IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

THE MAGNAVOX COMPANY, a Corporation, and SANDERS ASSOCIATES, INC., a Corporation, Plaintiffs, v. ACTIVISION, INC., a Corporation Defendant.	)	Civil Action C 82 5270 TEH

DEFENDANT'S PROPOSED FORM OF ORDER ON MOTION

TO DISMISS THE SECOND COUNTERCLAIM

The Court having considered Plaintiffs' Motion to Dismiss Defendant's Second Counterclaim under Rule 12 F.R.Civ.P., the parties having been heard and the Court being fully advised in the premises:

NOW THEREFORE IT IS ORDERED:

Defendant's motion to dismiss is hereby denied.

UNITED STATES DISTRICT JUDGE

By_____

Dated: _____

Order

FLEHR, HOHBACH, TEST,
ALBRITTON & HERBERT
ALDO J. TEST
THOMAS O. HERBERT
EDWARD S. WRIGHT
Suite 3400, Four Embarcadero Center
San Francisco, California 94111
Telephone: (415) 781-1989

WILSON, SONSINI, GOODRICH & ROSATI
HARRY B. BREMOND
MICHAEL A. LADRA
Two Palo Alto Square
Palo Alto, California 94304
Telephone (415) 493-9300

Attorneys for Defendant

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

THE MAGNAVOX COMPANY, a Corporation, and SANDERS ASSOCIATES, INC., a Corporation, Plaintiffs, v. ACTIVISION, INC., a Corporation Defendant.	Civil Action C 82 5270 TEH Hearing: January 10, 1983 10:00 a.m.

MEMORANDUM IN OPPOSITION TO PLAINTIFFS' MOTION TO DISMISS SECOND COUNTERCLAIM

Introduction

In general the present action is one for infringement of plaintiffs' reissue patent No. 28,507 naming William T. Rusch as inventor (hereinafter the Rusch reissue patent). In its response to the Complaint defendant not only raised defenses of non-infringement and invalidity of the Rusch reissue patent but also counterclaimed that one of plaintiffs' related patents was also invalid and not infringed by defendant's

activities. This second counterclaim, the subject of plaintiffs' motion herein, contests plaintiffs' U. S. patent 3,728,480 naming Ralph H. Baer as inventor (hereinafter the Baer original patent).

Both the Rusch reissue and Baer original patents are directed to television gaming apparatus which is presently known to the consuming public as video games. Video games take many forms but those which are the subject of this litigation include games which may be played on a home television receiver and in which symbols or "spots" are generated on the screen of the television. At least one of the "spots" can be moved across the screen by a game participant turning control knobs or the like. In this manner, the "spot" controlled by the participant can be moved to hit another "spot". In such games as are involved here the coincidence on the screen of the hit and the hitting "spots" is in some way detected and a distinct motion is imparted to the hit "spot".

An example of such a game in its most simple form might be the early video game of Pong wherein a single "spot" represents a ball and two additional "spots" represent paddles each of which is operated by a separate participant. Each of the participants, in the language of the patents, attempts to cause coincidence between his respective paddle and the ball and when that coincidence occurs it is detected by the gaming apparatus which causes the ball to have a distinct motion. More simply, each participant tries to strike the ball with his paddle so that the ball will bounce back to the other participant. While the Pong game mentioned above is a simplified version of the hit and hitting symbol type games, that particular game is not part of the present litigation but serves only for explanation. Defendant's game cartridges serve to program game consoles to display far more complex games. Even so, in some of the games as played with defendant's game cartridges, hit and hitting spots are displayed on a television screen, the spots appear to coincide on the screen and the hit spot takes on a distinct motion upon that coincidence.

The Rusch reissue patent, upon which plaintiff brought this litigation is directed in part to a game which generates a hitting spot and a hit spot with a distinct motion being imparted to the hit spot upon coincidence of the two spots. Claim 51 of the Rusch reissue patent is specific to just such a game. (A copy of the Rusch reissue patent is attached hereto as Appendix A and Claim 51 appears at Column 31 thereof.) Moreover, this Claim 51 has been specifically identified by plaintiffs as one of the claims it considers to be infringed (see letter of September 11, 1981 from Edward W. Goodman to Aldo J. Test, attached to the Affidavit of Edward W. Goodman filed herein by plaintiffs in support of the instant motion).

Broad as the language of the Rusch reissue patent is, the Baer original patent is even broader when considered in the context of home video games. The Baer original patent, particularly Claim 40, calls merely for a control unit which generates spots or dots and permits manipulation of the position of those spots with the generated spots being displayed on the screen of the single television receiver used by the participant. (A copy of the Baer original patent is attached hereto as Appendix B and Claim 40 appears at Column 16 thereof.) Any home video game which infringes Claim 51 of the Rusch reissue patent must also infringe Claim 40 of the Baer original patent.

In summary then if, in fact, defendant does infringe the Rusch reissue patent it necessarily infringes the Baer original patent. If a video game includes the spots, coincidence detection and distinct motion as called for in Claim 51 of the Rusch reissue patent, it must include the manipulated spots called for in Claim 40 of the Baer original patent.

Plaintiffs' Basis For the Instant Motion

Plaintiffs object to the second counterclaim on the ground that there is no actual controvery as to the Baer original patent. In support of its allegation as to lack of controversy plaintiffs allege:

1. That the Baer original patent is, and for the past five years has been the subject of a reissue application before the U. S. Patent Office (hereinafter the Baer reissue application) and that since the filing of the Baer reissue application, plaintiffs have not charged defendant, nor anyone else, with infringement of the Baer original patent nor have they brought any civil action for such infringement.

2. That the claims in their present reissue application form are not "identical" to the claims of the Baer original patent itself.

3. That the plaintiffs themselves have "decided" not to enforce the Baer original patent during the pendency of the Baer reissue application.

4. That defendant has shown no real or reasonable apprehension of future liability because:

(a) had there been any such apprehension defendant could have participated in proceedings before the Patent Office on the Baer reissue application, and

(b) the mere filing of the Complaint herein based on the Rusch reissue patent alone should allay such fears.

It is defendant's position that each and every one of plaintiffs' contentions is totally without merit.

An Actual Charge of Infringement is Not Necessary to Support a Declaratory Judgment Counterclaim

Plaintiffs state that defendant has never been charged with infringement of the Baer original patent. Such a charge of infringement is but one way to prove an actual controversy. It is by no means a requirement particularly, as here, where the declaratory action rises as a counterclaim between parties already locked in litigation. In Printing Plate Supply Co. v. Curtis Publishing Co., 278 F.Supp. 642 (E.D.Pa. 1968), plaintiff sued for infringement of four of its patents. Defendant counterclaimed,

seeking a declaration that those four patents were invalid and not infringed and, further, that a fifth patent held by plaintiff was likewise invalid and not infringed. As here, plaintiff in Printing Plate Supply moved to dismiss the counterclaim as to the fifth patent and the District Court denied that motion. In denying the motion the Court stated at 278 F.Supp. 647:

> Unlike the great majority of cases in this area, the declaratory plaintiff here is the defendant, and not the plaintiff, in the principal case. This distinction does not negate the necessity of establishing justiciability of the claim. [citing authority] It does, however, undercut the rationale supporting the manifest threat requirement. This requirement is intended to protect a patentee from harassment and from being required to litigate the validity of his patent at the whim of any party who is considering infringing it. [citing authority] Here the patentee initiated the litigation, and, thus, adjudication of claims regarding a patent bearing a close relationship to those which constitute the subject-matter of its own claim hardly constitutes undue harassment.

Even when the declaratory action is the subject of the complaint rather than a counterclaim, there still is no requirement for an actual charge of infringement. In Westinghouse Electric Corp. v. Aqua-Chem, Inc., 278 F.Supp. 975 (E.D.Pa. 1967) Westinghouse was a contractor bidding on large scale desalinization plants. Aqua-Chem owned three patents relating to that field and there had been actual allegations of infringement exchanged between the parties concerning two of the three patents. As to the third patent in suit, the '131 patent, Westinghouse had never offered for sale or manufactured any apparatus which it or Aqua-Chem believed to be covered by that patent. However, Westinghouse alleged in its complaint that it had been requested to bid upon and intended to offer for sale such apparatus which might be construed as covered by the '131 patent. Moreover, the '131 patent was described by the Court as being a variant of the apparatus covered by the other patents for which infringement had been charged. The Court there denied defendant's motion as to the '131 patent basing its decision upon the close relationship between the three patents and the business dealings of the parties.

Even if plaintiffs do not enforce the Baer original patent during the pendency of the Baer reissue application; nor charge anyone with infringement during that time; nor file civil actions on that patent during that time period, there is no assurance whatsoever that enforcement, charges of infringement and actual litigation will not begin once the proceedings on the Baer reissue application are terminated. More importantly, there is nothing to prevent plaintiffs from beginning such enforcement and litigation even now.

The Pendency of the Baer Reissue Application Has No Effect on the Status of the Baer Original Patent

Despite the five year pendency of the Baer reissue application, the Baer original patent is itself still effective and suit might be brought by plaintiffs at any time at their discretion. Although surrender of the original patent is required upon reissue, that surrender is effective only upon the issue of the reissued patent (35 U.S.C. §252). If the Baer reissue application never matures into a Baer reissue patent the Baer original patent continues to stand with the same effect it had prior to filing the Baer reissue application. While plaintiff, Sanders, has "offered" to surrender the Baer original patent upon the issuance of a reissue patent, that offer has no effect whatsoever until and unless the reissue patent does, in fact, issue -- a condition precedent which plaintiffs can unilaterally avoid by merely refusing whatever reissue patent the Patent Office is willing to grant or simply by abandoning the reissue application. As concisely stated in L. Horwitz, Patent Office Rules and Practice §171.1, at 627 (1982):

> The law is clear that the surrender of the patent and filing of a reissue application has no impact on the existence of that patent and places no disability on the owner to bring an action under 35 U.S.C. 291 (citing U.S. v. Marifarms Inc., 174 U.S.P.Q. 481 (D.Del. 1972)). 35 U.S.C. 252 specifically states that the surrender of the original patent does not take effect until the issue of the reissue patent. The physical delivery of the patent to the Patent Office is in compliance with the statute and the Rules of Practice. It will not be deemed a surrender in the true sense unless and until the reissue application matures into a reissue patent. Finally, it has been specifically held that the act of tendering a patent in the court [sic]

of a reissue application does not preclude plaintiff from maintaining a Section 291 action on the basis of the original patent. (Citing Hazelton Research, Inc. v. Firestone Tire & Rubber Co., 171 U.S.P.Q. 481 (W.D.Va. 1971); AT&T et al v. Milgo Elec.Corp. et al, 193 U.S.P.Q. 242 (S.D.N.Y. 1976)).

