession, by its elements and by its co-operative law, of their particular and individual qualities.

§ 282. Identity of Combinations Requires Identity of Elements, of Co-operative Law, and of Essential Attributes.

This method of investigation discloses those essential characteristics of the two combinations, by a comparison of which their identity or diversity is to be determined. Assuming that their functions are the same, since without this no iden-

tity is possible, the mode in which each combination performs these functions, or its intrinsic attributes when taken as a whole, first demand attention. If the forces, objects, or modes of application which constitute the essential factors of the two combinations are evidently different, the combinations must be distinct inventions; if evidently the same, the constituent elements of each combination and their co-operative laws must be examined. When every element in one is represented by an equivalent element in the other, so that a complete interchange of elements would work no alteration in the functions of the combination or in its co-operative law, the elements of both combinations are identical; but otherwise the elements are diverse and the combinations are independent inventions.[1] When all the elements are the

§ 282. [1] As a combination is the union of certain specific elements under one law of co-operation, two combinations cannot be identical unless the elements united in each are the same. This does not require, however, that the elements should be the same concrete inventions, for all elements are the same in reference to the combination if each is a true substitute for the other, according to the doctrine of equivalents. Nor is it necessary that the elements be the same in number, for one may be the equivalent of two or more, or two or more may be substituted in the place of one. But it is essential that when all immaterial parts are excluded, and the true constituent elements of each combination alone remain, these elements in each should be equivalents for all those in the other; and this is what is meant by the proposition that to drop an element, or to add an element, makes the result a different combination. Thus in Royer *v.* Schultz Belting Co. (1886), 28 Fed. Rep., 850, Treat, J.: (851) "The ordinary doctrine in law concerning patents is that if a party insists on a patent for a combination of devices (whether new or old is immaterial), each element of the combination is an essential element; so that one who uses a combination in some respects, but omits one of the elements that the patentee chooses to describe as essential, the supposed infringer does not infringe. The patentee is supposed to describe clearly and fully all the elements which he thinks essential to produce the result desired. If he chooses to crowd his supposed inventions or combinations with elements that have no functions whatsoever, and a party chooses to use a like contrivance, omitting some of those elements, he does not infringe. The reason of the rule, as explained by the Supreme Court very frequently, is this: that, first, a party claiming the patent should not incumber the combination or device with matters that are wholly unessential, and thereby block the path of improvement or invention. If he chooses to put such in his contrivance, he must abide by the result."

In Rowell *v.* Lindsay (1881), 6 Fed. Rep., 290, Dyer, J.: (293) "It is a settled rule of law that where a patent is for a combination of known parts, it is not infringed by the use of any number of the parts less than the whole; for the patent, in every such case, is for

same, identity depends upon identity of co-operative law. The co-operative laws of two combinations can scarcely differ

that identical combination, and nothing else, and a combination of any less number of parts is a different thing. . . . (295) The combination is an entirety. Unless it is maintained as such, the whole of the invention fails. If one of the elements is given up the thing claimed disappears. . . . The different parts may perform more or less important functions, but each and all are essential to make the thing which the patentee has claimed as his invention." 10 Bissell, 217 (220, 222); 19 O. G. 1565 (1565).

In Waterbury Brass Co. *v.* Miller (1871), 5 Fisher, 48, Woodruff, J.: (69) "In any proposed application of this principle it should be borne in mind that, in a certain sense, nearly all new machines are but combinations of old devices; that is to say, they do, or may, combine frames, bolts, screws and nuts, rods and pulleys, cranks and wheels, levers and pins, nails and boards, and, as the case may be, various other and more complicated devices, none of which, regarded singly or separately, are new; and yet the machine formed by the combination is new as a structure, new in its operation, and new in the effect produced. The patent, in such case, is not for a mere combination under the rule above referred to; and another machine, having the like construction, operation, and effect, in all that constitutes the principle of the machine, and the efficient means of its operation, is an infringement of the patent, notwithstanding it may be moved by a less number of wheels, or be held together by a less number of clamps, screws or nails, bolts or keys, and notwithstanding drum and pulley may be substituted for cog-wheels or other gear, or bolts for screws and nuts, or like changes be made in other devices employed to construct the machine. Such machine, notwithstanding such changes, is substantially the same in its patentable characteristics, and would be, within the terms of the specification, 'substantially as described.'" 9 Blatch. 77 (98).

In Rich *v.* Close (1870), 8 Blatch. 41, Woodruff, J.: (44) "It is true that inventions in general involve combinations of old devices. No machine is made that does not, in various of its parts, require for its construction the use of what is known and open to the use of all the world. Hence, when a machine is patented as an aggregate, third parties may not deny an infringement on the ground that they omit immaterial parts, or use fewer of the original old elements or substitute equivalents. The question will still recur: Is the alleged infringement substantially the same machine?" 4 Fisher, 279 (283).

In Roberts *v.* Harnden (1865), 2 Clifford, 500, Clifford, J.: (504) "Where all the elements of a machine are old, and the invention consists solely in the combination by which a new and useful result is effected, as compared with the old machine on which the improvement is made, no one can be held as an infringer who does not use all of the elements of the new combination. The reason of the rule is that others as well as the first patentee may improve the old machine; and if they do so by the use of a substantially different combination they are not infringers, although they may have used all of the elements of the first invention, except one, and their machine may perform substantially the same functions."

In Hill *v.* Thompson (1818), 1 Web. 239, Dallas, J.: (242) "It is a patent for a combination of processes, altogether new, leading to one end; and this being the nature of the alleged discovery, any

when, all their elements being identical, the union of these elements has resulted in combinations performing the same

use made of any of the ingredients singly, or any use made of such ingredients in partial combination, some of them being omitted, or any use of all or some of such ingredients in proportions essentially different from those specified, and yet producing a result equally beneficial (if not more so) with the result obtained by the proportions specified, will not constitute an infringement of the patent." 1 Abb. P. C. 304 (308).

That to omit one element of a combination destroys that combination, see Royer *v.* Schultz Belting Co. (1886), 28 Fed. Rep. 850; Schillinger *v.* Cranford (1885), 4 Mackay, 450; 37 O. G. 1349; Abbott *v.* Hoole Mfg. Co. (1885), 31 O. G. 1561; Travers *v.* Palmer (1885), 31 O. G. 382; 23 Fed. Rep. 511; Hayes *v.* Bickelhoupt (1885), 32 O. G. 133; 23 Fed. Rep. 183; Arnold *v.* Phelps (1884), 29 O. G. 538; Pacific Submarine Co. *v.* United States (1884), 19 Ct. of Claims, 234; Gould *v.* Spicers (1884), 20 Fed. Rep. 317; Gage *v.* Herring (1883), 107 U. S. 640; 23 O. G. 2119; Howe *v.* Neemes (1883), 18 Fed. Rep. 40; Matteson *v.* Caine (1883), 17 Fed. Rep. 525; 8 Sawyer, 498; Cotter *v.* New Haven Copper Co. (1882), 23 O. G. 740; 13 Fed. Rep. 234; New *v.* Warren (1882), 22 O. G. 587; Schmidt *v.* Freese (1882), 21 O. G. 1876; 12 Fed. Rep. 563; Tod *v.* Wick Bros. (1881), 36 Ohio St. 370; Cross *v.* Livermore (1881), 21 O. G. 139; 9 Fed. Rep. 607; American Ballast Log Co. *v.* Barnes (1881), 21 O. G. 1029; 9 Fed. Rep. 465; 4 Hughes, 278; Rowell *v.* Lindsay (1881), 10 Bissell, 217; 6 Fed. Rep. 290; 19 O. G. 1565; Faurott *v.* Hawes (1880), 3 Fed. Rep. 456; Gale Mfg. Co. *v.* Prutzman (1880), 5 Bann. & A. 154; 17 O. G. 743; Dittmar *v.* Rix (1880), 5 Bann. & A. 240; 17 O. G. 973; 1 Fed. Rep. 342; Sharp *v.* Tifft (1880), 17 O. G. 1282; 18 Blatch. 132; 2 Fed. Rep. 697; 5 Bann. & A. 399; Water Meter Co. *v.* Desper (1879), 101 U. S. 332; Burdett *v.* Estey (1879), 16 Blatch. 105; 4 Bann. & A. 141; Miller *v.* Bridgeport Brass Co. (1877), 3 Bann. & A. 20; 14 Blatch. 282; 12 O. G. 667; Stow *v.* Chicago (1877), 3 Bann. & A. 83; 8 Bissell, 47; Schumacher *v.* Cornell (1877), 96 U. S. 549; Smith *v.* Marshall (1876), 2 Bann. & A. 371; 10 O. G. 375; Sanford *v.* Merrimac Hat Co. (1876), 4 Clifford, 404; 2 Bann. & A. 408; 10 O. G. 466; Storrs *v.* Howe (1876), 2 Bann. & A. 420; 10 O. G. 421; 4 Clifford, 388; Dunbar *v.* Meyers (1876), 94 U. S. 187; 11 O. G. 35; Fisher *v.* Craig (1874), 1 Bann. & A. 365; 3 Sawyer, 69; Craig *v.* Smith (1874), 1 Bann. & A. 556; 4 Dillon, 349; Coolidge *v.* McCone (1874), 2 Sawyer, 571; 5 O. G. 458; Smith *v.* Woodruff (1874), 1 MacArthur, 459; 4 O. G. 635; 6 Fisher, 476; Westlake *v.* Cartter (1873), 4 O. G. 636; 6 Fisher, 519; Brown *v.* Hinkley (1873), 3 O. G. 384; 6 Fisher, 370; Bridge *v.* Brown (1873), Holmes, 205; 3 O. G. 121; King *v.* Louisville Cement Co. (1873), 6 Fisher, 336; 4 O. G. 181; Sarven *v.* Hall (1872), 1 O. G. 437; 9 Blatch. 524; 5 Fisher, 415; Gould *v.* Rees (1872), 15 Wall. 187; 6 Fisher, 106; 2 O. G. 624; Wallace *v.* Holmes (1871), 1 O. G. 117; 5 Fisher, 37; 9 Blatch. 65; Waterbury Brass Co. *v.* Miller (1871), 9 Blatch. 77; 5 Fisher, 48; Carter *v.* Baker (1871), 1 Sawyer, 512; 4 Fisher, 404; Watson *v.* Cunningham (1871), 4 Fisher, 528; Seymour *v.* Osborne (1870), 11 Wall. 516; Rich *v.* Close (1870), 8 Blatch. 41; 4 Fisher, 279; Stimpson *v.* Woodman (1869), 10 Wall. 117; Crompton *v.* Belknap Mills (1869), 3 Fisher, 536; Nicholson Pave-

functions in the same manner; still this test is not infallible, and only an analysis of that law itself, as manifested in each

ment Co. *v.* Hatch (1868), 4 Sawyer, 692; 3 Fisher, 432; Blanchard *v.* Puttman (1867), 2 Bond, 84; 3 Fisher, 186; Mabie *v.* Haskell (1865), 2 Clifford, 507; Roberts *v.* Harnden (1865), 2 Clifford, 500; Hale *v.* Stimpson (1865), 2 Fisher, 565; Eames *v.* Godfrey (1863), 1 Wall. 78; Vance *v.* Campbell (1861), 1 Black, 427; Dodge *v.* Card (1860), 1 Bond, 393; 2 Fisher, 116; Lee *v.* Blandy (1860), 1 Bond, 361; 2 Fisher, 89; Smith *v.* Higgins (1860), 2 Fisher, 97; Latta *v.* Shawk (1859), 1 Fisher, 465; 1 Bond, 259; Bell *v.* Daniels (1858), 1 Fisher, 372; 1 Bond, 212; McCormick *v.* Talcott (1857), 20 How. 402; Foss *v.* Herbert (1856), 2 Fisher, 31; 1 Bissell, 121; Pitts *v.* Wemple (1855), 6 McLean, 558; Pitts *v.* Wemple (1855), 2 Fisher, 10; 1 Bissell, 87; McCormick *v.* Manny (1855), 6 McLean, 539; Brooks *v.* Fiske (1853), 15 How. 212; Silsby *v.* Foote (1852), 14 How. 218; Smith *v.* Downing (1850), 1 Fisher, 64; Parker *v.* Haworth (1848), 4 McLean, 370; 2 Robb, 725; Root *v.* Ball (1846), 4 McLean, 177; 2 Robb, 513; Brooks *v.* Bicknell (1845), 4 McLean, 70; Brooks *v.* Bicknell (1844), 3 McLean, 432; Prouty *v.* Ruggles (1842), 16 Peters, 336; 2 Robb, 92; Prouty *v.* Draper (1841), 1 Story, 568; 2 Robb, 75; Barrett *v.* Hall (1818), 1 Mason, 447; 1 Robb, 207; Harrison *v.* Anderston Foundry Co. (1876), L. R. 1 App. 574; Clark *v.* Adie (1875), L. R. 10 Ch. Ap. 667; Booth *v.* Kennard (1856), 1 H. & N. 527.

In quite a number of the foregoing cases the courts distinguish between combinations of old elements and combinations consisting entirely or in part of new elements, and apply this doctrine in its fulness only to the former. It was their real desire to announce that new elements and sub-combinations were protected by the patent for the combination as a whole, though not specifically claimed therein; and being unable to assume this position without violence to accepted rules of interpretation, they endeavored to attain the same result by declaring that the new combination itself is used whenever any of its new elements are employed. This is manifestly inconsistent with any true theory of the nature of a combination, which can exist only where all its elements are present and co-operate in the mode devised by its inventor. See also § 254, note 1, *ante*.

That a combination of three elements is a different invention from a combination of two of them, see Bernard *v.* Heimann (1881) 21 O. G. 140; 20 Blatch. 21; 9 Fed. Rep. 400.

That the omission of one element in a combination, if its function is not performed by the remaining elements, makes a different combination, see Tobey Furniture Co. *v.* Colby (1885), 26 Fed. Rep. 100; 34 O. G. 1276.

That less than all the elements make a different combination, though the former was suggested by the latter, see Snow *v.* Lake Shore & M. S. R. R. Co. (1883), 18 Fed. Rep. 602; 25 O. G. 1280.

That where a combination has heretofore been used in connection with a certain element, it does not become a new combination by dropping that element, if the function and effect of the combination remain unchanged, the abandoned element being thus shown to have been immaterial, see Stow *v.* Chicago (1877), 8 Bissell, 47; 3 Bann. & A. 83; Smith *v.* Fay & Co. (1873), 6 Fisher, 446; Carlton *v.* Bokee (1873), 17 Wall. 463; 2 O. G. 520; 6 Fisher, 40; Waterbury Brass Co. *v.* Miller (1871), 5 Fisher, 48; 9 Blatch. 77;

combination, and an examination of the force, the object,

Hale *v.* Stimpson (1865), 2 Fisher, 565.

That the rejection of superfluous parts from a combination does not always require inventive skill, nor the union of the remaining parts constitute a new patentable combination, see McClain *v.* Ortmayer (1888), 42 O. G. 724; Smith *v.* Fay & Co. (1873), 6 Fisher, 446.