Moreover, it should be recognized that , even if a Baer reissue patent does eventually issue questions of infringement occurring up until the time of that reissue are determined on the basis of the original patent. A patent infringement action for damages may be brought on the Baer original patent now or at any time up to six years after a Baer reissue patent actually issues (35 U.S.C. §286). The Baer original patent continues to be viable and may very well be the subject of litigation either alone or together with a future Baer reissue patent. Plaintiffs have already taken this very tactic in earlier litigation.

The patent here in suit is itself a reissue of an earlier patent No. 3,659,284 (hereinafter Rusch original patent). Still another of plaintiffs' patents, No. 3,659,285, naming as joint inventors both the aforementioned Baer and Rusch together with William L. Harrison (hereinafter the Harrison original patent) was reissued as reissue No. Re. 28,598 (hereinafter the Harrison reissue patent).

Despite their omission in the Affidavit of Thomas A. Briody, filed herein by plaintiffs in support of the instant motion, there were, in fact, other patents involved in all of the listed actions. In every case in which reissue patent Re. 28,507, (the Rusch reissue patent) was involved so also was patent 3,659,284, (the Rusch original patent) involved. Moreover, in all cases in which reissue patent Re. 28,598, (the Harrison reissue) was involved so also was patent 3,659,285 (the Harrison original patent) involved (See accompanying Affidavits of Thomas E. Smith and Scott Hover-Smoot, together with the certified copies of Amended Complaint in Midway Mfg. Co. v. The Magnavox Co. et al, (S.D.N.Y. 74 Civ: 1657 CBM (attached hereto as Appendix C); Answer and Counterclaim in APF Electronics, Inc. et al v. The Magnavox Co. et al, S.D.N.Y. 79 Civ. 1129 LWP (attached hereto as Appendix D); and Complaint

in North American Foreign Trading Corp. v. The Magnavox Co. et al , S.D.N.Y. 81 Civ. 0564 (attached hereto as Appendix E). Plaintiffs have made a practice of suing on the original patent as well as the reissue patent once the reissue has been obtained. Consequently, plaintiffs' filing for a Baer reissue patent in no way allays defendant's fear that it will, in fact, be sued in the future on the Baer original patent.

Plaintiffs' Decision Not to Enforce the Baer Original Patent is Merely a Decision to Delay Suit

Plaintiffs also allege that they have "decided" not to enforce the Baer original patent during the pendency of the Baer reissue application. Such a unilateral decision is certainly revokable at best. Moreover, their "decision" clearly does not go so far as to assure that they will not enforce the Baer original patent after a decision on the Baer reissue application. Even taking plaintiffs' "decision" at face value it is clear that defendant can expect to be sued on the Baer original patent once there is a decision on the Baer reissue application -- regardless of what that decision might be. Plaintiffs' decision to postpone enforcement of the Baer original patent only serves to prolong the litigation between the parties and is the very practice the declaratory judgment act is designed to defeat.

Defendant's Apprehension of Litigation Did Not Require Participation in the Baer Reissue Proceedings

Plaintiffs further state that defendant can have no real or reasonable apprehension of future liability and that is apparently shown to plaintiffs' mind by defendant not participating in the proceedings of the Baer reissue application. Defendant has choosen to rely upon the Court for its challenge to plaintiffs' patents rather than upon the alternative limited proceeding before the Patent Office. Defendants' election should not and cannot be taken as any indication of a lack of apprehension. If such apprehension need be shown by affirmative action of defendant, defendant would have been required to file a declaratory judgment action on the Rusch reissue patent itself since defendant was clearly placed in apprehension of suit on that

patent by its exchange of correspondence with plaintiff Magnavox (see attachments to the Affidavit of Edward W. Goodman filed herein by plaintiffs in support of the instant motion). Defendant, however, chose not to file a declaratory judgment action nor to participate in the Baer reissue application but rested in the hope that plaintiffs would eventually recognize that defendant's activity does not infringe any valid patent claim of plaintiffs.

Moreover, plaintiffs indicate that defendant's fears should be allayed because the instant complaint refers only to the Rusch reissue patent. It should be noted, however, that plaintiffs' have made no binding admission that the Baer original patent is invalid. Clearly plaintiffs hope to place only the Rusch reissue patent in jeopardy in this litigation. If that patent fails here, plaintiffs will still have the Baer original patent with which to charge other defendants and, indeed, this very defendant with infringement at a later date.

Conclusion

Clearly, there is a case of controversy shown here. There is a real and reasonable apprehension of future litigation in addition to that already started by plaintiffs. To avoid such apprehension would be simple. Plaintiffs need merely admit with prejudice that the Baer original patent, as it stands, is invalid. To date, plaintiffs have declined to make such an assurance but rather seem intent on litigating that patent at a future date.

In view of the above it is respectfully submitted that a clear controversy is set forth and that there is real and reasonable apprehension that defendant will be subjected to litigation on the Baer original patent at some future date. Plaintiffs' motion should be denied.

FLEHR, HOHBACH, TEST,
ALBRITTON & HERBERT
Attorneys for Defendant

By 

Thomas O. Herbert

PROOF OF SERVICE BY MAIL

I am a citizen of the United States and a resident of the county of San Francisco. I am over the age of eighteen years and not a party to the above entitled action; my business address is: Suite 3400, Four Embarcadero Center, San Francisco, California 94111.

On 27 December 1982 I served the within

Memorandum in Opposition to Plaintiff's Motion to Dismiss Counterclaim, Declaration of Scott Hover-Smoot and Affidavit of Thomas E. Smith and Proposed Order

by placing a true copy thereof enclosed in a sealed envelope with postage thereon fully prepaid, in the United States post office mail box at San Francisco, addressed as follows:

Pillsbury, Madison & Sutro
Robert P. Taylor
225 Bush St.
P.O. Box 7880
San Francisco, Ca. 94120

Neuman, Williams, Anderson & Olson
Theodore W. Anderson
James T. Williams
77 West Washington St.
Chicago, Il. 60602

I, Scott R. Hover-Smoot, certify under penalty of perjury that the foregoing is true and correct.

Executed on 27 December 1982 at San Francisco, California.

Scott R. Hover-Smoot

United States Patent [19]

Rusch

[11] **Re. 28,507**

[45] **Reissued Aug. 5, 1975**

[54] **TELEVISION GAMING APPARATUS**

[75] Inventor: **William T. Rusch**, Hollis, N.H.

[73] Assignee: **Sanders Associates, Inc.**, South Nashua, N.H.

[22] Filed: **Apr. 25, 1974**

[21] Appl. No.: **464,256**

Related U.S. Patent Documents

Reissue of:

[64] Patent No.: **3,659,284**
Issued: **Apr. 25, 1972**
Appl. No.: **828,154**
Filed: **May 27, 1969**

[52] **U.S. Cl.** ..... **340/324 AD**; 178/6.8; 273/85 R; 315/377

[51] **Int. Cl.**[2] **G08B 5/36**

[58] **Field of Search** ..... 340/324 AD, 315/377

[56] **References Cited**

UNITED STATES PATENTS

2,455,992	12/1948	Goldsmith et al	315/22
2,595,646	5/1952	Doba et al	340/324 AD
2,847,661	8/1958	Althouse	315/22 X
3,017,625	1/1962	Evans et al	340/324 AD
3,046,676	7/1962	Hermann et al	35/25
3,151,248	9/1964	Glaser et al	250/227
3,158,858	11/1964	Ragen et al	340/324 AD
3,249,796	5/1966	Moffitt	315/22
3,497,760	2/1970	Kiesling	178/6.8 X

FOREIGN PATENTS OR APPLICATIONS

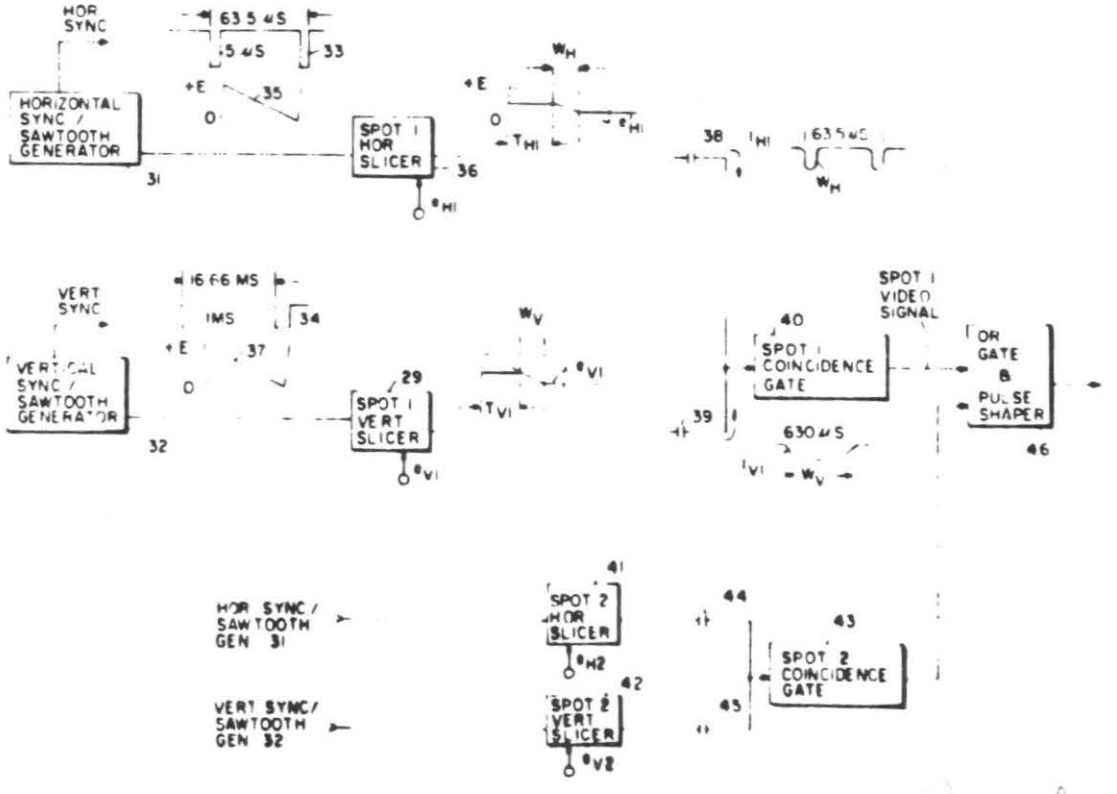
1,180,470	6/1959	France

Primary Examiner—David L. Trafton
Attorney, Agent, or Firm—Louis Etlinger, Richard I. Seligman

[57] **ABSTRACT**

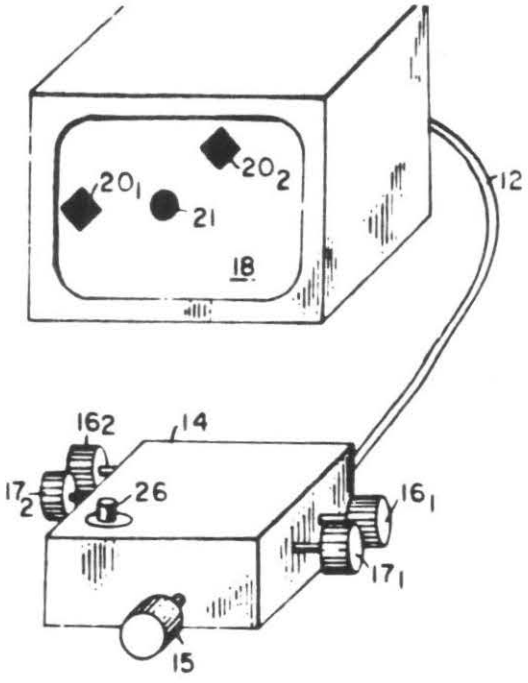
Apparatus and methods are herein disclosed for use in conjunction with standard monochrome and color television receivers, for the generation, display and manipulation of symbols or geometric figures upon the screen of the television receivers for the purpose of playing games. The invention comprises in one embodiment a control unit, connecting means and in some applications a television screen overlay mask utilized in conjunction with a standard television receiver. The control unit includes the control means, switches and electronic circuitry for the generation, manipulation and control of video signals which are to be displayed on the television screen. The symbols are generated by developing current pulses proportional to predetermined portions (slices) of horizontal and vertical sawtooth waves. The connecting means couples the video signals to the receiver antenna terminals thereby using existing electronic circuits within the receiver to process and display the signals. An overlay mask which may be removably attached to the television screen may determine the nature of the game to be played. Control units may be provided for each of the participants. Alternatively, games may be carried out in conjunction with background and other pictorial information originated in the television receiver by commercial TV, closed-circuit TV or a CATV station.