That to dismember an old combination and use some of the elements for the same function they performed while in the combination, may produce a different combination, but not a new and patentable one, see Stow *v.* Chicago (1877), 3 Bann. & A. 83; 8 Bissell, 47.

That where there is already a combination of certain elements, the selection of the most useful among their equivalents and uniting these into a combination of the same character for the same purpose, though better performed, is not invention, but mere mechanical skill, see Welling *v.* Crane (1882), 14 Fed. Rep. 571; 23 O. G. 189.

That combinations differ if any of their parts are substantially different, see Norton *v.* Haight (1884), 22 Fed. Rep. 787.

That where one element is new the combination must be new, see Temple Pump Co. *v.* Goss Pump & Rubber Bucket Mfg. Co. (1887), 39 O. G. 467; 30 Fed. Rep. 440.

That the substitution of a new element, producing an additional result, makes a different combination, see Smith *v.* Murray (1886), 27 Fed. Rep. 69.

That the substitution of a new element may make a different combination, though the new was suggested by the old, see American Ballast Log Co. *v.* Barnes (1881), 21 O. G. 1029; 9 Fed. Rep. 465; 4 Hughes, 278.

That to add to an existing combination some new constituent element is to create another combination, see Rowell *v.* Lindsay (1881), 6 Fed. Rep. 290; 10 Bissell, 217; 19 O. G. 1565; Babcock *v.* Judd (1880), 1 Fed. Rep. 408; 17 O. G. 1351; 5 Bann. & A. 127; Sanford *v.* Merrimac Hat Co. (1876), 4 Clifford, 404; 10 O. G. 466; 2 Bann. & A. 408; Robertson *v.* Hill (1873), 4 O. G. 132; 6 Fisher, 465; Gallahue *v.* Butterfield (1872), 10 Blatch. 232; 6 Fisher, 203; 2 O. G. 645; Le Roy *v.* Tatham (1859), 22 How. 132.

But that the former combination still remains the same in itself though used as an element in the new one, see Pitts *v.* Wemple (1855), 6 McLean, 558.

And that the inventor of the new combination obtains no right to claim or use the old as against its patentee, see Williams *v.* Boston & Albany R. R. Co. (1879), 17 Blatch. 21; 16 O. G. 906; 4 Bann. & A. 441; Howes *v.* Nute (1870), 4 Clifford, 173; 4 Fisher, 263; Evans *v.* Eaton, (1822), 7 Wheaton, 356; 1 Robb, 336.

That where the elements of a combination are found in different prior inventions, composing combinations to effect the same result, and could have been selected and combined as at present by mechanical skill alone, there is no new invention, see Saxby *v.* Gloucester Waggon Co. (1881), L. R. 7 Q. B. 305.

That the use of a combination in a different machine does not change the combination, see La Rue *v.* Western Electric Co. (1886), 28 Fed. Rep. 85; 36 O. G. 453.

That the rule concerning equivalents applies equally to combinations as to simple inventions is evident from the cases cited under §§ 253, 254, etc., *ante*. That in mechanical combinations at least, the characteristics of an equivalent differ from those of an equivalent in simple inventions is apparent from § 254,

and the mode of application which it represents, can finally

ante, and cases there referred to. This difference has led to some general statements that the doctrine of equivalents is not fully applicable to combinations. Thus in Sands *v.* Wardwell (1869), 3 Clifford, 277, Clifford, J.: (282) "Technical equivalents do not belong to a mere combination of old elements. Such a combination is regarded merely as an improvement upon what was before known, and which, without such new combination, would have belonged to the public. Inventors of such improvements, if their rights are secured by letters-patent, may treat all others as infringers who make, use, or vend to others to be used, any and every subsequent combination of those elements not substantially different; and no such subsequent combination is substantially different merely because the person constructing a machine under it employs a different device for one of the elements, provided such device was, at the date of the first patent, a well-known substitute for such omitted element. Other inventors may secure valid patents for subsequent combinations of the same elements, provided the combination is substantially different and the invention produces a new and useful result; but no person can be treated as an infringer who does not use all of the elements of the first combination, unless the change is merely formal or colorable, as every subsequent combination is which is not substantially different; and no subsequent change can be regarded as substantially different merely because it drops one of the elements of the one patented and employs in its stead another, which, though different in form, was well known at the date of the patent as a common substitute for the element so dropped."

In Roberts *v.* Harnden (1865), 2 Clifford, 500, Clifford, J.: (504) "The property of the first inventor consists in the new combination he has made, and to that and its result he is fairly and fully entitled, but he cannot invoke the doctrine of equivalents to suppress any other improvement which does not embrace his improvement, and which is substantially different. Formal differences or colorable evasions, however, are not sufficient to confer any right as against the first patent, but the patentee and all those claiming under him will treat all such as culpable infringements."

All this class of statements, nevertheless, recognize that equivalent elements in combination are legally the same elements. For further cases to the same effect, see Williams *v.* Boston & Albany R. R. Co. (1879), 16 O. G. 906; 17 Blatch. 21; 4 Bann & A. 441; Fuller *v.* Yentzer (1876), 94 U. S. 288; 11 O. G. 551; Locomotive Engine Safety Truck Co. *v.* Erie Railway Co. (1872), 10 Blatch. 292; 3 O. G. 93; 6 Fisher, 187; and cases cited under §§ 254, 258, *ante*.

That any substantial change in the character of the elements of a combination makes the combination a different invention, see Hale *v.* Stimpson (1865), 2 Fisher, 565.

The effects of various changes in the elements of a combination is well described by Shepley, J., in Maynadier *v.* Tenney (1877), 2 Bann. & A. 615. The learned judge says: (616) "Under these circumstances this being [a combination], it was competent for any person to do three things: He might, in the first place, dispensing with one of the elements of that combination in its precise form, introduce into it a known equivalent, . . . equivalent in the sense that in that combination it was the use of another well-known device, performing the same operation in the same way. That would be a naked infringement. It was competent, secondly, for a person

exhaust the field of inquiry by reaching a result as certain as physical science can attain.[2]

to make the change in the machine by introducing, in the place of any one of the elements of that combination, another device not known before as an equivalent device; that would not be an infringement under the decisions of the Supreme Court, which say it is not an infringement where the device substituted was not a known equivalent at the date of the patent. It was competent, in the third place, for a party desiring to change the features of the machine, to substitute for one of the elements in the combination features which should accomplish the same result by the same mode of operation that this element accomplished; and which, in addition to it, should perform some other function which was novel and useful. That, without being a naked infringement, would be the subject of a patent for an improvement, in consequence of the additional new features which it introduced, but would still be subject to the original patent, having embodied in it that which was novel and useful in the original combination."

[2] That one combination of elements is not identical with another combination of the same elements, see Otis Bros. Mfg. Co. *v.* Crane Bros. Mfg. Co. (1886), 27 Fed. Rep. 550; Pattee *v.* Moline Plow Co. (1881), 22 O. G. 173; 10 Bissell, 377; 9 Fed. Rep. 821.

That unless the co-operative laws of two combinations are the same, the combinations are distinct, notwithstanding the identity of their elements, see Dederick *v.* Cassell (1881), 9 Fed. Rep. 306; 20 O. G. 1233; 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; Haberman *v.* Whitman (1880), 5 Bann. & A. 530; Lyman Ventilating & Refrigerator Co. *v.* Lalor (1874), 12 Blatch. 303; 6 O. G. 642; 1 Bann. & A. 403; Murray *v.* Clayton (1872), L. R. 7 Ch. Ap. 570.

That the arrangement of the same elements under a different co-operative law, though producing the same results, is a different combination, see Railway Register Mfg. Co. *v.* Third Avenue R. R. Co. (1887), 42 O. G. 379.

That a mere difference in the relative position of the elements may produce a new combination, by creating a difference in their mode of co-operation, see Fitch *v.* Bragg (1881), 20 O. G. 1589; 8 Fed. Rep. 588; Haberman *v.* Whitman (1880), 5 Bann. & A. 530; Adams *v.* Joliet Mfg. Co. (1877), 12 O. G. 93; 3 Bann. & A. 1; Fuller *v.* Yentzer (1876), 94 U. S. 288; 11 O. G. 551; Gilbert & Barker Mfg. Co. *v.* Walworth Mfg. Co. (1876), 9 O. G. 746; 2 Bann. & A. 271; Carstaedt *v.* U. S. Corset Co. (1875), 13 Blatch. 119; 9 O. G. 151; 2 Bann. & A. 119; Calkins *v.* Bertraud (1875), 6 Bissell, 494; 9 O. G. 795; 2 Bann. & A. 215; Gilbert & Barker Mfg. Co. *v.* Tirrel (1874), 12 Blatch. 144; 1 Bann. & A. 315; 8 O. G. 2; Woodward *v.* Dinsmore (1870), 4 Fisher, 163.

That changes in the arrangement of the elements do not change the combination unless they also change its function or the function of an element, see Phipps *v.* Yost (1886), 26 Fed. Rep. 447; Dederick *v.* Whitman Agricultural Co. (1886), 26 Fed. Rep. 755; 36 O. G. 571.

That where the ideas of means embodied in two combinations are the same, the combinations are identical whatever other differences exist, see Howe *v.* Williams (1863), 2 Clifford, 245; 2 Fisher, 395.

The principal questions in which a comparison of two or more combinations is involved are three: (1) Whether a

SECTION VI.

OF THE NOVELTY OF INVENTIONS: IDENTITY OF ARTS, MACHINES, MANUFACTURES, COMPOSITIONS OF MATTER, DESIGNS, AND IMPROVEMENTS.

§ 283. Identity of Inventions of Particular Classes.

With the exception of compositions of matter, inventions of every species may be either simple or compound; and

given combination is anticipated by a prior combination; (2) Whether a patented combination is infringed by a later combination; (3) Whether, in view of previously existing combinations, a new combination has originated in inventive skill. Each of these questions requires the consideration of the identity of two or more combinations, and to that extent all are answered in the same manner. But each also requires the consideration of matters peculiar to itself, and in reference to these matters the answers may be widely different. It is essential, in reading the decisions in which the identity of combinations is discussed, to remember that the declarations of the courts in one class of cases are not always applicable to the others.

which is essential to the issue of a patent.

1. A combination is anticipated by another whenever the same elemental means or their known equivalents, united under the same co-operative law, have been in prior use in this country or have been patented or described in a printed publication either at home or abroad. In this case it is immaterial whether the prior combination was patented or not, or whether it existed as a separate and independent means, or merely as a subordinate part of a larger combination; the possession of it by the public in any form recognizable by them, deprives the later combination of that legal novelty

2. A combination is infringed whenever the elements described in the patent, or their known equivalents, united under the co-operative law also therein described, are made, used, or sold, without the permission of the patentee. In this case the real nature of the combination as an invention is of no consequence. Only the exact combination described and claimed in the patent is capable of infringement, and any variation in the elements or the co-operative law which leaves the claimed combination unappropriated does not invade the rights of the patentee. The use of less than all the elements, or the union of the same elements under a different co-operative law, is not the employment of the patented combination; but if the patented combination be taken as a member of new combinations, or be in any manner added to or varied, while still preserving its own means coacting under its own law, the patent is infringed, however great is the improvement in the arts, and however different in other respects the new combination may appear to be.

3. No combination can be a new invention and patentable as such unless it is the fruit of inventive skill. A substantial difference between combinations does not, therefore, show that the later

as in these the indications of identity and the methods of examination are dissimilar, the first point to be ascertained in any given case is whether the art or instrument is a simple invention or a combination. In considering each species in detail we shall therefore contemplate it both as simple and combined; and since the characteristics of the simple constitute the characteristics of the elements of the combined, they are entitled to the foremost place in our discussion.

§ 284. Identity of Simple Arts.

A simple art is a single act or operation. As the result of an inventive act it is essentially distinct from and independent of the concrete agencies by which it is performed, and can be accurately apprehended only by abstracting it from these, and contemplating it as an idea embodied in an act alone. If we regard the means from the view-point of the end, this act is the first step beyond the proximate effect, and is thus intermediate between the function and the tangible instrument employed in its production. It differs from the function only in that the latter cannot be conceived by the mind apart from some effect actually produced in the object acted on, while the idea of the former is complete when the effect is apprehended as producible by the application to the object of the agencies employed. For this reason, as we have previously seen, an art is the most comprehensive of all species of inventions; and except in the single instance where the act or operation can be performed only by some specific instrument it is superior to all exterior agencies, and may indifferently employ them as its own subsidiary means.

combination is a true invention. Whether the new combination is formed by dropping elements from known combinations, or by adding new elements, or by rearranging existing elements, the question of invention and of patentability is still to be determined by the application of the same tests to which all other supposed inventions are subjected. If the later combination is suggested by the former, or has been arrived at by the gradual development of mechanical knowledge, it is not a patentable invention, however useful or different it may be. And on the other hand, if actually requiring the exercise of the creative faculties for its production it is a new invention, without reference to its degree of deviation from the old. See further on these topics §§ 153–156, 168, 176, 185, 193, 205, 217, 254, 465, 472, 496, 523–528, 670–672, 922–924, and notes.

§ 285. Identity of Simple Arts is Identity of their Essential Factors.

The idea of a simple art includes the subordinate ideas of a force, an object, and a mode of application; and any given art may belong to either one of those three great classes of inventions whose differences depend on the relation of the inventive act to each of these subordinate ideas. As the most comprehensive of inventions, an art may either be a force applied, a mode of application, or a specific force directed in a specific manner toward a specific object; and the attributes essential to its identity vary in character and number according to the class in which it is embraced. Thus arts which are mere modes of application, capable of employing various forces and of producing their effects on various objects, have few essential attributes, sometimes perhaps but one, and hence are wider in their scope, and of more universal adaptation than any other operative means. An art which is a force applied, employing a particular force in a particular manner, has more essential attributes, and therefore is of narrower scope and a more limited utility. And one consisting in the application of a specific force in a specific manner to a specific object possesses the most numerous essential qualities, and hence is more restricted in its scope and usefulness than any other species of invention. To ascertain the essential characteristics of an art, it is therefore necessary, first of all, to determine to which of these three great classes it belongs; thus fixing the number and nature of those attributes which have resulted from the inventive act and are embraced in its idea of means. If it be found to be an act applying force, without reference to particular forces or particular objects, its characteristics must be sought only in the method in which it is performed, in the degree, direction, or order in which through it the forces are applied. If it prove to be a force applied, its attributes include, not merely the essential qualities of the mode of application, but those of the force also, as employed in that peculiar operation. And if it be the application of specific forces in a specific manner to specific objects, those qualities of the object which render it susceptible to this specific influence, as well as those of the

force and application, become essential qualities of the invention, no one of which can be removed without destroying its identity.[1]

§ 286. Identity of Simple Arts Determined by Relegating Each to its Proper Group and Comparing their Essential Factors.

The method of comparing simple arts with one another is thus clearly indicated. The exact idea embodied in each art is first to be distinguished by excluding from the mind every conception which pertains merely to the concrete instrument on one side, or to the function of the means upon the other. Each art is then to be referred to its appropriate class, as denoted by that one or more of its subordinate factors in whose discovery the inventive faculties have been employed. If the two arts belong in separate classes, they are essentially distinct, though one may be included in the other. If both are of the same class, a comparison of the subordinate ideas, in which the essential qualities of each reside, is necessary. In one class the two arts will be the same when the same act is performed in the same manner, whatever be the nature of the force or object.[1] Arts of another class will be identical only when both apply the same force by the same methods to their several objects. And in the third class, unless they direct the same force on the same object through the same mode of application, they differ in their substance and each is a complete and separate invention.

§ 285. [1] That in a process a similar substance is one which acts or is acted on in the same way, see American Wood Paper Co. *v.* The Fibre Disintegrating Co. (1868), 3 Fisher, 362; 6 Blatch. 27.

§ 286. [1] That when an inventor has discovered that the obstacles encountered in a chemical process are due to certain impurities present in the ingredients, and has devised a method of removing them, any other method of removing the same impurities from the ingredients is the same improvement in the chemical process, see United Nickel Co. *v.* Harris (1878), 17 O. G. 325; 15 Blatch. 319; 3 Bann. & A. 627.

That the identity of two processes may be inferred from the chemical identity of their results, see Pickhardt *v.* Packard (1884), 22 Fed. Rep. 530.

See also §§ 107, 170, and notes, *ante*.

§ 287. Identity of Combination Arts.

An art may be a combination of two or more simple arts.[1] In that case its identity depends on the identity of its constituent elements, on the identity of their co-operative law, and on the identity of the essential characteristics of the combination taken as a whole. The identity of its constituent arts is ascertained according to the method described in reference to simple arts. The essential qualities of its co-operative law are indicated by the effect produced by each constituent art upon the function of the others and upon their common object. The attributes of the combination, taken as a whole, are manifested by the mode in which it operates upon the common fabric or material in the production of the ultimate result.

§ 288. Identity of Combination Arts Determined by Comparing their Elements, Co-operative Laws, and Essential Attributes.

The comparison of two compound arts thus consists in ascertaining whether both are constituted by the union of the same elemental arts, or their equivalents, under the same co-operative law, and operate in the same manner to produce the same results. Diversity in either of these three particulars is fatal to the identity of the arts compared.[1] The

§ 287. [1] That a new process may braced in two otherwise identical processes makes them essentially different processes, see Cotter *v.* New Haven Copper Co. (1882), 13 Fed. Rep. 234; 23 O. G. 740.

That a difference in the proportions of ingredients used in two chemical processes does not make the processes different, if the ingredients discharge the same functions and accomplish the same results in both processes, see Rumford Chemical Works *v.* Lauer (1872), 10 Blatch. 122; 5 Fisher, 615; 3 O. G. 349.

That an art may be the same, though the order of its acts varies, and its apparatus is changed, see Hammerschlag Mfg. Co. *v.* Bancroft (1887), 32 Fed. Rep. 585.

See also § 170, and notes, *ante*.

consist of a combination of old processes, see Wallace *v.* Noyes (1882), 13 Fed. Rep. 172; 21 Blatch. 83; 23 O. G. 435; Cannington *v.* Nuttall (1871), L. R. 5 H. L. 205; Bovill *v.* Keyworth, (1857), 7 El. & B. 725.

§ 288. [1] That a process from which one element of another and otherwise identical process is omitted is a different process, see Lawther *v.* Hamilton (1888), 42 O. G., 487; Arnold *v.* Phelps (1884), 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 any substantial difference between any of the subordinate arts em-

omission from one combination of a single art which is a constituent element in the other; or any change in the degree or order or direction of any elemental art by which a variation is introduced into the co-operative law; or the addition of a new art performing functions not discharged by any in the old; or the substitution of new elements which are not true equivalents for those whose place they seem to occupy, — renders the arts essentially dissimilar, requiring for each its own inventive act.

§ 289. Identity of Simple Machines.

A simple machine is a machine composed of parts which are not, in themselves, complete machines. The idea which it embodies necessarily includes the subordinate ideas of a force, an object, and a mode of application; but the inventive act by which it is created usually relates only to the latter, and in such cases the concrete machine expresses that idea alone. Still there may be machines which generate the force that they apply, and others, possibly, which represent the specific application of a specific force to a specific object. These would be, however, rather arts than mere machines, involving the invention of something more than the mechanical apparatus by which the force and object were connected, and never could be fully covered by a patent for the instrument employed, unless by that instrument alone the force could be united with its object. But to whichever of these classes an individual machine belongs, it may be properly considered as a mode of operation embodied in tangible materials, and its essential characteristics are those by which it is enabled to perform its functions according to the structural law imposed on it by its inventor. To ascertain these it is only necessary to exclude from contemplation every part of the machine which is not indispensable to the performance of its functions, and by observing what remains in actual operation, determine at once the number and the nature of its integral parts, and the attributes and limitations of its structural law.

§ 290. Identity of Simple Machines Determined by Identity of Essential Parts and of Structural Laws.

Practically difficult as the comparison of two machines may be, even to persons who possess the widest experience and the highest industrial skill, the rules which govern this comparison and its results are easily intelligible. The first subject for examination is the function of each machine, and if diversity be here discovered the conclusion that the two machines are not the same becomes inevitable.[1] If their functions prove to be identical two points remain to be considered; the number and the nature of their essential parts, and the character of their respective structural laws. If the integral parts of each are interchangeable with those of the other without disturbance of its functions, these parts are mere equivalents, and therefore legally identical; and being thus identical, if each essential part of each machine performs its office in the same order and direction and degree as its equivalent in the other, the structural law of each must also be the same.[2] The

§ 290. [1] In Gottfried *v.* The Phillip Best Brewing Co. (1879), 17 O. G. 675, Dyer, J.: (684) "In Rice *v.* Heald (13 Pac. L. R. 34), the court said that no machine can be an anticipation of the patented invention which could not be made to produce, without altering its construction, substantially the same results as were produced by the patented machine. Any prior machine which would not produce substantially the same results as the one patented could not be substantially the same machine, no matter how strongly the prior machine may resemble the patented machine in its construction." 5 Bann. & A. 4 (34).

Further, that difference of function or effect indicates substantial difference in the machines, see Barber *v.* Hallett (1879), 20 O. G. 449; 10 Fed. Rep. 130; Johnson *v.* Root (1858), 1 Fisher, 351; Brooks *v.* Bicknell (1844), 3 McLean, 432.

That differences in the excellence, rapidity, or economy of the action of two machines may denote essential differences in their real character, see Gallahue *v.* Butterfield (1872), 2 O. G. 645; 10 Blatch. 232; 6 Fisher, 203; Seymour *v.* Marsh (1872), 6 Fisher, 115; 9 Phila. 380; 2 O. G. 675; Johnson *v.* Root (1858), 1 Fisher, 351.

That whether the new result arises from a change in the parts of the machines, or in their mode of operation, it still indicates substantial difference in the machines, see Cornell *v.* Downer & Bemis Brewing Co. (1877), 7 Bissell, 346; 11 O. G. 331; 2 Bann. & A. 514; Turrill *v.* Illinois Central R. R. Co. (1867), 3 Bissell, 66; 3 Fisher, 330.

But that the new result must be produced by changes in the machine itself, not by mere difference in its mode of use, see Boston Elastic Fabrics Co. *v.* East Hampton Rubber Thread Co. (1874), Holmes, 372; 5 O. G. 696; 1 Bann. & A. 222.

[2] That where the same or equivalent parts operate in the same manner in the two machines to produce the same ef-

determination of either of these points assists in the decision of the other. Where two machines, the integral parts of each of which are equivalents for those of the other, perform the same function, it is measurably certain that the structural laws of both will be the same; and conversely, when two machines perform the same functions and are governed by the same structural law, their integral parts are almost always, if not always, interchangeable, however widely they appear to differ from each other.

§ 291. Identity of Combination Machines.

A compound machine consists of two or more simple machines united under a co-operative law. Its identity is conditioned upon the employment of the same elemental machines in the same co-operative union, with the same function and the same ultimate effect.[1] Hence, the withdrawal of any one of these constituent machines, or the substitution for it of another which is not its true equivalent, or an alteration in it which changes its essential character as an operative means, or the addition of a new subordinate machine, — destroys the former combination and creates another and a different ma-

fect, the two machines are the same, see Holly *v.* Vergennes Mach. Co. (1880), 4 Fed. Rep. 74; 18 Blatch. 327; 18 O. G. 1177; Blanchard *v.* Puttman (1867), 3 Fisher, 186; 2 Bond, 84; Cahoon *v.* Ring (1859), 1 Fisher, 397; 1 Clifford, 592; Sickels *v.* Borden (1856), 3 Blatch. 535; Foss *v.* Herbert (1856), 1 Bissell, 121; 2 Fisher, 31; Blanchard *v.* Beers (1852), 2 Blatch. 411; Parker *v.* Stiles (1849), 5 McLean, 44; Brooks *v.* Bicknell (1844), 3 McLean, 432.

On the contrary, that a substantial difference, either in structure or in mode of operation, shows that the two machines are essentially distinct, see Stebbins Hydraulic Elevator Mfg. Co. *v.* Stebbins (1880), 17 O. G. 1348; 4 Fed. Rep. 445; Wicke *v.* Ostrum (1880), 103 U. S. 461; 19 O. G. 867; Clarke Patent Steam & Fire Regulator Co. *v.* Copeland (1862), 2 Fisher, 221; Tatham *v.* Le Roy (1852), 2 Blatch. 474.

§ 291. [1] That a machine combination is the same when it embodies the same idea, though it be different to the eye, see Smith *v.* Higgins (1859), 1 Fisher, 537.

See also §§ 173–175, 178, 179, and notes, *ante*.

That where the elements, their function, mode of operation, and result remain the same, no change in form or proportion can change the essence of the combination, see Storrs *v.* Howe (1876), 4 Clifford, 388; 10 O. G. 421; 2 Bann. & A. 420; Case *v.* Brown (1864), 2 Wall. 320; Howe *v.* Williams (1863), 2 Fisher, 395; 2 Clifford, 245; Foss *v.* Herbert (1856), 2 Fisher, 31; 1 Bissell, 121; Winans *v.* Denmead (1853), 15 How. 330; O'Reilly *v.* Morse (1853), 15 How. 62.

chine. So also when, although the elements remain the same in substance, their rearrangement or some formal variation in themselves disturbs their previous relations to each other, and thus introduces a new co-operative law; or where, if this can be mechanically possible, with unchanged elements and the same co-operative law the combination as a whole assumes a different character and performs different functions or the same functions in a different manner, the conditions of identity are defeated and the combination is itself destroyed.

§ 292. Identity of Combination Machines Determined by Comparing their Elements, Co-operative Laws, and Essential Attributes.

In comparing two compound machines whose functions are identical, the mode of operation of each combination as a whole is first to be examined. If these are found to be the same, the elements of each and their co-operative laws are next to be considered. If one embraces more constituent machines than does the other, or if their elements are not equivalent according to the rule which governs these in combinations, or if the influence which each exerts upon the rest in one is not the same which it exerts upon them in the other, whether this difference results from differences in the size, capacity, material, or arrangement of the elements themselves, the two machines are not identical.

§ 293. Identity of Simple Manufactures.

A manufacture is any instrument other than a machine, a composition of matter, or a design. It may be either simple or compound. If it is simple, the parts of which it is composed, although each in its separate state may be a complete and operative instrument, lose their identity of character and function when united in the manufacture, and exist only as integral members of its one idea of means.[1] In a simple manu-

§ 293. [1] This attribute of a simple manufacture has sometimes been overlooked by the courts, and patentability thus denied to meritorious inventions on the ground that the parts of which they were composed did not coact in the production of a unitary result. It cannot be assumed that every assemblage of parts, even though each part in its separate state be an operative means,

facture, therefore, no qualities are essential except those without which the idea of means embodied in it could not be expressed; and the presence of these qualities is often found consistent with the widest diversities in shape, size, capacity, arrangement, and materials, as well as in the method of its use and the perfection with which it accomplishes its results. The exclusion of these merely formal variations, and the consequent reduction of the concrete instrument to its necessary attributes, at once determines its real character and defines the scope of the inventive act from which it sprang.

§ 294. Identity of Simple Manufactures: Manufacture generally a "Mode of Application."

Although the inventor of a manufacture must necessarily have conceived the three ideas of force, of mode of application, and of object, yet rarely, if ever, does his complete invention represent a new idea of either force or object. A true manufacture is generally, perhaps always, a mere mode of application. The force which it applies is derived from sources exterior to itself, and may be independently varied, both in character and quantity, without affecting the nature of the instrument through which it operates. The objects upon which its functions are performed also lie outside the scope of the invention, and however they may differ among themselves, neither require nor indicate a change in the essential attributes of the instrument to which they are subjected.

purports to be a combination; and hence that it is not to be regarded as a true invention unless it endures the tests applied to patentable combinations. Where the several parts still perform their individual functions, the union constitutes either a combination or an aggregation; the former if they co-operate; the latter if their operation is several and distinct. But where the different parts cease, when united, to perform their individual functions, and become merged in the manufacture as a whole, the patentability of the instrument is not to be judged by the rules governing combinations but by the novelty and utility of the instrument itself and the inventive skill employed in its production. The arrangement of numerous tools upon a single handle may thus be an invention, if new and useful and resulting from inventive skill, though no two of the tools can be used at once or for the same purpose, — the real invention consisting, not in the "combination of functions," but in the shape or proportions of the handle, and the mode in which the tools are located thereon.

When an inventor has discovered that specific forces may be made available through a specific instrument, or that the qualities of a specific object render it susceptible to certain forces when applied through a specific article, his real invention is an art, not a mere manufacture, by whatever name he may himself entitle or describe it. If his instrument is old, its new use does not change its nature nor endow it with new properties; if it is new, his use of it is one invention and the instrument itself another, unless the use and instrument are so related that by no other instrument the same use could be served.

§ 295. Identity of Simple Manufactures: Danger of Being Misled by Diversity of Use.

In comparing simple manufactures with each other, care, therefore, must especially be taken lest the examiner be misled by a diversity of use, as well as by the formal differences which the two instruments present. All manufactures are identical which, when used in connection with the same force and in reference to the same object, produce the same effect upon the object by the same method of applying the force. That one is customarily employed upon a different class of objects, or as a medium for a different class of forces, from the other indicates no essential distinction between them, if without alteration in the instrument itself, or by mere formal variations in its size, capacity, or other attributes, each could employ the forces and perform the functions usually regarded as peculiar to the other. Beneath these accidents of tangible embodiment always lies the substance of the invention, — that idea among whose essential characteristics nothing is embraced which is not indispensable to the production of the desired effect through this specific method of applying force. And while this principle is as correct and true in reference to machines as to manufactures, yet in considering the latter it should be particularly remembered, since, being not only mere modes of application but also destitute of structural law, they are of wider scope than any other class of instruments, having the fewest necessary attributes, and consequently are most liable to be mistaken for each other.