64 Claims, 35 Drawing Figures



Appendix A

FIG. 1



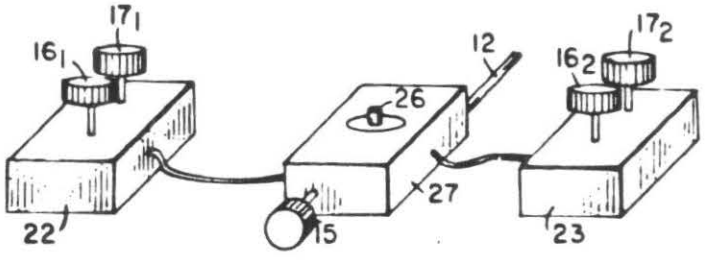


FIG. 1A

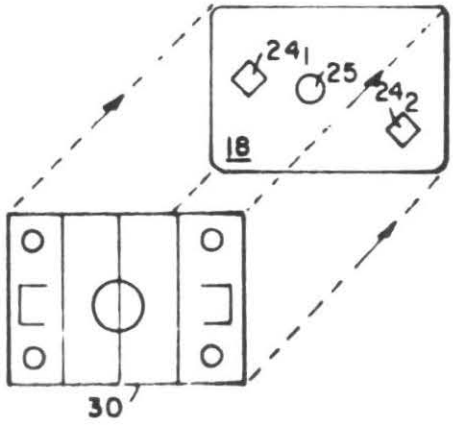


FIG. 2

INVENTOR.
WILLIAM T RUSCH
BY Richard D. Seligmon
ATTORNEY

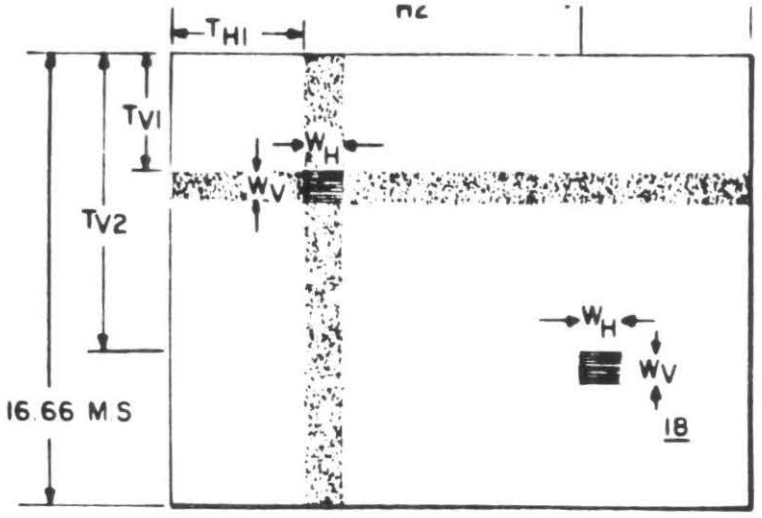


FIG. 3

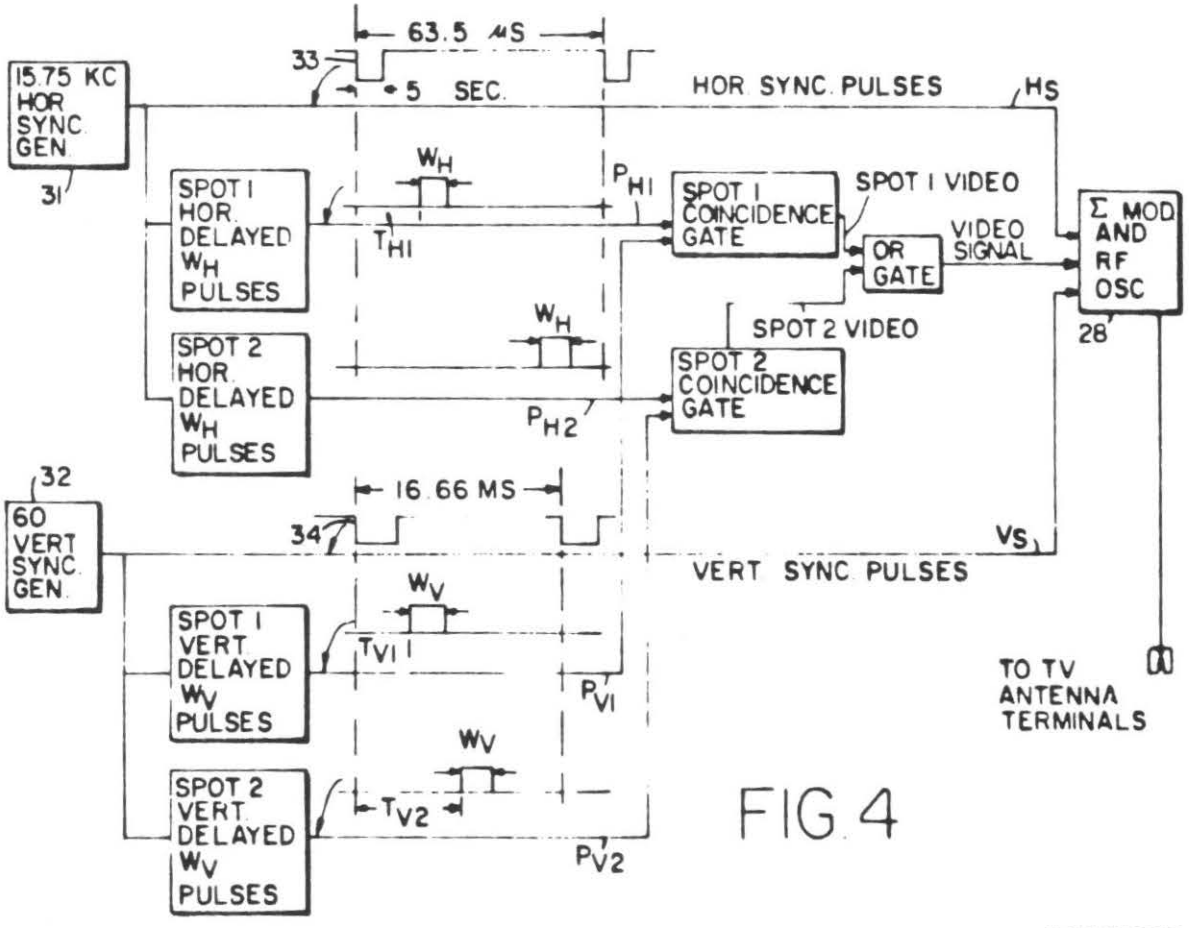


FIG. 4

INVENTOR.
WILLIAM T RUSCH
BY
Richard S. Seligman
ATTORNEY

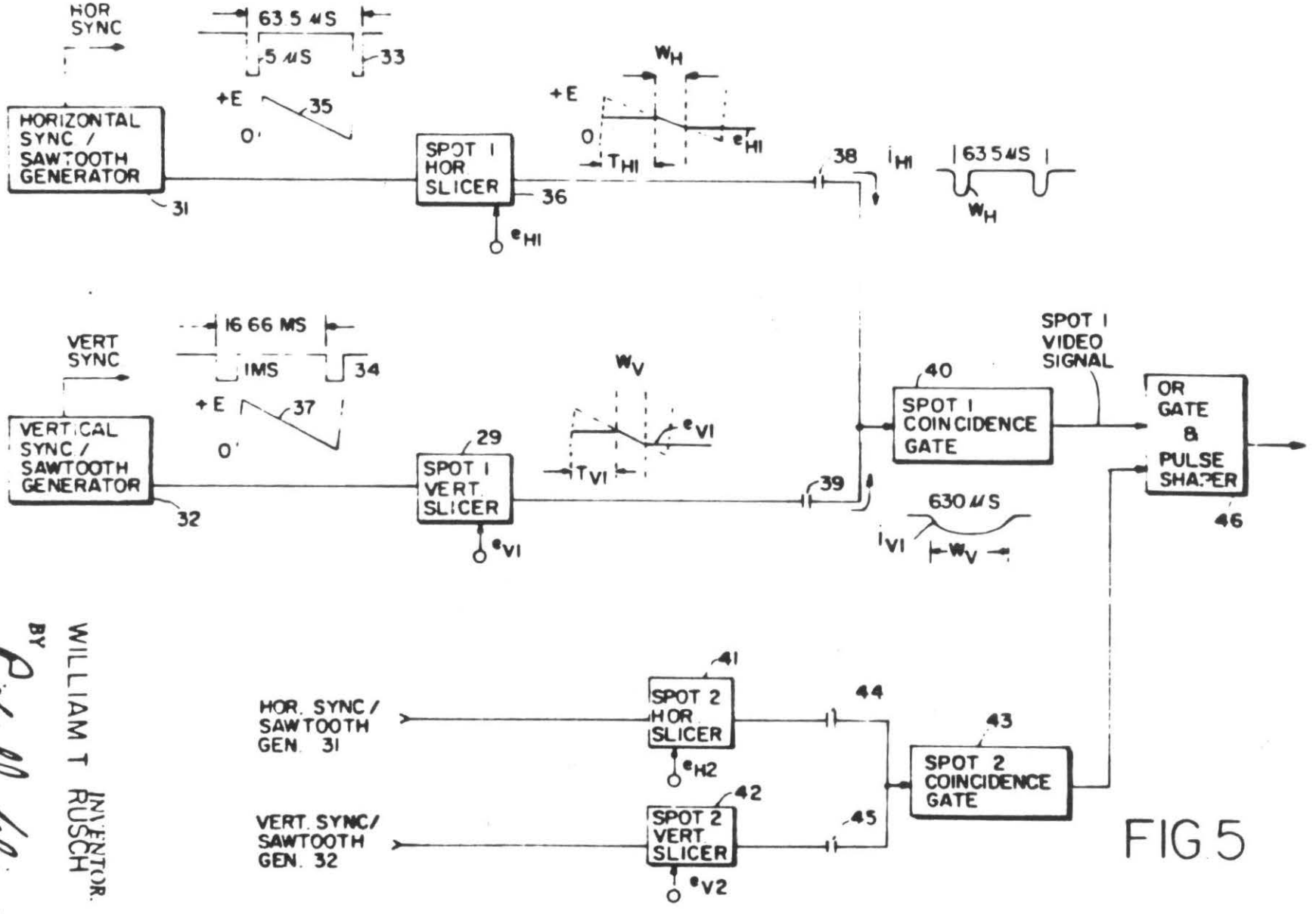
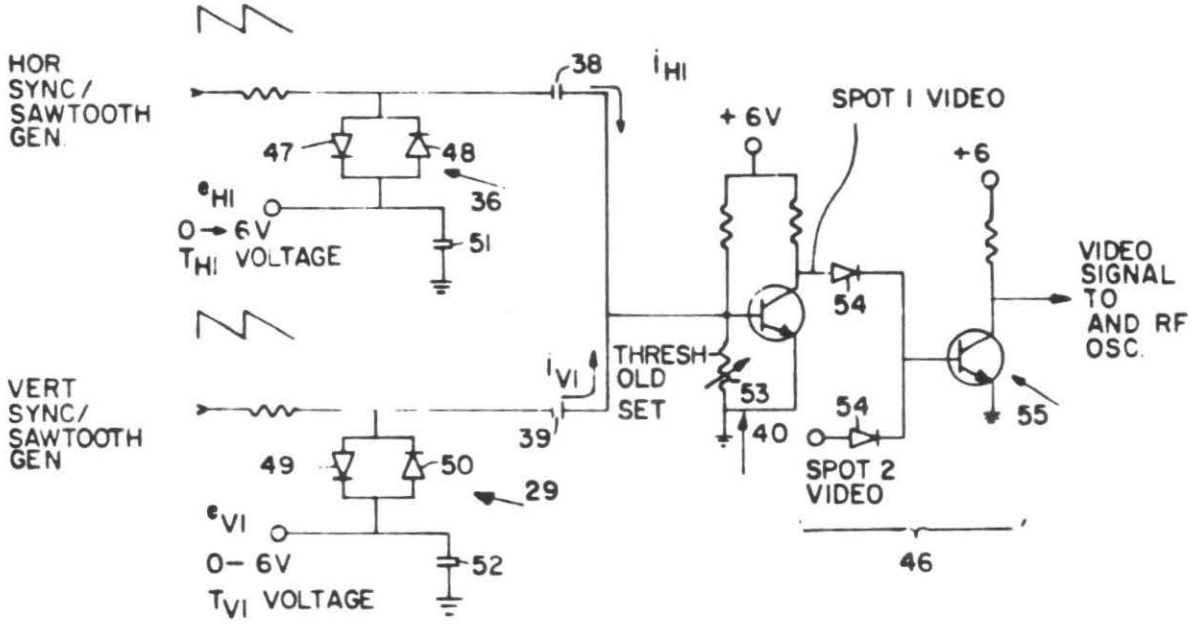