§ 296. Identity of Simple Manufactures Determined by Comparing their Integral Parts.

Whenever, having reconciled these differences of customary use and excluded formal variations, the functions of two simple manufactures are perceived to be the same, their identity or diversity may be determined by comparing their integral parts and the office which they fill in each invention. This comparison consists principally in an application of the doctrine of equivalents. If the integral parts of each instrument are the equivalents of those which constitute the other, the instruments themselves must be the same. A simple manufacture is either a single substance, or a group of substances whose members are so collocated that the whole is capable of being used for certain purposes, according to the will of its employer. Having no *modus operandi*, no intrinsic structural law, its identity resides solely in those qualities of its constituent substances which are involved in the performance of their functions, and which have been so brought together in the invention as to unite in the one quality or set of qualities by which its ultimate effects are produced. Hence when a manufacture is composed of a single substance, any other substance having the same qualities is its equivalent and constitutes the same invention. And in a group of substances, any change which removes some of its constituent members and replaces them with others, manifesting in the same collocation the same operative attributes, is a mere substitution of equivalents, and leaves the individuality of the invention undisturbed. When the apparent differences between two manufactures can be thus accounted for, their identity may be regarded as established.

§ 297. Identity of Simple Manufactures: Slight Differences Important.

Where each of the two manufactures consists of a single substance, diversities, otherwise formal, are sometimes of the most essential character. In such cases the idea itself may be, and often is, expressed by the mere shape given to the substance by the inventor, or by the proportions of one part to another, or even by the nature or the quality of the ma-

terials of which it is composed. Slight differences in these respects may thus indicate an entire difference in the method of applying force, and hence a radical distinction between the two inventions. In a less, but still a great, degree this is true of simple manufactures composed of several substances. As these, when united, constitute, for nearly all the purposes of the complete invention, but a single substance, the method in which they perform their functions usually depends, to a considerable extent, on their possession of those qualities which, in most other species of inventions, are regarded as pertaining not to substance but to form.

§ 298. Identity of Combination Manufactures.

A compound manufacture consists of two or more simple manufactures united under a co-operative law. Practically, most manufactures, however simple in appearance, are really combinations, — each elemental instrument preserving in the compound instrument its distinctive character and performing its distinctive function, though co-operating with the others in producing the common result. The identity of such a combination resides in the identity of the simple manufactures of which it consists, in the identity of its co-operative law, and in the identity of the resultant qualities inhering in the combination as a whole. Hence, as in other combinations, the withdrawal or substantial alteration of any one of its constituent elements, or the addition of an element which introduces a new function or performs the old by operations essentially distinct from those by which it has been previously accomplished, or the rearrangement of existing elements under a different co-operative law, or any variation in the combination as a whole which changes its method of applying force to the common object, is fatal to its identity, and brings into existence a different invention.

§ 299. Identity of Combination Manufactures: Determined by Comparing their Elements, Co-operative Laws, and Essential Attributes.

The comparison of two manufactures, each of which is a combination performing the same functions by the same

method of applying force, requires, first, an examination of their elemental manufactures; and second, the detection of their co-operative laws. To analyze a compound manufacture, and distinguish its essential elements from one another, is a task often attended with much difficulty; partly because so many manufactures, apparently the most simple, are in reality combinations; partly because its individual elements, being characterized by no inherent *modus operandi*, or structural law, depend for their identity upon the presence of qualities which as to other species of inventions would be merely formal. An equal difficulty is experienced in the endeavor to discover their co-operative law. When several arts or machines are brought together and set in operation by the application of the impelling force, it is generally easy to determine whether each performs only its appropriate function according to its own interior law, or whether in addition it so influences the action of the others that new modes of operation and new functions are created. But in a manufacture not only the impelling force but the directing law lies outside of the instrument itself; and the true question is not simply whether, when employed in one mode or for one purpose, the different elements coact upon each other or their common object, but whether they are capable of any use in which this mutual co-operation is developed. In other words, whether a manufacture composed of other manufactures is a true combination, or a mere aggregation having no co-operative law, is not to be decided by the mere inspection of the instrument itself, either when idle or employed in one or more especial occupations, but by referring it to all the uses of which it is capable, and ascertaining if in any one of these the instrument, though as to all the others destitute of a co-operative law, is as to this a unit or a simple aggregation. But when these difficulties are removed, the comparison of two compound manufactures is readily accomplished. If all the elements in each are the equivalents of those in the other, and are so arranged in each as to be subject to the same co-operative law, the manufactures are the same, not otherwise. And here, as elsewhere, the inference is almost irresistible that, given the same elements and the same characteristics in each combination taken as a

whole, the methods of interior co-operation are the same; and on the other hand, that where the combinations exhibit the same methods of applying force, and their constituent elements are under the control of the same co-operative law, the elements themselves must be identical.[1]

§ 300. Identity of Compositions: Compositions Governed by Peculiar Rules.

A composition of matter, though generally regarded as a combination, is governed by rules peculiar to itself. It is composed of ingredients each of which, in its separate state, is an operative means, and its own properties are the result of the co-operation of these elemental means upon each other and upon the objects to which, while united in the composition, they may be applied. But when thus intermingled, the individuality of these constituent elements, though not so far destroyed as to be irrecoverable by mechanical or chemical analysis, is in most cases removed from human observation, and it becomes impossible to ascertain whether, while in the composition, each ingredient operates according to its individual law, and in addition thereto performs new functions in connection with, or in consequence of its association to, the others, or whether its entire original properties are for the time being lost, and the new composition thus becomes a simple substance endowed with properties resulting from the mixture of these separate elements in one. While, therefore, since a composition of matter is formed by uniting certain existing well-known elements which in themselves are operative means, the rules which govern it must in some respects resemble those controlling ordinary combinations; in others, on account of the impossibility of pushing any method of analysis far enough to determine the real character of its constituent elements or the true mode of their co-operation with each other in the composition, these rules are similar to those which are applied to simple arts and instruments.[1]

§ 299. [1] See § 184–189, and notes, *ante*, as to the various points involved in the identity of simple and combination manufactures.

§ 300. [1] See §§ 192–195, 254, 282, and notes, *ante*.

§ 301. Identity of Compositions Depends on Identity of Elements, of Co-operative Laws, and of Essential Attributes.

A composition of matter is a force applied. The existence of this force depends upon the union and co-operation of certain other forces which are manifested through the properties of the individual ingredients. The inventive act by which the composition is created thus consists in the discovery of the ability of these elemental forces to unite in the production of the new force, and the contrivance of such a method of commingling them as will develop the new force desired. The scope of this inventive act indicates the scope of the invention. The invention is not the resulting composition alone, without reference to the ingredients from which it is compounded or to the method of their intermixture. Nor is it solely the group of elements, without regard to the mode by which they are united or the characteristics of the substance in which they result. Nor is it the mere process of commingling, apart from the ingredients employed and the nature of the compound thus produced. The invention is a substance possessing certain properties and formed by uniting certain other substances in a peculiar manner. Its identity depends upon the identity of its constituent elements, upon the identity of their co-operative law, and upon the identity of the properties exhibited in the composition as a whole.[1] In this respect it

§ 301. [1] That where one composition of matter contains ingredients which are neither present nor represented by equivalents in the other, the two are essentially different, see Rogers *v.* Ennis (1878), 14 O. G. 601 ; 15 Blatch. 47 ; Tarr *v.* Folsom (1874), 1 Bann. & A. 24 ; 5 O. G. 92 ; Holmes, 312.

But that the absence from one of substances which are included in the other, but perform therein no ingredi-ental function, does not make the compositions distinct, see Klein *v.* Russell (1873), 19 Wall. 433.

That though the substances of which two compositions are composed are different in themselves, yet if they serve the same purposes in the two compositions, the compositions may be the same, see Francis *v.* Mellor (1871), 5 Fisher, 153 ; 1 O. G. 48.

That a composition of matter consisting of certain substances of a given quality, intermixed in a specific manner and possessing certain properties, is not identical with a composition formed of the same ingredients without reference to quality or mode of intermixture, and not possessing the same properties, see Muntz *v.* Foster (1843), 2 Web. 93, 96.

That where the same or equivalent ingredients are united under the same co-operative law, and the resulting compositions have the same properties, these compositions are the same, see Goodyear *v.* Berry (1868), 2 Bond, 189 ; 3 Fisher, 439.

See also § 196, and notes, *ante*.

resembles a true combination; and like other combinations, its identity is lost by the removal or substantial change of any of its elements, or by the introduction of a new ingredient which calls into activity some elemental force hitherto absent or inoperative, or by the union of its present elements under a new co-operative law.

§ 302. Identity of Compositions: Identity of Elements Assumed when their Functions are Identical.

But when the question of the identity of its constituent elements and of their co-operative law arises, the rule of combinations can be no longer strictly followed. Elements of a combination are identical only when, in their individual character, they are the same operative means; not merely furnishing to the combination the same subordinate function, but performing this by the same mode of operation. But in a composition of matter such a test is not always practicable. In some mechanical compositions, the individuality of whose ingredients is not wholly obscured, and which on that account might more properly be regarded as manufactures than compositions, the method in which each ingredient performs its office in the combination is discernible; and in such cases the identity of their constituent elements depends both on identity of function and identity of means. In other mechanical and all chemical compositions, however, the individuality of the ingredients is lost, and though it may be known that each ingredient furnishes to the compound a specific elemental force, the essential character of the ingredient as an operative means, and the method by which it performs its functions in the combination, may be entirely undiscernible. In cases of this character, the rule that elements are to be regarded as the same only when they serve the same purpose in the combination, by the same method of applying force, would be both useless and unreasonable. The law requires no further certainty than science can afford, and when no evidence of the identity of two ingredients can be obtained, except that they perform the same function in the composition, this evidence is accepted as sufficient and the ingredients are held to be the same. The doctrine of equivalents, in reference

to compositions of matter, thus differs according to the nature of the composition and the state of scientific knowledge. In compositions, where the mode in which the individual ingredients furnish to the composition the required elemental force is ascertainable, equivalence is determined by the rule which governs other combinations; otherwise, the rule followed is that applied to simple arts and instruments, and all ingredients are equivalents which, at the date of the patent, were known as possessing properties that in the given composition make them interchangeable.[1]

§ 303. Identity of Compositions: Identity of Co-operative Laws Assumed when Effect of Combining Elements is Identical.

The same diversity of rule obtains in reference to their co-operative law. In compositions where the mode of action of the individual ingredients can be detected after their union in the combination, the law of their co-operation is also usually perceptible and can be considered as an independent factor in determining the identity of the composition as a whole. But in those compositions where the individuality of the ingredients vanishes in the intermixture, and their mode of action can be ascertained only through the functions they perform, nothing is able to be known concerning their co-operative law, except that when grouped in a certain manner they will co-operate in the production of a given resul ; and the co-operative law must therefore be regarded as the same in every grouping of the same ingredients which manifests the same resultant force. In compositions of the former class, although the ingredients remain unchanged and the entire composition still possesses the same properties, by some change in the

§ 302. [1] That one ingredient in a chemical combination is the equivalent of another when each fulfils the same office in the combination, and was known as such at the date of the patent, see Bridgeport Wood Finishing Co. *v.* Hooper (1880), 5 Fed. Rep. 63; 18 Blatch. 459; 20 O. G. 156; Wonson *v.* Gilman (1877), 2 Bann. & A. 590; 11 O. G. 1011; Roots *v.* Hyndman (1873), 6 Fisher, 439; 4 O. G. 29; Woodward *v.* Morrison (1872), 2 O. G. 120; Holmes, 124; 5 Fisher, 357; Rumford Chemical Works *v.* Lauer (1872), 10 Blatch. 122; 5 Fisher, 615; 3 O. G. 349; Poppenhusen *v.* Falke (1862), 2 Fisher, 213; 5 Blatch. 46; Matthews *v.* Skates (1860), 1 Fisher, 602; Goodyear *v.* The Railroad (1853), 2 Wall. Jr. 356; 1 Fisher, 626.

processes of intermixture a variation may take place in their co-operative law, and a new composition thus be substituted for the old. But in the latter class no alteration in the method of co-operation can be contemplated. Though possible, it is not practically ascertainable, and therefore is regarded as impossible; and hence no change in the proportions of ingredients or in their mode of union can disturb the identity of the composition as a whole, while its resultant properties remain unchanged.

§ 304. Identity of Compositions Determined by Comparing their Elements, Co-operative Laws, and Essential Attributes.

In comparing one composition of matter with another, inquiry is first directed to the characteristic properties of each composition as a whole. If these are found to differ the compositions are of course distinct; when they are the same the question as to the identity of their constituent elements is next considered. If the two compositions are of such a character that the mode in which their individual ingredients perform their several functions is discernible, the elements of each are identical with those of the other only when their action and effect are both the same. But in compositions of a different character, the mode of action of their elements being undiscernible, these elements are regarded as identical if known as interchangeable without affecting the essential properties of the entire composition. When the ingredients of both compositions prove to be the same, their co-operative laws are then to be compared. Ingredients and result being identical, a variation here becomes improbable, but cannot be regarded as impossible except in compositions where if it exists it must be undiscoverable, and where on that account its identity is conclusively presumed from the identity of the ingredients and their result. If the ingredients coact in different methods through differences in proportions or in modes of intermixture, a difference in the character of the inventive act is indicated, and the two compositions are two separate inventions. But if, either through research in the former cases or through presumption in the latter, the co-operative laws of both compositions are shown

to be identical, the identity of the two compositions is established.

§ 303. **Identity of Designs: Designs Subject to Peculiar Rules.**

A design is also subject to peculiar rules. The ultimate end proposed by its inventor is the production of a certain impression on the mind through the eye. The proximate end, or function, is the formation on the retina of a certain image. The means employed is such a configuration or ornamentation, imparted to an exterior physical substance, as will reflect light in a certain manner and thus produce the desired image in the eye.[1] In this species of invention there is no room for variety either in the end, the function, or the means. Every configuration, every ornament, which can perform the function, necessarily performs it by precisely the same mode of operation. No matter how diverse in details or arrangement the design may be, if it produces the same image on the retina it does so by directing light upon it in exactly the same manner; and nothing is essential to the performance of its functions except those attributes by which the required directions and reflections of the rays of light can be produced. All variations in a design are, therefore, merely formal, unless they change its character as a director and reflector of light, — that is, unless they change the image which it forms within the eye;[2] and hence the function and the means become the exact measures of each other, neither being capable of alteration without a corresponding alteration in the other, and the identity of one establishing the identity of the other. Furthermore, the image formed upon the retina becomes known only through the impression thereby made upon the mind; and thus the ultimate effect becomes the measure of the function, as the function is the measure of the means. Whatever, then, may be the intrinsic attributes of the shape

§ 305. [1] That a design is the appearance imparted to a substance, and is distinct from the means by which such appearance is produced, see Gorham Mfg. Co. *v.* White (1871), 14 Wall. 511; 2 O. G. 592; 6 Fisher, 94; and cases cited under §§ 201, 203, *ante*.