FIG 5

WILLIAM T RUSCH
INVENTOR.
BY Richard W. Kelly
ATTORNEY

FIG. 6



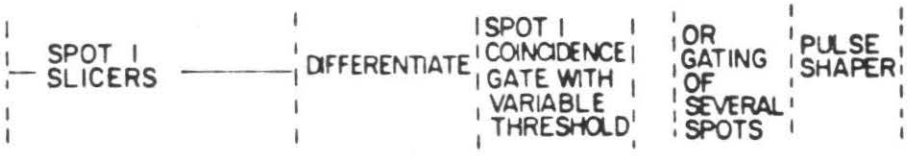


FIG. 8

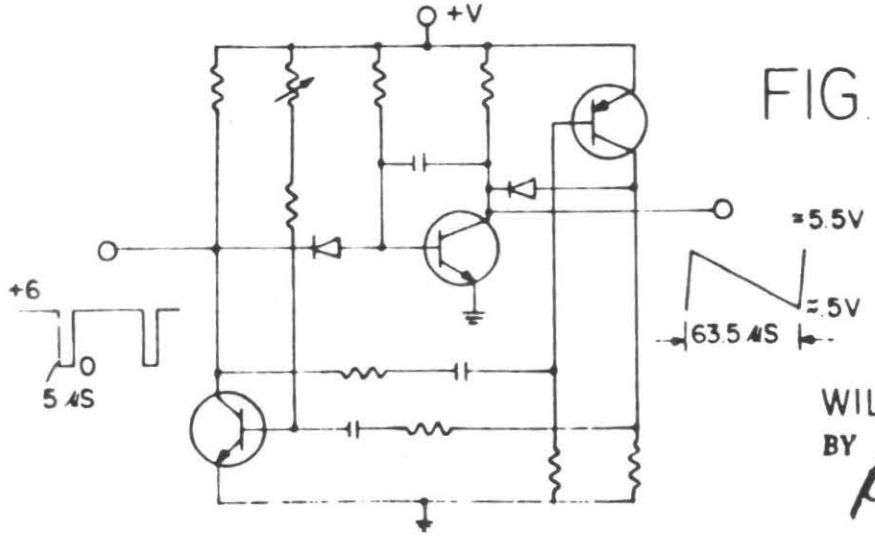


FIG. 7

INVENTOR.
WILLIAM T. RUSCH
BY Richard Seliger
ATTORNEY

FIG. 9A

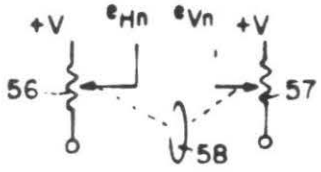


FIG. 9B

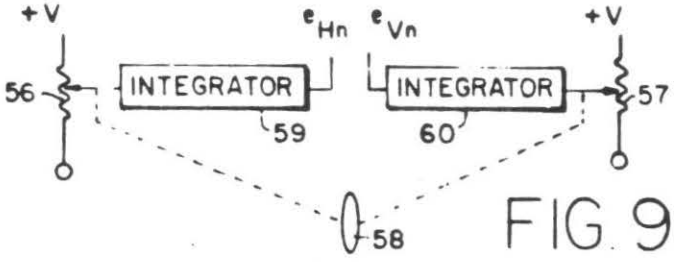


FIG. 9C

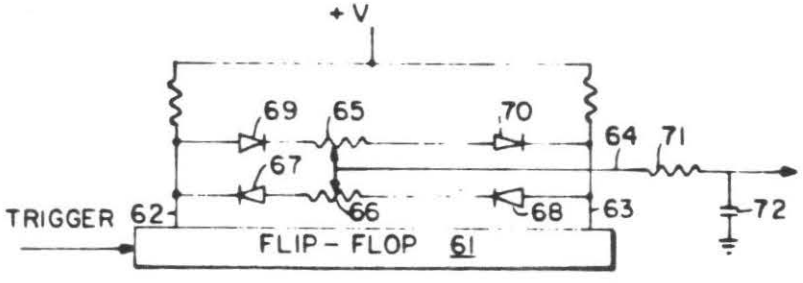


FIG. 10A

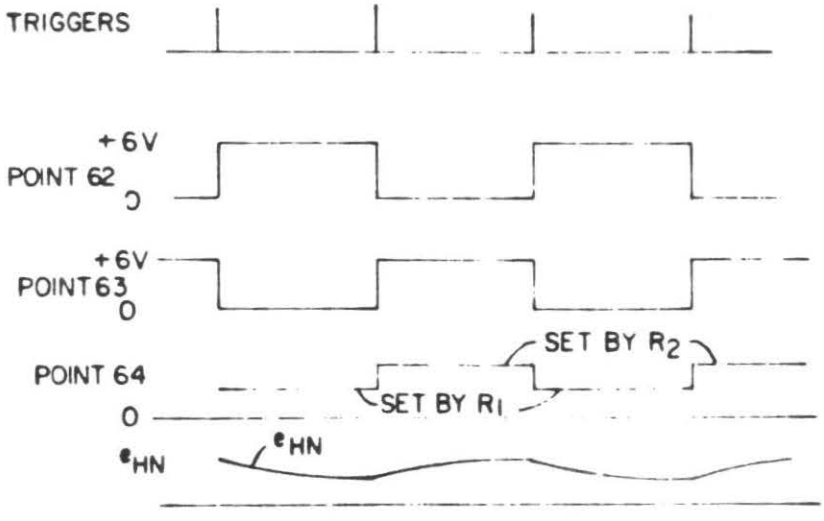


FIG. 10B

INVENTOR.