[2] That designs may be identical though their elements differ, see *Ex parte* Pope (1883), 25 O. G. 290.

That a slight variation in a design does not destroy its identity, see Lehnbeuter *v.* Holthaus (1882), 105 U. S. 94; 21 O. G. 1783.

given to the object to which the design adheres, the essential character of the design itself can be determined only by examining its ultimate effect, and the sole test of its identity thus resides in the impression which it makes upon the mind.

§ 306. Identity of Designs Determined by Comparing their Effect on the Minds of Observers.

In consequence of these peculiarities, whenever two designs are to be compared, the first duty of the observer is to disregard all those particulars of the invention which, in other species, he considers most important. Neither the elements of the design nor their co-operative law, not even their functions, occupy his thoughts. Excluding those, his attention is directed to their ultimate effects alone, and these are studied as the design produces them, not merely in his own mind but within the minds of others, — a task of some uncertainty, but still the only mode to be pursued.[1] If in this method, he dis-

§ 306. [1] In Foster *v.* Crossin (1885), 23 Fed. Rep. 400, Carpenter, J.: (402) "Design, of course, relates solely to the appearance of the article to the ordinary purchaser, and when the question is whether a difference of design be substantial and valuable, surely there can be no test better than the practical test which is furnished by observing the effect of the two designs on the appreciating observation of the purchasing public."

In Tomkinson *v.* Willets Mfg. Co. (1884), 23 Fed. Rep. 895, Coxe, J.: (896): "It is by no means necessary that the patented thing should be copied in every particular. If the infringing design has the same general appearance, if the variations are slight, if to the eye of an ordinary person the two are substantially similar, it is enough. It is of no consequence that persons skilled in the art are able to detect differences. Those who have devoted time and study to the subject, who have spent their lives in dealing in articles similar to those in controversy, may see at a glance features which are wholly unimportant, and unobserved by those whose pursuits are in other directions, and who are attracted only by general appearances. If the resemblance is such that a purchaser would be deceived, it will not aid the infringer to show that he has deviated slightly from a straight line in one place, and from a curved line in another, or that he has added or omitted something which an expert can discover." 32 O. G. 382 (383); 31 O. G. 918 (918).

In Dryfoos *v.* Friedman (1884), 18 Fed. Rep. 824, Wheeler, J.: (826) "As this patent, as before mentioned, does not cover the patterns, the improvements would consist in the design of the arrangement of them on the fabric, advantageously to be divided, for the fabric was not intended for use whole, but only by cutting the patterns apart. The spaces for seams and lines in them to divide by were prominent and important. The appearance of the pieces of fabric, with and without these spaces and lines, might be so nearly the same

covers that the impressions made by the inventions are substantially distinct, the inventions must essentially differ from each other. If, on the contrary, the impressions are the same, the conclusion is inevitable that the inventions are identical.

§ 307. Identity of Improvements: Depends partly on the Character of the Original Invention.

Hitherto we have discussed this question of identity only in reference to generic inventions, — to arts, machines, manufactures, compositions, and designs, which are wholly new or wholly old. Compared with the entire body of inventions these are practically few in number, most inventions being superstructures raised on old foundations, improvements made upon existing means. In these the concrete art or instrument embodies both the old and the new idea of means, the old originating in the inventive act by which the generic invention

that the difference would not attract the attention of a disinterested observer, but it would at once be noticeable to ordinary purchasers or users of such material. The differences in designs necessary to take away their identity in law are understood to be such appearances as would attract the attention of an ordinary observer, giving such attention as a purchaser usually gives. Gorham Co. *v.* White, 14 Wall. 511. This, of course, means purchasers of the articles in question for the purposes for which they were intended and are purchased. A purchaser of these fabrics would ordinarily be a person intending to cut them up and make them into skirts or sell them to others to make into skirts. A purchaser of ordinary observation with that intention would notice at once these prominent facilities for accomplishing those purposes. To such a person the design patented and that used by the defendant would be quite different." 21 Blatch. 563 (565).

That two designs are identical when they present the same appearance to the eyes of ordinary observers, no matter what may be their differences of detail, see Dobson *v.* Dornan (1886), 118 U. S. 10; 35 O. G. 750; Untermeyer *v.* Jeannot (1884), 20 Fed. Rep. 503; Jennings *v.* Kibbe (1882), 22 O. G. 331; 10 Fed. Rep. 669; 20 Blatch. 353; Wood *v.* Dolby (1881), 7 Fed. Rep. 475; 19 Blatch. 214; 20 O. G. 523; Miller *v.* Smith (1880), 5 Fed. Rep. 359; 18 O. G. 1047; Cone *v.* Morgan Envelope Co. (1879), 4 Bann. & A. 107; Perry *v.* Starrett (1878), 3 Bann. & A. 485; 14 O. G. 599; McCrea *v.* Holdsworth (1870), L. R. 6 Ch. Ap. 418. See also §§ 201–207, and notes, *ante*.

That the court may determine the identity of designs by inspection, see Western Electric Mfg. Co. *v.* Odell (1883), 18 Fed. Rep. 321; Jennings *v.* Kibbe (1882), 22 O. G. 321; 10 Fed. Rep. 669; 20 Blatch. 353.

§ 307. [1] In Mills *v.* Scott (1849), 6 U. C. Q. B. 205, Robinson, C. J. (206) defines an improvement as "an improvement in the principle of something which had before been patented."

was created, the new developed from the old by a subsequent exercise of inventive skill.[1] To place before the mind the exact limits of the inventive act by which the later idea was evolved, and thence to ascertain its nature and identity, it thus becomes essential to determine the true character and scope of the original invention, as it stood at the date of this later exercise of the inventor's powers.

§ 308. Identity of Improvements; Whole State of the Art to be Considered.

To ascertain the extent to which the fundamental idea of the invention was developed before this later forward step was taken requires a knowledge of the whole state of the art to which the invention belongs. The inventor of an improvement must be assumed to have possessed this knowledge, and to have contemplated from the point of view afforded by it, not only the end to be accomplished, but the function and the mode of operation of his means. From the same point of view must the examiner consider the improvement, if he would comprehend its purpose and its character, and accurately define the place it fills in the development of the industrial art in which it is embraced.

§ 309. Identity of Improvements: Improvements of Two Classes: in the Means as a Whole; in its Integral Parts.

The end proposed by the inventor of an improvement may reside either in the ultimate effect produced by the invention on its object, or in the method by which the invention operates in the attainment of its usual results. When he endeavors to produce a better ultimate result, all changes which he introduces into the function or the mode of operation of the old invention relate to his development of the idea of means, and if not merely formal, represent his new improvement. When he endeavors to produce the same result in a more economical or speedy manner, all changes in the function or the mode of operation of the old invention are included in the end, and only those alterations in the invention by which these changes in the function or the mode of operation are effected are embraced in his idea of means. Thus in

regard to all generic arts and instruments, two fields for improvement are open to inventors: in one of which the whole idea of the original invention is carried forward, resulting in a wider or more perfect ultimate effect; in the other some subordinate idea alone is developed, creating not a change in the condition of the product, but a change in the condition of the means.[1] To one of these two classes all improvements must belong, and the first step in ascertaining the real character of an improvement is to refer it to its proper class, and thus determine the true scope of its idea of means.

§ 310. Identity of Improvements: Distinctions between Substance and Form.

The end proposed by the inventor of an improvement being ascertained, the examiner should next attempt to discover the essential attributes of his invention, and to distinguish that which is included in its substance from that which relates only to its form. The principle of distinction is the same here as elsewhere. Whatever qualities of the invention are indispensable to the attainment of its end, according to the method of attainment conceived by its inventor, are included in its essence. If he accomplishes a better ultimate effect, every change in the function or the mode of operation which is necessary to the fulfilment of his purpose as he endeavors to fulfil it belongs to the substance of his invention, and the sum of all these changes constitutes his improvement. If he achieves merely a speedier or cheaper mode of operation in the means, only those changes in the details of the art or instrument which are essential to its operation in the speedier or cheaper mode are of the substance of his invention. Hence if two separate inventors, each attempting to produce the same change in the ultimate effect, accomplish it by introducing different changes into the function or the mode of operation of the original means, although both are improvements in the same art or instrument and both improvements fulfil the same purpose, yet as improvements they are separate

§ 309. [1] That an improvement may be made in the structure of an invention as well as in its entire operation, see Sinclair *v.* Backus (1880), 17 O. G. 1503; 4 Fed. Rep. 539; 5 Bann. & A. 81.

inventions. Hence, also, when two variations in the same integral parts, or in the arrangement of integral parts, increase the speed or the economy of the original means, they will be different inventions unless the variations are substantially the same.

§ 311. Identity of Improvements: Improvements how Effected; not Mere Diversities of Use.

The nature of the variations by which an improvement is effected depends upon the species of invention to which the original belongs. An improvement in an art consists in some change in the act or acts of which it is composed, or in the order in which they are performed. Improvements in a simple instrument are made by altering the shape, size, or material of its integral parts, or by a rearrangement of such parts among themselves.[1] Improvements in a compound instrument are introduced by modifying its constituent elements or their co-operative law.[2] But in examining these changes as they are produced in any species of inventions, its fundamental character, as determined by that one or more of its subordinate factors on which the inventive act that gave it birth was exercised, must never be forgotten. To whatever species it belongs, a mode of application cannot be improved by adopting it as the connecting link between another force and object, nor is a force applied improved by a mere change of objects. If these new uses are the fruit of an inventive act and thus escape the limits of a double use, they become new and independent means, and not mere improvements in the means employed. Inventions are improved only by a

§ 311. [1] That an improvement may be made in a machine by merely altering the shape of one or more of its parts, see Williams *v.* Barker (1880), 18 O. G. 243; 2 Fed. Rep. 649.

[2] That an improvement may be made in a combination by changing the shape or capacity of the elements, or modifying their arrangement, see Sharp *v.* Tifft (1880), 17 O. G. 1282; 2 Fed. Rep. 697; 18 Blatch. 132; 5 Bann. & A. 399; Whitney *v.* Emmett (1831), Baldwin, 303; 1 Robb, 567; Foxwell *v.* Bostock (1864), 12 W. R. 723; 10 L. T. Rep. N. S. 144.

But that if any change is made either in the essential character of the elements or in their co-operative law, the result is not an improvement, but a new combination, see Bliss *v.* City of Brooklyn (1873), 3 O. G. 269; 10 Blatch. 521; 6 Fisher, 289; Hale *v.* Stimpson (1865), 2 Fisher, 565.

development of the original idea of means, — that is, by carrying forward the same inventive act from which the original invention sprang; and this occurs only when the process of discovery is further exercised upon the same subordinate factor, whether it be the force, the object, or the mode of application.

§ 312. Identity of Improvements: Character of an Improvement Depends on the Nature and Effect of the Variation in the Old Invention.

The character of an improvement, as an invention, is thus determined by the nature of the variations which produce it when viewed in their relations to the end proposed. A variation in the acts or in their order in an art, affecting only its own mode of operation, is not the same improvement as a variation producing better ultimate effects, however nearly the two variations may resemble one another. And changes in an instrument whereby simply the speed or cheapness of its action is increased, though differing but slightly from the changes which enable it to furnish better products, are not the same improvement as that by which the latter object is attained. This distinction is but another application of the axiom that different effects can only be produced by different means.

§ 313. Identity of Improvements Determined by Comparing their Classes, their Mode of Operation, and their Effect.

Wherefore, in comparing two improvements on the same original invention, the first point for investigation is the class to which they severally belong. If they are of different classes, contemplating and achieving different ends, — the one securing a better ultimate effect, the other only a better mode of operation in the means, — the improvements must necessarily be distinct. If they are of the same class, the precise effect produced by each is then to be considered; for though both are directed toward the ultimate result or toward the mode of operation of the means, the changes which they accomplish in either may be different, and thus a true diversity of ends may still exist, proving a true diversity of means. When in this respect also

the improvements coincide, the variations which they introduce into the idea of the original invention, so far as these are necessary to the fulfilment of their common purpose, require attention, and if these variations are in each substantially the same, the improvements are to be regarded as identical.[1]

§ 314. Identity of Inventions Practically a Subject of Great Difficulty.

The duty of determining the identity or the diversity of inventions, according to the principles discussed in this and the foregoing sections, pertains rather to the expert than to the lawyer or the judge; still, neither judge nor lawyer can properly discharge the functions of his office in connection with inventions unless his own industrial skill and knowledge are sufficient to enable him to understand and follow the inquiries and reasonings of experts, and argue or decide intelligently upon their conclusions. This is the region where nearly all the difficulties of the subject are encountered. It is the field in which originates the greater proportion of contested cases, and which furnishes perennial crops of new and puzzling questions as science and the arts advance together to subdue the earth. In the investigation of the novelty or relative priority of inventions, it proves often a veritable "Slough of Despond;" but when it is once safely crossed, and the identity of the competing arts or instruments is established, all other questions become comparatively easy and their solution definite and sure.[1]

§ 313. [1] That one improvement to an invention may not be identical with another though both produce the same effect, see Otis Bros. Mfg. Co. *v.* Crane Bros. Mfg. Co. (1886), 27 Fed. Rep. 550. See also as to improvements §§ 210–218, and notes, *ante*.

§ 314. [1] In Butterworth *v.* Hoe (1884), 112 U. S. 50, Matthews, J.: (59) "The questions of fact arising in this field find their answers in every department of physical science, in every branch of mechanical art; the questions of law necessary to be applied in the settlement of this class of public and private rights have founded a special branch of technical jurisprudence. The investigation of every claim presented involves the adjudication of disputed questions of fact, upon scientific or legal principles, and is, therefore, essentially judicial in its character, and requires the intelligent judgment of a trained body of skilled officials, expert in the various branches of science and art, learned in the history of invention, and proceeding by fixed rules to systematic conclusions."

SECTION VII.

OF THE NOVELTY OF INVENTIONS: PRIORITY: PRIOR USE.

§ 315. Novelty, as between Identical Inventions, Determined by Priority.

The identity of two inventions having been established, the legal novelty of either depends upon the state of public knowledge, at the date of its invention, concerning the existence and the nature of the other. If one existed in a manner accessible to the public when the other was invented, the latter is not new to the public, whatever it may be to the inventor;[1] and, on the other hand, though the earlier were a complete art or instrument at the date of the invention of the later, yet if it were concealed and inaccessible, so that the public had derived no benefit from its invention, the later, if first introduced to public use, becomes in reference to them a new invention, entitling the inventor from whom they receive it to a patent.

§ 316. Priority Evidenced by Use, by Publication, and by Patent.

The law has recognized three methods in which inventions may be made accessible to the public: by use, by publication, and by patent.[1] In each of these three methods it requires

§ 315. [1] In Patterson *v.* Gas Light & Coke Co. (1877), L. R. 3 App. 239, Lord Blackburn: (244) "The consideration for a patent is the communication to the public of a process that is new. In Hindmarch on Patents (1st ed., 1846, p. 33) it is laid down that 'if the public once becomes possessed of an invention by any means whatever, no subsequent patent for it can be granted, either to the true or first inventor himself or any other person; for the public cannot be deprived of the right to use the invention, and a patentee of the invention could not give any consideration to the public for the grant, the public already possessing everything that he could give.' This is, in my opinion, a correct statement of the law. It is not necessary that the invention should be used by the public as well as known to the public. If the invention and the mode in which it can be used has been made known to the public by a description in a work which has been publicly circulated, . . . or in a specification duly enrolled, . . . it avoids the patent, though it is not shown that it ever was actually put in use."

§ 316. [1] In Plimpton *v.* Malcolmson

the presence of certain qualities before it will receive them as sufficient evidence of public knowledge. The use, the publi-

(1875), L. R. 3 Ch. 531, Jessel, M. R.: (556) "When you say a thing is known to the public and part of common knowledge, of course you do not mean that every individual member of the public knows it. That would be absurd. What is meant is that if it is a manufacture connected with a particular trade, the people in the trade shall know something about it; if it is a thing connected with a chemical invention, people conversant with chemistry shall know something about it. And it need not go so far as that. You need not show that the bulk, or even a large number, of those people know it. If a sufficient number know it, or if the communication is such that a sufficient number may be presumed, or assumed, to know it, that will do. Now how are they to know it? They are to know it by being told of it, or informed of it in some way. You may show that they knew it, by showing that the trade had commonly used it. That is the best evidence you can have. You may show the thing was known because it was used and brought into practice. . . . But you may show they knew it in another way, — that it was published or made known to the public. . . . How made known to the public? It has been held that if it is in a specification, certainly in a modern specification, which had been enrolled in the Patent Office, and not published besides, that will do. And it has also been held that, as a common rule, if the description has been printed in England, and published in England, in a book which circulates in England, that will do. But after all, it is a question of fact. The judge must decide, from the evidence brought before him, whether it has in fact been sufficiently published to come within the definition of being made known within the realm. The cases cited [Household Co. *v.* Neilson, 1 Web. 673; Stead *v.* Williams, 2 Web. 120; Stead *v.* Anderson, 2 Web. 147; Heurteloupe's Patent, 1 Web. 553; Lang *v.* Gisborne, 31 Beav. 133] may be rather used as illustrations of what will amount to sufficient evidence than as deciding anything in principle beyond this, that it must be sufficiently known." See also, Muntz *v.* Foster (1844), 2 Web. 96.

That under the patent laws of the United States there can be no prior knowledge of the invention except by use in this country, or by publication or by patent, see Searls *v.* Bouton (1882), 12 Fed. Red. 140; 21 O. G. 1784; 20 Blatch. 426; Judson *v.* Bradford (1878), 3 Bann. & A. 539; 16 O. G. 171.

That mere knowledge without prior use, patent, or publication is no bar, see Judson *v.* Bradford (1878), 3 Bann. & A. 539; 16 O. G. 171.

That prior use in this country will bar a patent, see Kelleher *v.* Darling (1878), 4 Clifford, 424; 14 O. G. 673; 3 Bann. & A. 438; Roemer *v.* Simm (1874), 5 O. G. 555; Hiatt *v.* Twomey (1836), 1 Dev. & Bat. Eq. 315.

That the same effect follows under the law of England, see Card's Patent, (1848), 2 Web. 161.

That "prior use intimates prior knowledge and shows prior invention," see Household Co. *v.* Neilson (1843), 1 Web. 673 (699).

That such use must be affirmatively proved, see American Bell Telephone Co. *v.* People's Telephone Co. (1884), 29 O. G. 1029; 22 Fed. Rep. 309; 22 Blatch. 531; Washburn & Moen Mfg. Co. *v.* Haish (1880), 10 Bissell, 65; 4 Fed. Rep. 900.

That knowledge of a general property of matter does not prevent a patent for

cation, or the patent must have attained a specified degree both of completeness and publicity, and it must have existed at the date of the invention of the art or instrument whose novelty is called in question. The consideration of each of the three methods thus involves an examination of both of these essential qualities. And first, of Prior Use.

§ 317. Prior Use: its Essential Requisites.

An invention becomes accessible to the public through its use, only when it is employed in such a manner as to disclose fully to the public the idea of means which it embodies.[1] To this end it is necessary: (1) That the invention be complete and operative; (2) That it be practically employed; and (3) That its employment be in public. Unless the invention is complete and operative it does not, in the eye of the law, as yet exist, and therefore is incapable of use. Unless it is practically employed it does not, as a general rule, clearly exhibit its idea of means. Unless employed in public it does not confer upon the public such a knowledge as places the invention fully in their reach. Thus, when either of these requisites is wanting, the use does not destroy the novelty of subsequent inventions.

the application of that property to a first place was it known as an article particular use, see Hills *v.* Gas Light Co. (1860), 5 H. & N. 312.

§ 317. [1] In Walton *v.* Bateman (1842), 1 Web. 613, Cresswell, J. (616): "With respect to this not being a new invention, the nature of that objection is distinct and clear upon the face of it. It involves two questions for your consideration. First, was any article made before, answering the purposes and having the properties of that which the plaintiff has made and claims as the patent? . . . They must show that the article made before had the same properties as that in respect of which the patent was granted. . . . Now, if it had not, it cannot be put in competition with this; if it had, then was it known and in use? That would involve another question. Now in the having those properties? Did any person know what he was buying? . . . (619) Then even supposing that that article did embody the principle of the plaintiffs, so as to present to persons using it the properties, qualities, and advantages in principle of that article which the plaintiff makes, the question for you will be, whether that user is not to be considered rather in the nature of an experiment than of any public use of the article."

That unless the use of the invention so discloses its character that it can be made by any person skilled in the art, from a mere inspection or use of it, it is not prior use, see Hancock *v.* Somerville, (1851), 39 New. L. J. 158. See also § 324, and notes, *post*.

§ 318. Prior Use: Prior Invention must have been Complete and Practically Available.

To constitute a prior use the identical idea of means expressed in the present invention must have been reduced to practice and made available for immediate use.[1] Neither a sketch of the projected art or instrument as the inventor has conceived it, nor drawings whether with or without verbal

§ 318. [1] In Worswick Mfg. Co. *v.* Steiger (1883), 17 Fed. Rep. 250, Welker, J.: (251) "It will be noticed that the claim of this patent is a combination claim consisting of several elements that co-operate together to produce the device claimed. This device, then, can only be anticipated by a prior device, having identically the same elements, or the mechanical equivalents of those that are not used. It will not do to find in older devices a portion of these elements in one machine, another portion in a second machine, another in a third, and so on, and then say that this device is anticipated."

That there can be no prior use unless the device used were identical with the present invention, see Judson *v.* Bradford (1878), 16 O. G. 171; 3 Bann. & A. 539; Ellithorp *v.* Robertson (1859), 4 Blatch. 307; 2 Fisher, 83; Livingston *v.* Jones (1859), 1 Fisher, 521; Pitts *v.* Wemple (1855), 1 Bissell, 87; 2 Fisher, 10; Foote *v.* Silsby (1851), 2 Blatch. 260; Parker *v.* Stiles (1849), 5 McLean, 44; Woodcock *v.* Parker (1813), 1 Gallison, 438; 1 Robb, 37. See also note 4, *post*.

That what would infringe if later will anticipate if earlier, see Peters *v.* Active Mfg. Co. (1884), 21 Fed. Rep. 319; 28 O. G. 1102. This is not true unless both inventions are of the same class and scope.

That the size of the prior invention is immaterial, see Peters *v.* Active Mfg. Co. (1884), 21 Fed. Rep. 319; 28 O. G. 1102.

That apparatus does not anticipate a process, see Everest *v.* Buffalo Lubricating Oil Co. (1884), 20 Fed. Rep. 848; 28 O. G. 1101.

That a prophetic intimation is not prior use, see Celluloid Mfg. Co. *v.* Chrolithion Collar & Cuff Co. (1885), 23 Blatch. 205; 23 Fed. Rep. 397; 31 O. G. 519.

That accidental operations not discovered at the time are not prior use, see Boyd *v.* Cherry (1883), 4 McCrary, 70.

That the prior use of all the elements of a combination does not anticipate the combination itself, see Kelleher *v.* Darling (1878), 3 Bann. & A. 438; 14 O. G. 673; 4 Clifford, 424.

That the prior invention must have been complete and operative, see Allis *v.* Buckstaff (1882), 13 Fed. Rep. 879; 22 O. G. 1705; Stephenson *v.* Brooklyn Cross-Town R. R. Co. (1881) 19 Blatch. 473; 14 Fed. Rep. 457; Judson *v.* Bradford (1878), 16 O. G. 171; 3 Bann. & A. 539; Shoup *v.* Henrici (1876), 2 Bann. & A. 249; 9 O. G. 1162; Lyman Ventilating & Refrigerator Co. *v.* Chamberlain (1876), 2 Bann. & A. 433; 10 O. G. 588; Johnson *v.* McCullough (1870), 4 Fisher, 170; Woodman *v.* Stimpson (1866), 3 Fisher, 98; Ellithorp *v.* Robertson (1859), 4 Blatch. 307; 2 Fisher, 83; Cahoon *v.* Ring (1859), 1 Fisher, 397; 1 Clifford, 592; Sickels *v.* Borden (1856), 3 Blatch. 535; Winans *v.* N. Y. & Harlem R. R. Co. (1855), 4 Fisher, 1; Pitts *v.* Wemple (1855), 1 Bissell, 87; 2 Fisher, 10; Lang *v.* Gisborne (1862), 31 Beav. 133. See also cases cited in note 3, *post*.

description, nor any model other than a practical and working instrument, nor even an application for a patent, can fulfil this requirement, since each or all of these can be produced without the existence of an operative and available invention.[2] Mere experiments, if unsuccessful, however nearly they approach to the complete invention, and even although patented,[3]

[2] That neither written description nor drawing constitutes prior use, see Detroit Lubricator Mfg. Co. *v.* Renchard (1881), 9 Fed. Rep. 293; Lyman Ventilating & Refrigerator Co. *v.* Lalor (1874), 6 O. G. 642; 12 Blatch. 303; 1 Bann. & A. 403; Northwestern Fire Extinguisher Co. *v.* Philadelphia Fire Extinguisher Co. (1874), 6 O. G. 34; 10 Phila. 227; 1 Bann. & A. 177; 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; Winans *v.* N. Y. & Harlem R. R. Co. (1855), 4 Fisher, 1; Lewis *v.* Marling (1829), 1 Web. 490; 1 Abb. P. C. 417.

That the construction of a model is not prior use, see Union Paper Bag Mach. Co. *v.* Pultz & Walkley Co. (1879), 16 Blatch. 76; 4 Bann. & A. 181; Kelleher *v.* Darling (1878), 14 O. G. 673; 4 Clifford, 424; 3 Bann. & A. 438; Stilwell & Bierce Mfg. Co. *v.* Cincinnati Gas Light & Coke Co. (1875), 7 O. G. 829; 1 Bann. & A. 610; Johnson *v.* McCullough (1870), 4 Fisher, 170; Cahoon *v.* Ring (1859), 1 Fisher, 397; 1 Clifford, 592; Lewis *v.* Marling (1829), 1 Web. 490; 1 Abb. P. C. 417.

That an application for a patent does not show prior use or knowledge unless it be also shown that the invention was then complete and operative, see Adams *v.* Howard (1884), 26 O. G. 825; 19 Fed. Rep. 317; Howes *v.* McNeal (1878), 15 Blatch. 103; 15 O. G. 608; 3 Bann. & A. 376; Barker *v.* Stowe (1878), 14 O. G. 559; 15 Blatch. 49; 3 Bann. & A. 337; Lyman Ventilating & Refrigerator Co. *v.* Newell (1876), 10 O. G. 588; 2 Bann. & A. 433; Northwestern Fire Extinguisher Co. *v.* Philadelphia Fire Extinguisher Co. (1874), 6 O. G. 34; 10 Phila. 227; 1 Bann. & A. 177; Case *v.* Brown (1862), 1 Bissell, 382; 2 Fisher, 268.

[3] In Gottfried *v.* The Phillip Best Brewing Co. (1879), 5 Bann. & A. 4, Dyer, J.: (24) "It will be admitted that, to justify the court in overthrowing a patent granted for what appears to be a new and useful invention or improvement, on the ground that the device has been anticipated by another and earlier invention, the court should be well satisfied by clear and credible testimony that the alleged earlier invention actually existed; that it was a perfected device, capable of practical use; that it was embodied in distinct form, and carried into operation as a complete thing, and was not of such a character as to entitle it only to be regarded as an unperfected or abandoned experiment." 17 O. G. 675 (681).

In Coffin *v.* Ogden (1873), 18 Wall. 120, Swayne, J.: (124) "If the thing were embryotic or inchoate, if it rested in speculation or experiment, if the process pursued for its development had failed to reach the point of consummation, it cannot avail to defeat a patent founded upon a discovery or invention which was completed, while in the other case there was only progress, however near that progress may have approximated to the end in view. The law requires not conjecture, but certainty. If the question relates to a machine, the conception must have been clothed in substantial forms, which demonstrate at

the union of all parts of the invention for a different purpose, or the production of an art or instrument embody-

once its practical efficacy and utility." 5 O. G. 270 (271).

In Wayne *v.* Holmes (1856), 2 Fisher, 20, Leavitt, J.: (23) "And proof of prior experiments on the principle of this invention, if not carried on to completion, does not make out the fact of prior knowledge or use, within the meaning of the patent laws. The machine or structure alleged to be similar to that patented must have been so far perfected as to be of practical utility. And if abandoned after experimental trials as useless, a presumption would arise that the alleged invention was not identical with one subsequently patented to another person, the merits and utility of which are proved by its general use, and admitted superiority over all others." 1 Bond, 27 (35).

In Howe *v.* Underwood (1854), 1 Fisher, 160, Sprague, J.: (166) "The patent law goes undoubtedly upon the ground that when a man, by his knowledge and skill, has made and perfected a machine, the public are then put in possession of the invention, and have the benefit, in some form, of that knowledge and skill; and that the man who comes afterward cannot deprive the public of that benefit, though he may be an original inventor of the machine. He has not given the consideration for an exclusive privilege, because the public had it before; and although he may have the merit of invention, he cannot have the right to take from the community that which they possess by the invention of another. A machine, therefore, in order to anticipate any subsequent discovery, must be perfected; that is, made so as to be of practical utility, and not to be merely experimental and end in experiment. The terms 'being an experiment,' and 'ending in experiment,' are used in contradistinction to the term 'being of practical utility.' Until of practical utility the public attention is not called to the invention; it does not give to the public that which the public lays hold of as beneficial. If it is an experiment only, and ends in experiment, and is laid aside as unsuccessful, however far it may have been advanced, however many ideas may have been combined in it which, subsequently taken up, might, when perfected, make a good machine, still, not being perfected, it has not come before the public as a useful thing, and is therefore entirely inoperative as affecting the rights of those coming afterward. This is important to be understood, because the idea has been carried all along, that if a prior inventor has gone to a certain extent, although he fall short of making a complete machine, practically useful, those who come after him have no right to secure to themselves the advantage of their invention. That is not the law."