WILLIAM T. RUSCH
BY
Richard D. Seligman
ATTORNEY

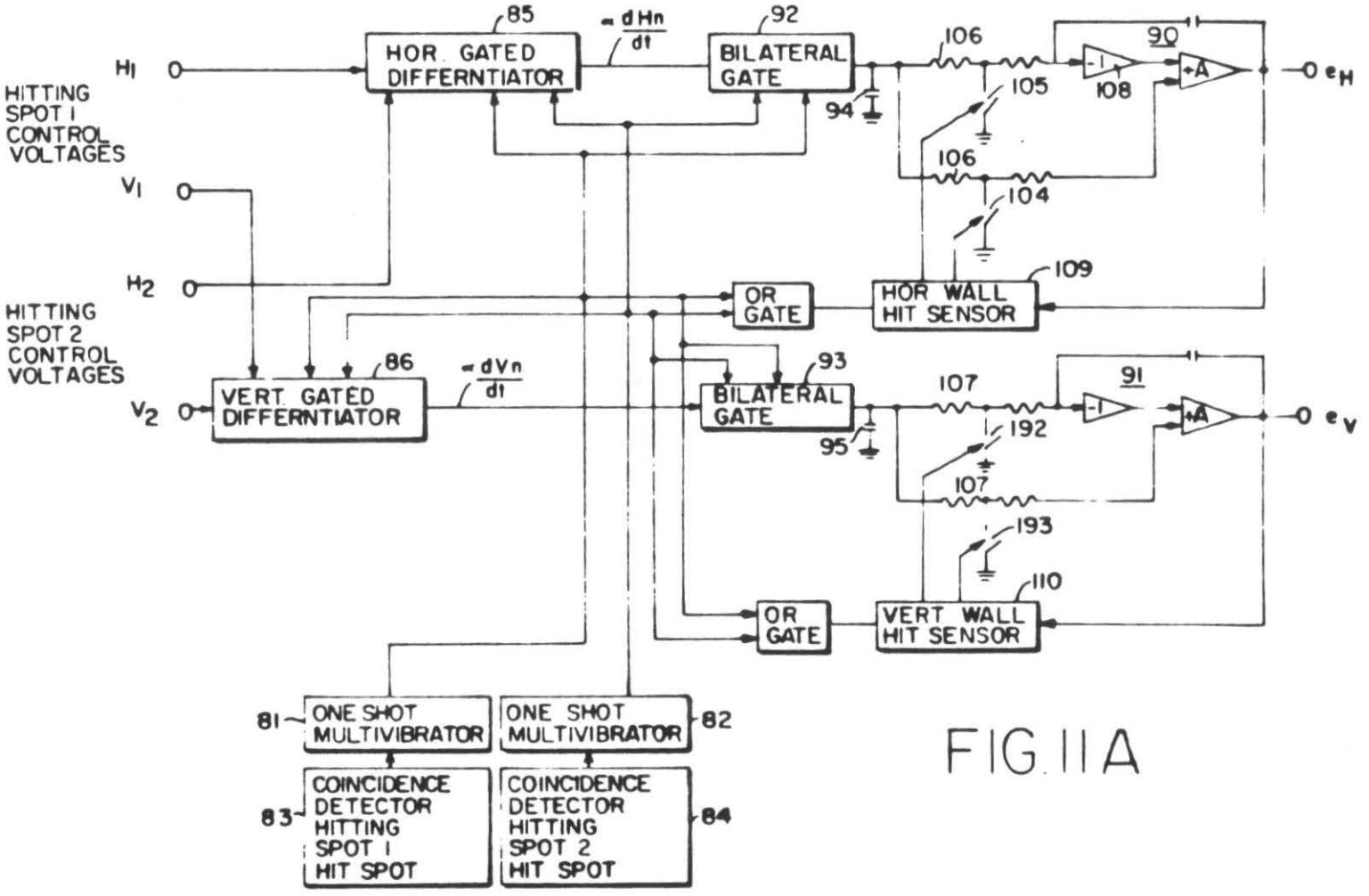


FIG. 11A

INVENTOR.
WILLIAM T RUSCH
BY Richard D. Lilligren
ATTORNEY

16 Sheets-Sheet 6

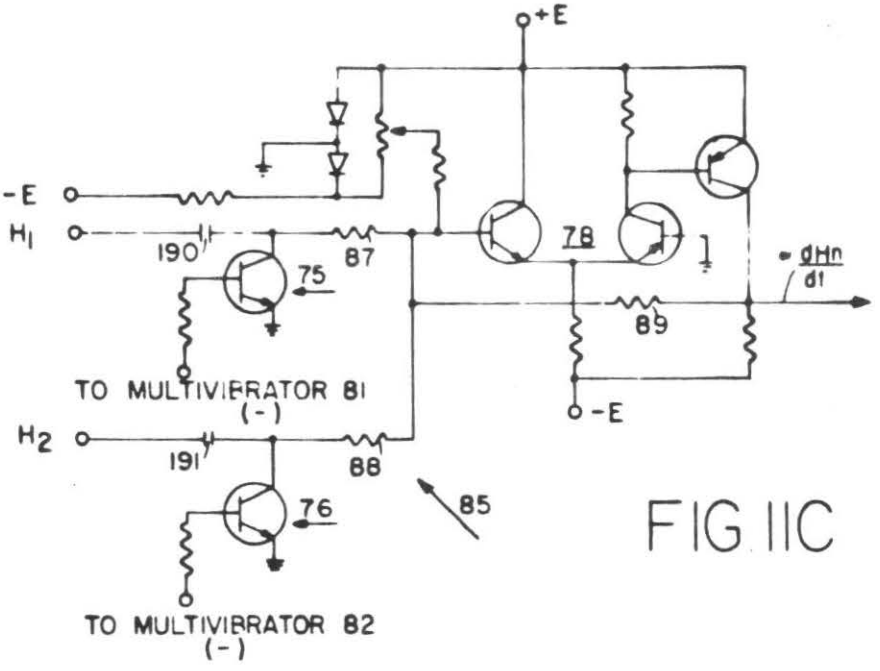


FIG. 11C

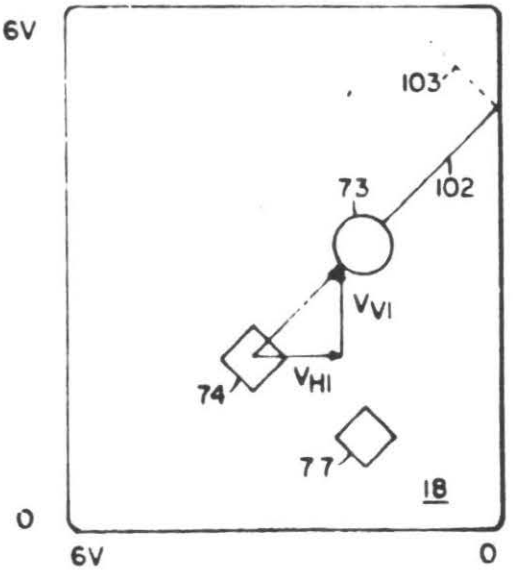


FIG. 11B

INVENTOR.
WILLIAM T RUSCH
BY
Richard Seliger
ATTORNEY

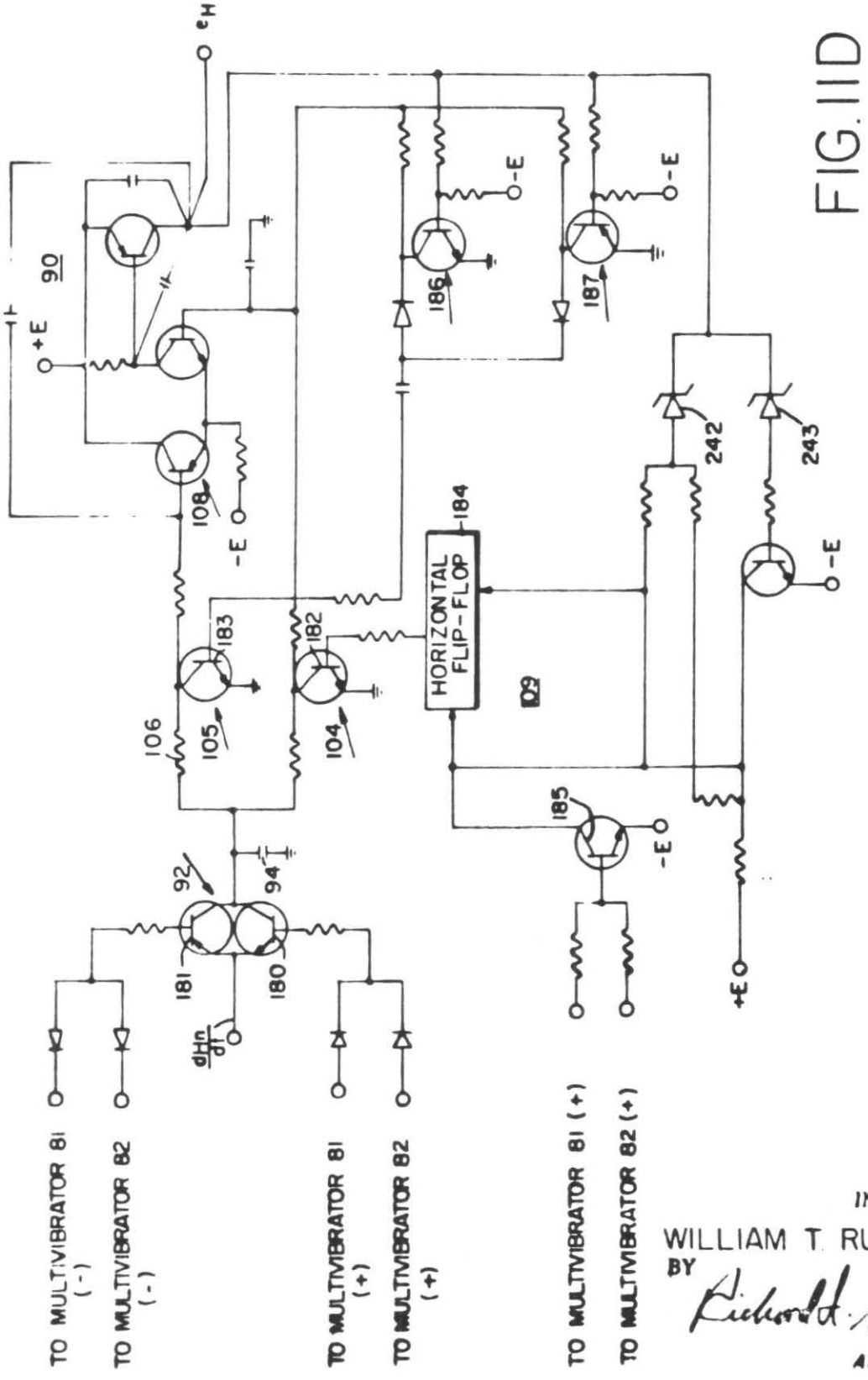


FIG. IID

INVENTOR.
WILLIAM T. RUSCH
BY Richard A. Felipsen
ATTORNEY