In Galloway *v.* Bleaden (1839), 1 Web. 521, Tindal, C. J.: (525) "The law is undoubtedly now understood to be this: — a mere experiment, or a mere course of experiments, for the purpose of producing a result which is not brought to its completion, but begins and ends in uncertain experiments — that is not such an invention as should prevent another person, who is more successful, or pursues with greater industry the chain in the line that has been laid out for him by the preceding inventor, from availing himself of it and having the benefit of it. . . . (526) The question you are to determine is whether on the evidence the thing itself was complete, so as to be used, or whether only a series of experiments were going on. Up to this time the model had been shown, but not any actual

ing the same ideas but in a lower state of development, are equally insufficient, — neither being an invention whose employ-

paddle-wheel made; much less up to the time we are now discussing had any one been applied to any real practical use. . . . (529) That there had been many experiments made upon the same line, and almost tending, if not entirely, to the same result, is clear from the testimony you have heard; and that these were experiments known to various persons; but if they rested in experiment only, and had not attained the object for which the patent was taken out, mere experiment, afterwards supposed by the parties to be fruitless, and abandoned because they had not brought it to a complete result, that will not prevent a more successful competitor, who may avail himself as far as his predecessors have gone of their discoveries, and add the last link of improvements, in bringing it to perfection."

In Jones *v.* Pearce (1832), 1 Web. 122, Patterson, J.: (124) "If on the whole of this evidence . . . it appeared this wheel [in prior use] was a wheel on the same principles and in substance the same wheel as the other for which the plaintiff has taken out his patent, and that was used openly in public so that everybody might see it, and had continued to use the same thing up to the time of taking out the patent, undoubtedly then that would be a ground to say that the plaintiff's invention is not new . . . but if, on the other hand, you are of opinion that [the alleged prior invention] was an experiment, and that [its inventor] found it did not answer, and ceased to use it altogether, and abandoned it as useless, and nobody else followed it up, and that the plaintiff's invention which came afterwards was his own invention and remedied the defects, . . . then there is no reason for saying the plaintiff's patent is not good." 1 Abb. P. C. 472 (475).

That abandoned experiments are not prior use, see American Bell Telephone Co. *v.* Molecular Telephone Co. (1885), 32 Fed. Rep. 214; 23 Blatch. 253; Fay *v.* Allen (1885), 24 Fed. Rep. 804; 32 O. G. 1355; Celluloid Mfg. Co. *v.* Chrolithion Collar & Cuff Co. (1885), 23 Blatch. 205; 23 Fed. Rep. 397; 31 O. G. 519; Phillips *v.* Carroll (1885), 23 Fed. Rep. 249; 31 O. G. 265; Miller *v.* Pickering (1883), 25 O. G. 89; 16 Fed. Rep. 540; 16 Phila. 533; Sheridan *v.* Latus (1883), 25 O. G. 501; Allis *v.* Buckstaff (1882), 13 Fed. Rep. 879; 22 O. G. 1705; Davis *v.* Brown (1881), 19 Blatch. 263; 9 Fed. Rep. 647; 20 O. G. 1021; Putnam *v.* Hollender (1881), 19 Blatch. 48; 6 Fed. Rep. 882; 19 O. G. 1423; Roberts *v.* Schrieber (1880), 5 Bann. & A. 491; 18 O. G. 125; 2 Fed. Rep. 855; Whittlesey *v.* Ames (1880), 13 Fed. Rep. 893; 9 Bissell, 225; 5 Bann. & A. 96; 18 O. G. 357; Union Paper Bag Mach. Co. *v.* Pultz & Walkley Co. (1879), 15 Blatch. 160; 16 Blatch. 76; 4 Bann. & A. 181; Kelleher *v.* Darling (1878), 14 O. G. 673; 4 Clifford, 424; 3 Bann. & A. 438; Albright *v.* Celluloid Harness Trimming Co. (1877), 2 Bann. & A. 629; 12 O. G. 227; La Baw *v.* Hawkins (1874), 1 Bann. & A. 428; 6 O. G. 724; Wood Paper Patent (1874), 23 Wall. 566; Corn Planter Patent (1874), 23 Wall. 181; 6 O. G. 392; Aultman *v.* Holley (1873), 11 Blatch. 317; 6 Fisher, 534; 5 O. G. 3; Decker *v.* Grote (1873), 10 Blatch. 331; 3 O. G. 65; 6 Fisher, 143; Smith *v.* O'Connor (1873), 4 O. G. 633; 2 Sawyer, 461; 6 Fisher, 469; Blake *v.* Rawson (1872), 3 O. G. 122; 6 Fisher, 74; Holmes, 200; Murphy *v.* Eastham (1872), 2 O. G. 61; Holmes, 113; 5 Fisher, 306; Roberts *v.* Dickey (1871), 1 O. G. 4; 4 Fisher, 532; 4 Brews. 260; Sayles *v.* Chicago & N. W.

ment, under any circumstances, can confer upon the public such an acquaintance with the new idea of means as will

R. R. Co. (1871), 3 Bissell, 52 ; 4 Fisher, 584 ; Wood *v.* Cleveland Rolling Mill Co. (1871), 4 Fisher, 550 ; Turrill *v.* Illinois Central R. R. Co. (1867), 3 Bissell, 66; 3 Fisher, 330 ; Union Sugar Refinery *v.* Matthiesson (1865), 3 Clifford, 639 ; 2 Fisher, 600 ; White *v.* Allen (1863), 2 Fisher, 440 ; 2 Clifford, 224 ; Union Mfg. Co. *v.* Lounsbury (1863), 2 Fisher, 389 ; Hayden *v.* Suffolk Mfg. Co. (1862), 4 Fisher, 86 ; Matthews *v.* Skates (1860), 1 Fisher, 602 ; Singer *v.* Walmsley (1860), 1 Fisher, 558; Ellithorp *v.* Robertson (1859), 4 Blatch. 307; 2 Fisher, 83; Judson *v.* Moore (1859), 1 Bond, 285 ; 1 Fisher, 544 ; Latta *v.* Shawk (1859), 1 Bond, 259 ; 1 Fisher, 465 ; Cahoon *v.* Ring (1859), 1 Fisher, 397; 1 Clifford, 592 ; Bell *v.* Daniels (1858), 1 Bond, 212 ; 1 Fisher, 372 ; Pitts *v.* Edmonds (1857), 1 Bissell, 168 ; 2 Fisher, 52 ; Wayne *v.* Holmes (1856), 1 Bond, 27; 2 Fisher, 20 ; Ransom *v.* Mayor of New York (1856), 1 Fisher, 252 ; Allen *v.* Hunter (1855), 6 McLean, 303; Winans *v.* N. Y. & Harlem R. R. Co. (1855), 4 Fisher, 1 ; Howe *v.* Underwood (1854), 1 Fisher, 160; Many *v.* Sizer (1849), 1 Fisher, 17 ; Parkhurst *v.* Kinsman (1849), 1 Blatch. 488 ; Many *v.* Jagger (1848), 1 Blatch. 372 ; Murray *v.* Clayton (1872), L. R. 7 Ch. Ap. 570 ; Daw *v.* Eley (1867), L. R. 3 Eq. 496 ; Stead *v.* Williams (1843), 2 Web. 126 ; Gibson *v.* Brand (1841), 1 Web. 627 ; Cornish *v.* Keene (1835), 1 Web. 501; 2 Abb. P. C. 139; Jones *v.* Pearce (1832), 1 Web. 121 ; 1 Abb. P. C. 472.

That an unsuccessful experiment was patented does not indicate prior use, see Hitchcock *v.* Tremaine (1871), 8 Blatch. 440; 4 Fisher, 508 ; Whitely *v.* Swayne (1868), 7 Wall. 685.

As to what constitutes an unsuccessful experiment : —

That a rude machine, made for experiment and then abandoned, is an unsuccessful experiment, see Hoyt *v.* Slocum (1886), 26 Fed. Rep. 329 ; Gottfried *v.* Phillip Best Brewing Co. (1879), 17 O. G. 675 ; 5 Bann. & A. 4.

That a partial embodiment of the idea, but wanting the qualities necessary to make it operative, is an unsuccessful experiment, see Roberts *v.* Schrieber (1880), 18 O. G. 125; 2 Fed. Rep. 855 ; 5 Bann. & A. 491; Richardson *v.* Noyes (1876), 10 O. G. 507.

That to make one article, use it in one situation without subjecting it to the tests required to demonstrate its practicability in general use, and then throw it away, is an unsuccessful experiment, see Putnam *v.* Hollender (1881), 19 O. G. 1423 ; 19 Blatch. 48; 6 Fed. Rep. 882 ; Swift *v.* Whisen (1867), 2 Bond, 115 ; 3 Fisher, 343.

That to bring together all the parts of an invention, but to fail in accomplishing the desired result from want of knowledge how to use them, is an unsuccessful experiment, see Campbell *v.* Mayor of N. Y. (1881), 20 O. G. 1817; 9 Fed. Rep. 500 ; 20 Blatch. 67.

That experiments made with the abandoned and unsuccessful devices of others are still unsuccessful experiments, see Latta *v.* Shawk (1859), 1 Fisher, 465; 1 Bond, 259.

That the throwing aside of an invention does not *ipso facto* show that it was an unsuccessful experiment, see Brush *v.* Condit (1884), 20 Fed. Rep. 826 ; 22 Blatch. 246 ; 28 O. G. 451 ; Pickering *v.* McCullough (1878), 13 O. G. 818 ; 3 Bann. & A. 279 ; Snow *v.* Tapley (1878), 13 O. G. 548.

That the abandonment of an experiment shows that it was unsuccessful, see Fay *v.* Allen (1885), 24 Fed. Rep. 804 ; 32 O. G. 1355 ; Brush *v.* Condit,

enable them to apply it practically in the arts.[4] Yet the invention used, if embodying the same idea, need not, in all respects, be as mechanically perfect, nor perform its operations with the same degree of excellence, as that which it anticipates. For though formal diversities exist, and though by the application of industrial skill the later may have been made more serviceable or attractive than the earlier, the earlier may still exhibit the complete idea of the invention in the same stage of development.

(1884), 20 Fed. Rep. 826; 22 Blatch. 246; 28 O. G. 451; American Bell Telephone Co. *v.* People's Telephone Co. (1884), 29 O. G. 1029; 22 Fed. Rep. 309; 22 Blatch. 531.

That the want of success with the public indicates that the invention was a mere experiment, see Hicks *v.* Otto (1884), 29 O. G. 365; 22 Blatch. 94; 19 Fed. Rep. 749.

That long neglect of an invention (seventeen years) may show that it was an unsuccessful experiment, see Yale Lock Mfg. Co. *v.* Berkshire Nat. Bank (1885), 26 Fed. Rep. 104.

That lost and disused inventions may be regarded as abandoned experiments, see Adams & Westlake Mfg. Co. *v.* Rathbone (1886), 26 Fed. Rep. 262.

That the prior invention must have been reduced to practice, see Roberts *v.* Reed Torpedo Co. (1869), 3 Brews. 558; 3 Fisher, 629.

That a device not put in practical use nor claimed, though afterwards embodied in other articles, is an abandoned experiment, see Hutchinson *v.* Everett (1885), 26 Fed. Rep. 531; 35 O. G. 1110.

That any use which shows that the article is practically available is prior use, see Brush *v.* Condit (1884), 20 Fed. Rep. 826; 22 Blatch. 246; 28 O. G. 451.

[4] That the union of all the parts of the invention for a different purpose is not prior use, see Campbell *v.* Mayor of N. Y. (1881), 20 O. G. 1817; 20 Blatch. 67; 9 Fed. Rep. 500.

That however nearly the device in prior use approached the present invention, it cannot anticipate it unless it were in every essential respect the same, see Livingston *v.* Jones (1859), 1 Fisher, 521.

That no prior use existed unless the prior inventor had attained to such a clear idea of the invention as would enable him to bestow it on the public, see Boyd *v.* Cherry (1883), 4 McCrary, 70; Minter *v.* Mower (1835), 1 Web. 138; 2 Abb. P. C. 178.

That a device does not anticipate when radical changes would be necessary to enable it to perform the work of the patented invention, see Consolidated Bunging Apparatus Co. *v.* Woerle (1887), 29 Fed. Rep. 449: 38 O. G. 1015.

That it is no defence in a suit for infringement that a prior machine might have been modified so as to do the work of the plaintiff's invention, see Wood *v.* Cleveland Rolling Mill Co. (1871), 4 Fisher, 550.

§ 319. Prior Use: Prior Invention must have been Practically Employed.

The earlier invention having been complete and operative, the idea which it embodies must have been manifested through its practical employment. Possibly there are cases where an instrument itself discloses the essential attributes of its idea of means as fully as if it had been practically used, and in these cases actual use of the invention may not be essential.[1] But, as a general rule, the invention must be practically employed. To conceive the idea and to embody it, or to embody an idea by chance without conceiving or perceiving it, is not enough. The idea, as it lies in the mind of the inventor, must not only be completely expressed in his invention, but must be fully and intelligibly communicated through it; and though his art or instrument be perfect in itself, if it is not applied in practice in such a manner as to demonstrate that it accomplishes the end for which it was created, and to indicate the method by which it attains that end, the idea is not within the actual possession of the public.[2] Still, on the other hand,

§ 319. [1] Mr. Webster (1 Web. 719, n.) referring to evidence contradicting novelty, remarks: "The third class of evidence is the production of a machine or article of manufacture with or without proof of actual user anterior to the date of the patent. On the authority of the above case [Household Co. *v.* Neilson, 1 Web. 673] it would appear that the production of such a machine or article of manufacture, without actual proof as to its use, or any evidence as to whence it originally came, or as to its mode of manufacture, would vitiate subsequent letters-patent for such a machine or article of manufacture, as negativing the grantee of such letters-patent being the true and first inventor. With reference to this head two distinct cases may occur: the one in which the machine or article of manufacture so produced shows at once its mode of manufacture; the other in which the machine or article of manufacture does not present any means of knowledge to the public so as to enable any person to reproduce the same. . . . An arrangement of material parts, as a simple combination of the elements of machinery, discloses its mode of manufacture to the eye on inspection, but with respect to a paint, or a dye, or a medicine, and many other inventions, a mere inspection of the result attained will convey no information as to the mode of manufacture." See also Sayles *v.* Chicago & Northwestern R. R. Co. (1871), 3 Bissell, 52; 4 Fisher, 584; Parker *v.* Ferguson (1849), 1 Blatch. 407.