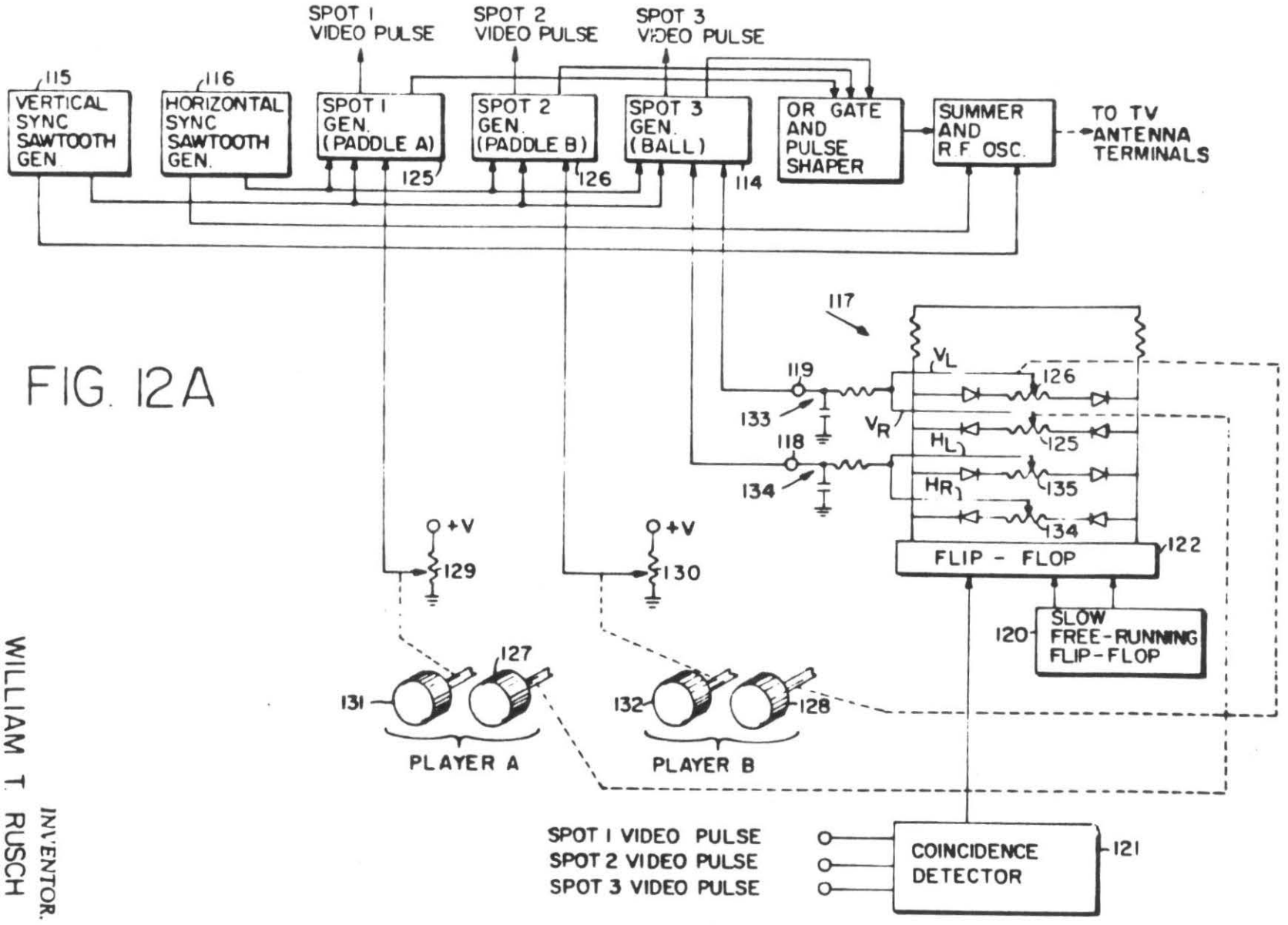


FIG. 12A

INVENTOR.
WILLIAM T. RUSCH
BY
Richard D. Kellogg
ATTORNEY

16 Sheets-Sheet 9

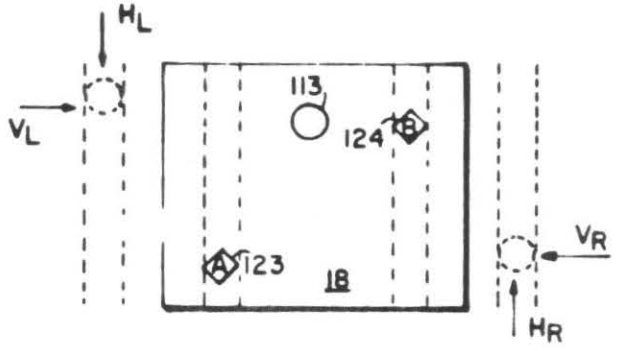


FIG. 12B

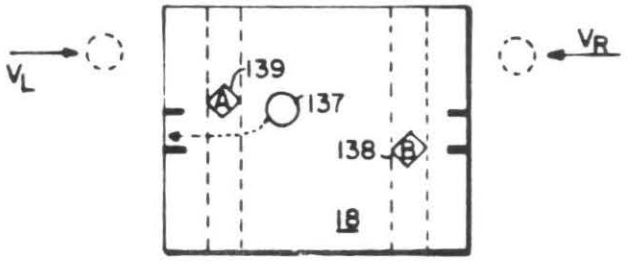


FIG. 12C

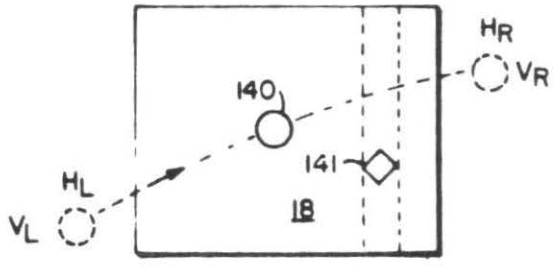


FIG. 12D

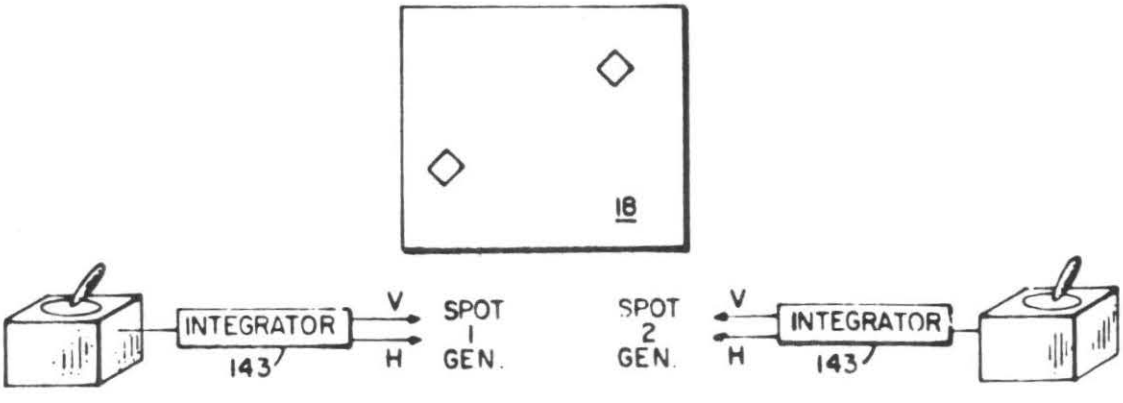


FIG. 13

INVENTOR.
WILLIAM T. RUSCH
BY
Richard J. Seligman
ATTORNEY

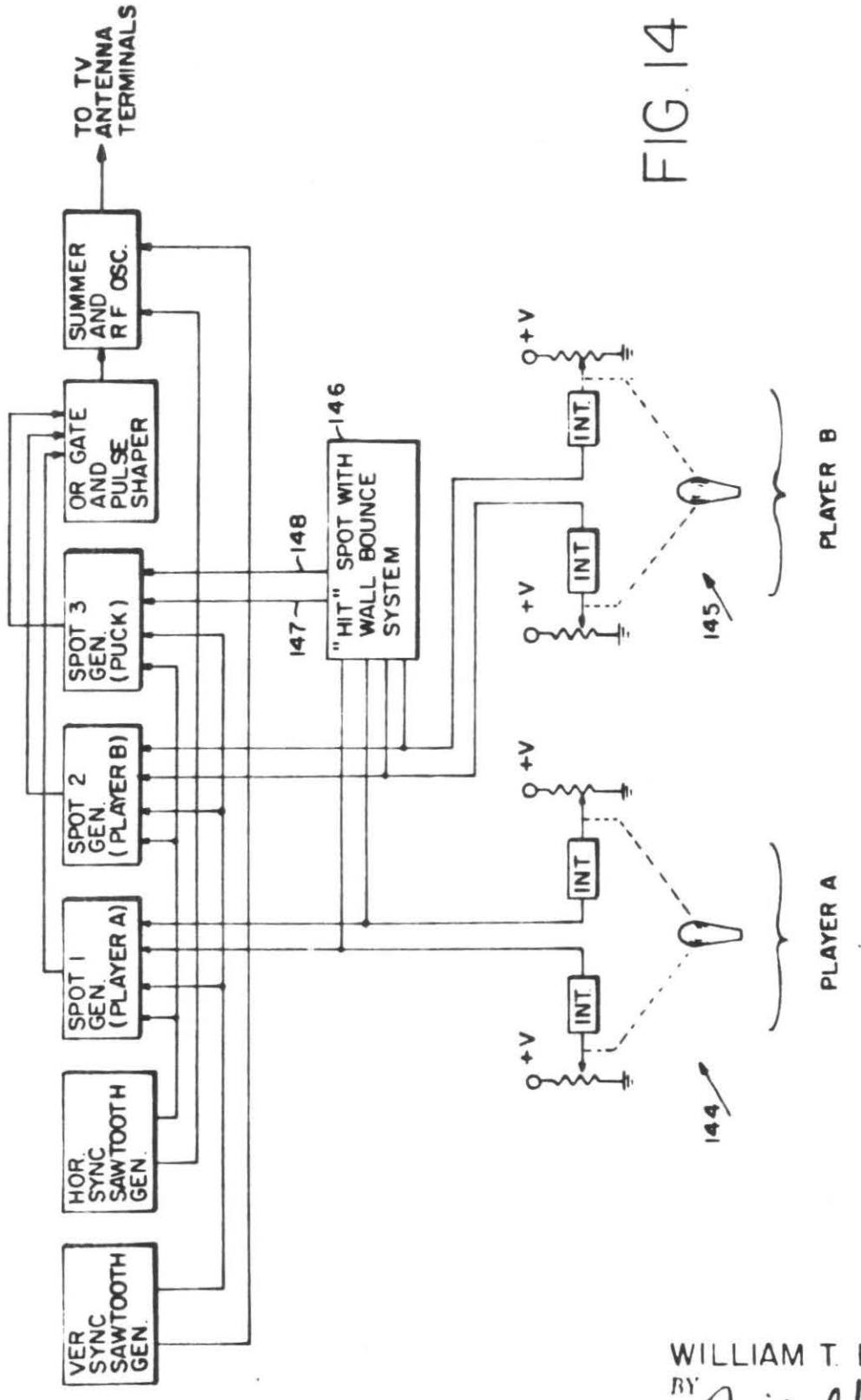
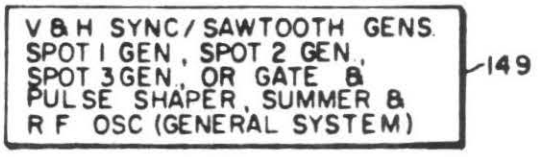