[2] In Andrews *v.* Carman (1876), 13 Blatch. 307, Benedict, J.: (323) "A chance operation of a principle, unrecognized by any one at the time, and from which no information of its existence, and no knowledge of a method of its employment is derived by any one, if proved to have occurred, will not be sufficient to defeat the claim of him who

the law does not require extensive practical employment. A single instance of efficient use suffices, although the art or instrument be thenceforth abandoned.[3] Nor is it necessary that the earlier invention have been used for the same purpose as the later, nor that it pass beyond the region of experiment if the experiment were evidently successful, nor that it be under a patent, nor if under a patent that the patent should be valid.[4]

first discovers the principle, and, by putting it to a practical and intelligent use, first makes it available to man." 2 Bann. & A. 277 (292); 9 O. G. 1011 (1016). See also Maxheimer *v.* Mayer (1881), 20 Blatch. 17; 9 Fed. Rep. 460; 20 O. G. 1162.

Thus that where an invention embodies two distinct ideas of means its use as one is not prior use as to the other if the latter is not thereby disclosed, see Clough *v.* Barker (1882), 106 U. S. 166; 22 O. G. 2157; Minter *v.* Mower (1835), 1 Web. 133; 2 Abb. P. C. 178.

That to construct the invention is not necessarily prior use, see Parker *v.* Hulme (1849), 1 Fisher, 44; Lewis *v.* Marling (1829), 1 Web. 490; 1 Abb. P. C. 417.

That prior invention does not constitute prior use, see Colt *v.* Massachusetts Arms Co. (1851), 1 Fisher, 108.

That sale of the invention is not necessary, — use in the country of itself defeats the subsequent invention, — see Betts *v.* Neilson (1868), L. R. 3 Ch. Ap. 429.

That sale to any one who desires to purchase evidences prior use, see Gibson *v.* Brand (1841), 1 Web. 627.

That the prior existence of a similar machine, without use, does not show a want of novelty, unless the later invention was derived from the former, see Butch *v.* Boyer (1871), 8 Phila. 57.

[3] That a single instance of prior use will prove a want of novelty, see Brush *v.* Condit (1884), 22 Blatch. 246; 28 O. G. 451; 20 Fed. Rep. 826; Miller *v.* Force (1882), 9 Fed. Rep. 603; 21 O. G. 947; Boston Elastic Fabrics Co. *v.* East Hampton Rubber Thread Co., (1876), 2 Bann. & A. 268; 9 O. G. 745; Rice *v.* Garnhart (1874), 34 Wis. 453; Sayles *v.* Chicago & Northwestern R. R. Co. (1871), 3 Bissell, 52; 4 Fisher, 584; Sayles *v.* Chicago & Northwestern R. R. Co. (1865), 1 Bissell, 468; 2 Fisher, 523; Rich *v.* Lippincott (1853), 2 Fisher, 1.

That the abandonment of the invention after its successful use does not prevent this use from operating as prior use, see McNish *v.* Everson (1880), 5 Bann. & A. 484; 17 O. G. 1506; 2 Fed. Rep. 899; Shoup *v.* Henrici (1876), 2 Bann. & A. 249; 9 O. G. 1162; Northwestern Fire Extinguisher Co. *v.* Philadelphia Fire Extinguisher Co. (1874), 6 O. G. 34; 1 Bann. & A. 177; 10 Phila. 227; Evans *v.* Hettick (1822), 7 Wheaton, 453; 1 Robb, 417; Evans *v.* Hettick (1818), 3 Wash. 408; 1 Robb, 166.

[4] That the prior use need not have been for the same purpose, see Stephenson *v.* Brooklyn Cross-Town R. R. Co. (1881), 19 Blatch. 473; 14 Fed. Rep. 457.

That its use in combination with other things, if its real character is thereby disclosed, is prior use, see Carpenter *v.* Smith (1841), 1 Web. 530.

That the use is prior use, though only experimental, if the experiment were successful, see Northwestern Fire Extinguisher Co. *v.* Philadelphia Fire Extinguisher Co. (1874), 6 O. G. 34; 1 Bann. & A. 177; 10 Phila. 227; Rice

For any use of an invention whereby the end proposed by the inventor is practically accomplished, by the employment of the means which he devised in order to attain it, discloses his idea as fully as if the operation of his art or instrument were indefinitely prolonged.

§ 320. Prior Use: Prior Invention must have been Practically Employed in Public.

But even the practical employment of a complete and operative art or instrument does not confer the invention on the public, unless the use of the invention be in public. A use *in* public is not necessarily a use *by* the public. It is distinguished, not from an individual, but from a secret use. It is a use which places the invention in such a relation to the public that if they choose to be acquainted with it, they can do so.[1]

v. Garnhart (1874), 34 Wis. 453 ; Watson *v.* Bladen (1826), 4 Wash. 580 ; 1 Robb, 510.

That though the prior user may not have employed the invention with the same skill and profit as the present inventor, the latter cannot have a patent, see Waterman *v.* Thompson (1863), 2 Fisher, 461.

That whether a prior inventor in this country succeeded in patenting his invention or not is immaterial, if known and used it defeats any subsequent inventor's right to a patent, see Coffin *v.* Ogden (1873), 18 Wall. 120 ; 5 O. G. 270 ; Whipple *v.* The Baldwin Mfg. Co. (1858), 4 Fisher, 29 ; Colt *v.* The Massachusetts Arms Co. (1851), 1 Fisher, 108.

§ 320. [1] In Perkins *v.* Nashua Card & Glazed Paper Co. (1880), 2 Fed. Rep. 451, Lowell, J.: (452) "The law desires to encourage inventors to make their discoveries known for the improvement of the art, and to discourage an extension of the monopoly beyond the statutory period. For these reasons, and because of the difficulty of ascertaining the amount of knowledge which may have been derived from the exhibition, publication, or use of the invention, it has always been held that when the public have had means of knowledge they have had knowledge of the invention. Thus if a book has been published describing the invention, it is not important that no one has read it. Stead *v.* Williams, 7 M. & G. 818. If a pier has been placed in the bed of a river, or a pipe under ground, it is conclusively presumed to be known to all men. It has been intimated that a use in a workshop, where the workmen are pledged to secrecy, may not be a public use. Kendall *v.* Winsor, 21 How. 322, charge of Curtis, J.; Bevin *v.* Easthampton Bell Co., 9 Blatch. 50; Heath *v.* Smith, 3 Ell. & B. 255. In the last of these cases it is held that if the invention has been worked in the ordinary way, without an injunction of secrecy, the use is public. In McClurg *v.* Kingsland, 1 How. 202, it is said by Mr. Justice Baldwin, *obiter*, that use in a factory is a public use. A use very trifling in amount, or a publication purely technical, or a single sale, have often been held to deprive an inventor of his patent,

Thus while a use by the inventor in the seclusion of his private laboratory or workshop, as a secret of his trade, does

without evidence that any one interested to acquire knowledge of the invention had acquired it. Henry *v.* Prov. Tool Co., 14 O. G. 855; Egbert *v.* Lippman, Ib. 822; McMillan *v.* Barclay, 5 Fisher, 189; *Re* Adamson's Patent, 6 De G. M. & G. 420; Patterson *v.* Gas Light Co., 3 App. Cas. 239; Lang *v.* Gisborne, 31 Beav. 133. . . . Taking these decisions together, I understand the law to be, that actual knowledge of the invention need not have been derived by any one interested to practise it; it is enough that any one or more persons, not under a pledge of secrecy, saw the invention practised, or even might have seen it if they had used their opportunities, provided it was in fact practised in the ordinary way after being completed. And it must be held either that the workmen and visitors were a part of the public, or that they were persons from whom the public might have acquired the art without a breach of trust." 5 Bann. & A. 395 (396); 17 O. G. 1285 (1286).

In Carpenter *v.* Smith (1841), 1 Web. 530, Abinger, C. B.: (534) "The plaintiff's counsel has referred to the words of the statute to show that the words 'public use and exercise,' formed a part of the patent, from which he desires you to take the definition of what he calls the legal meaning of the word 'new;' and he draws this inference, that unless it has been in public use and in public exercise before, it is new. . . . Now I differ altogether from the learned counsel in that respect; and I think what is meant by 'public use and exercise,' as has been held by my predecessors before (and I think one's own common sense leads one to adopt that definition), is this, — a man is entitled to a patent for a new invention, and if his invention is new and useful he shall not be prejudiced by any other man having invented that before and not made any use of it, because the mere speculations of ingenious men, which may be fruitful of a great variety of inventions, if they are not brought into actual use, ought not to stand in the way of other men equally ingenious, who may afterwards make the same inventions and apply them. . . . So that the meaning of the words 'public use' is this, — that a man shall not, by his own private invention, which he keeps locked up in his own breast, or in his own desk, and never communicates it, take away the right that another man has to a patent for the same invention. Now 'public use' means this — that the use of it shall not be secret, but public. . . . (535) Therefore if a man invents a thing for his own use, whether he sells it or not, if he invents a lock and puts it on his own gate and has used it for a dozen years, that is a public use of it. If it were otherwise, see what the consequence would be. . . . If that was not a public use of it which prevented a man from taking out a patent, any man might go and take a model of that lock, and get a patent for it. How can he be the inventor of it? Because, to obtain a patent, a man must be the inventor; and if it has been once in public use (that is, used in a public manner, not used by the public), yet, if it has been used by half a dozen individuals, or one, in a public manner, any man having access to it, how can he be said to be the inventor, if by merely gaining access to that he takes out a patent? . . . (539) Gentlemen, in my opinion, if you believe the witness, that the lock was on Mr. Davis's gate sixteen years ago, and that he saw it every day of his life, and repaired it twelve years ago, and has brought it here and described it to you

not show public knowledge,[2] the practical employment of the invention by others than the inventor, in their trade or profession, though in concealment from the general public, is, in the present sense, a use in public.[3] But foreign use, at least un-

now, it appears to me, if you are of that opinion, that that was a public use of the invention. The application and the practical utility of that before the eyes of the public comes within the meaning of the words, as I understand them, of this patent, and it is only used in contradistinction of a public use and exercise, to which the public has no access."

This case came up in the exchequer on motion for a new trial on this instruction, the plaintiff claiming that the use of an invention in such a manner that a particular portion of the public in a particular locality may have access to it without its being sold or brought into market, does not defeat a subsequent patent. In giving the opinion of the court the judges held as follows: Alderson, B.: (542) "I think there ought to be no rule in this case. I have not the least doubt that that is the right construction of the law which my lord has put upon it. Public use means a use in public, so as to come to the knowledge of others than the inventor, as contradistinguished from the use of it by himself in his chamber." Gurney, B., concurred. Abinger, C. B.: (543) "The public use and exercise of an invention means a use and exercise in public, not by the public."

Mr. Webster, in a note to this case, p. 543, criticises the decision on the ground that the lock, being possibly of secret construction, did not by its mere use disclose to the public the method of making it; and compares it to a chemical compound of unknown ingredients and preparation. Doubtless the true rule in all cases is this, that the article used must render the invention embraced in its construction accessible to the public; and this principle is recognized by Abinger, C. B., in various parts of the above opinion, especially where he supposes that "any man might go and take a model of that lock and get a patent for it."

That no use can be prior use unless it existed in a manner accessible to the public, see Bullock Printing Press Co. *v.* Jones (1878), 13 O. G. 124.

That to make and sell an article without secrecy in the realm, for the purpose of exporting and use abroad, is use in public and prior use, see Carpenter *v.* Smith (1841), 1 Web. 530.

[2] In Stead *v.* Williams (1843), 2 Web. 126, Cresswell, J., speaking of the former use of the invention, says: (136) "That appears to have been . . . used by him in public; not concealed; no secrecy about it; made known to all persons who came to his house, so far as their ocular inspection could make them. It was intended to be public, not to be made a matter of merchandise certainly, but merely for his own private use; but the knowledge of it exposed to the public an article in public use, and continued to be used down to the time in question. . . . Whether it had been used by one or used by five, I do not think it makes any difference."

That secret use is not prior use, see Smith *v.* Davidson (1857), 19 C. S. 691; Carpenter *v.* Smith (1842), 1 Web. 540; Carpenter *v.* Smith (1841), 1 Web. 530.

[3] In Cornish *v.* Keene (1835), 1 Web. 501, Tindal, C. J.: (508) "If this [invention] was at the time these letters-patent were granted in any degree of general use; if it was known at all to the world publicly and practised openly, so that any other person might have the means of acquiring the knowledge

der the provisions of our present statutes, does not communi-

of it as well as this person who obtained the patent, then the letters-patent are void; on the other hand, if it were not known and used at the time in England, then as far as this question is concerned the letters-patent will stand. Now, it will be a question for you, gentlemen, to say, whether upon the evidence which you have heard you are satisfied that the invention was or was not in use and operation, public use and operation, at the time the letters-patent were granted. It is obvious that there are certain limits to that question; the bringing it within that precise description which I have just given must depend upon the particular facts that are brought before a jury. A man may make experiments in his own closet for the purpose of improving any art or manufacture in public use; if he makes these experiments and never communicates them to the world, and lays them by as forgotten things, another person who has made the same experiments, or has gone a little further, or is satisfied with the experiments, may take out a patent, and protect himself in the privilege of the sole making of the article for fourteen years; and it will be no answer to him to say that another person before him made the same experiments, and therefore that he was not the first discoverer of it; because there may be many discoverers starting at the same time, many rivals that may be running on the same road at the same time, and the first which comes to the crown and takes out a patent, it not being generally known to the public, is the man who has a right to clothe himself with the authority of the patent and enjoy its benefits. That would be an extreme case on one side; but if the evidence that is brought in any case, when properly considered, classes itself under the description of experiment only, and unsuccessful experiment, that would be no answer to the validity of the patent. On the other hand, the use of an article may be so general as to be almost universal. In a case like that, you can hardly suppose that any one would incur the expense and trouble of taking out a patent. That would be a case where all mankind would say, 'You have no right to step in and take that which is in almost universal use, for that is, in fact, to create a monopoly to yourself in this article, without either giving the benefit to the world of the new discovery, or the personal right to the value of the patent to which you would be entitled from your ingenuity and from your application.' Therefore it must be between those two (if I may so call it) limits that cases will range themselves in evidence, and it must be for a jury to say whether, supposing those points to be out of the question in any particular case, evidence which has been brought before them convinces them to their understandings that this subject of the patent was in public use and operation at that time — at the time when the patent itself was granted by the crown. If it was in public use and operation, then the patent is a void patent. . . . if it was not, the patent stands good. . . . (512) I am not aware that by going more fully into it I can make you better acquainted with the discovery than you must be already. I would only observe that it must not be such a practice of it as is only referable to mere experiments for the purpose of making a discovery, or something secret, or confined to the party who was making it at the time; but that it must be, in order to set aside the patent, a case where it was in public use and operation among persons in that trade and likely to know it." 2 Abb. P. C. 139 (171, 177).

In Dollond's Case (1766), cited in