FIG. 14

INVENTOR.
WILLIAM T. RUSCH
BY Richard J. Seligman
ATTORNEY



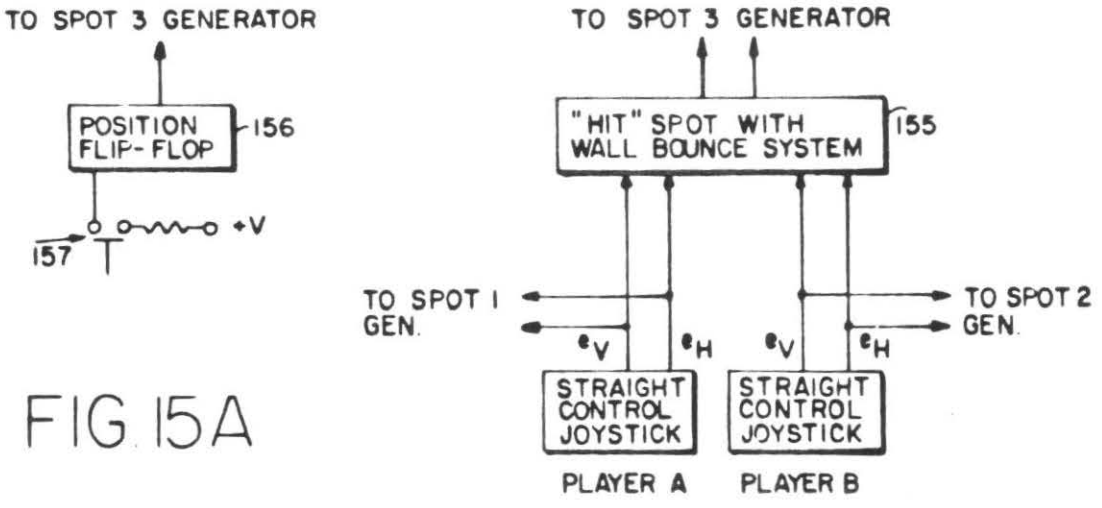


FIG. 15A

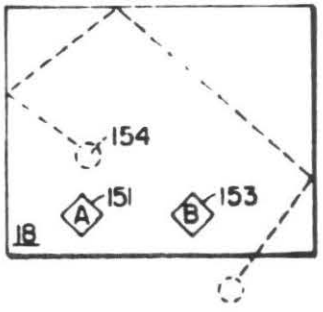


FIG. 15B

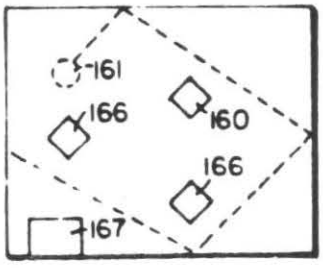


FIG. 16B

INVENTOR.
WILLIAM T. RUSCH
BY Richard A. Seligman
ATTORNEY

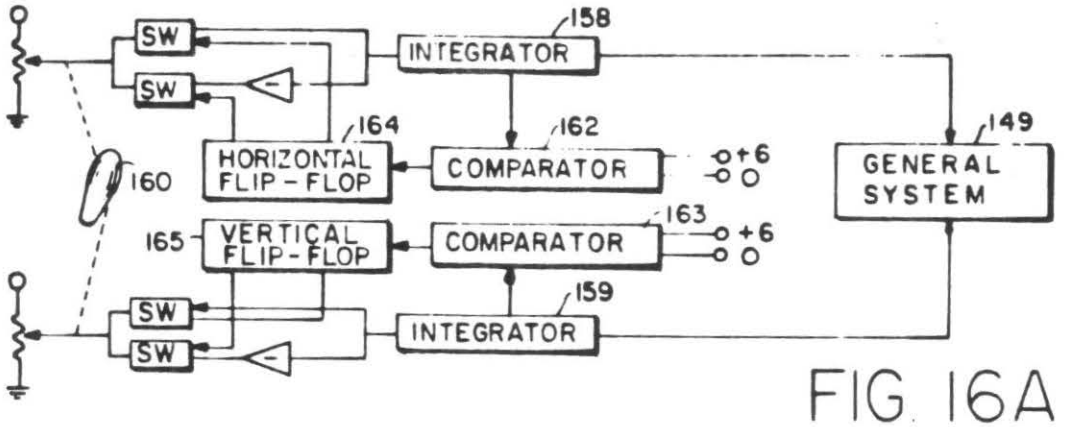


FIG. 16A

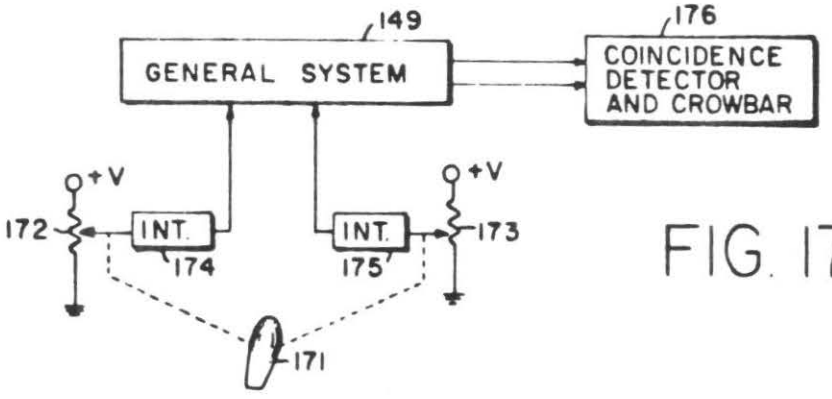


FIG. 17A

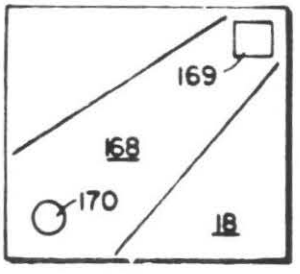


FIG. 17B

INVENTOR.
WILLIAM T. RUSCH
BY Richard J. Seligman
ATTORNEY

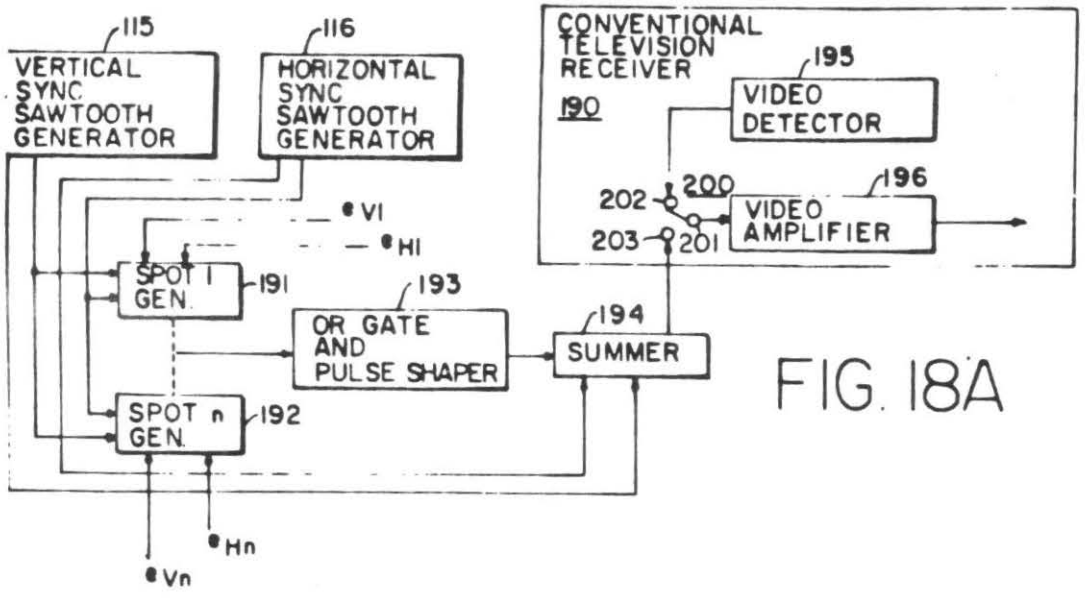


FIG. 18A

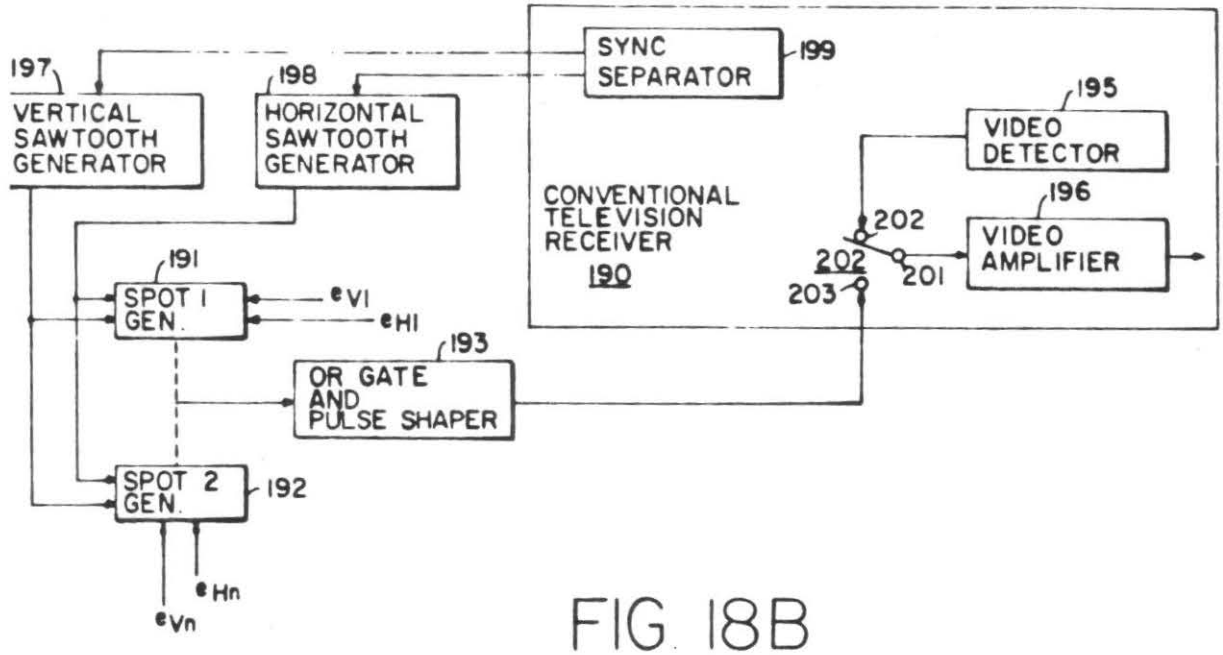


FIG. 18B

INVENTOR.
WILLIAM T. RUSCH
BY
Richard J. Seligman
ATTORNEY

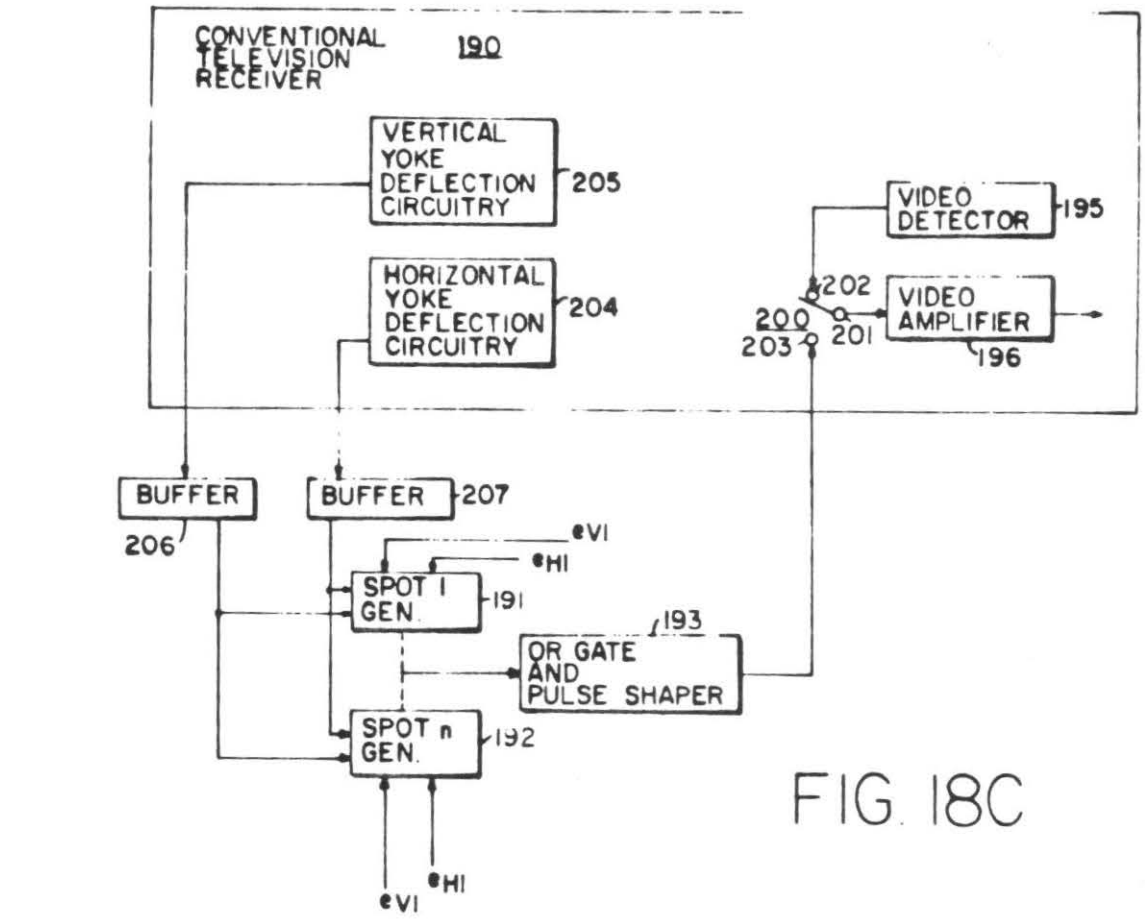


FIG. 18C

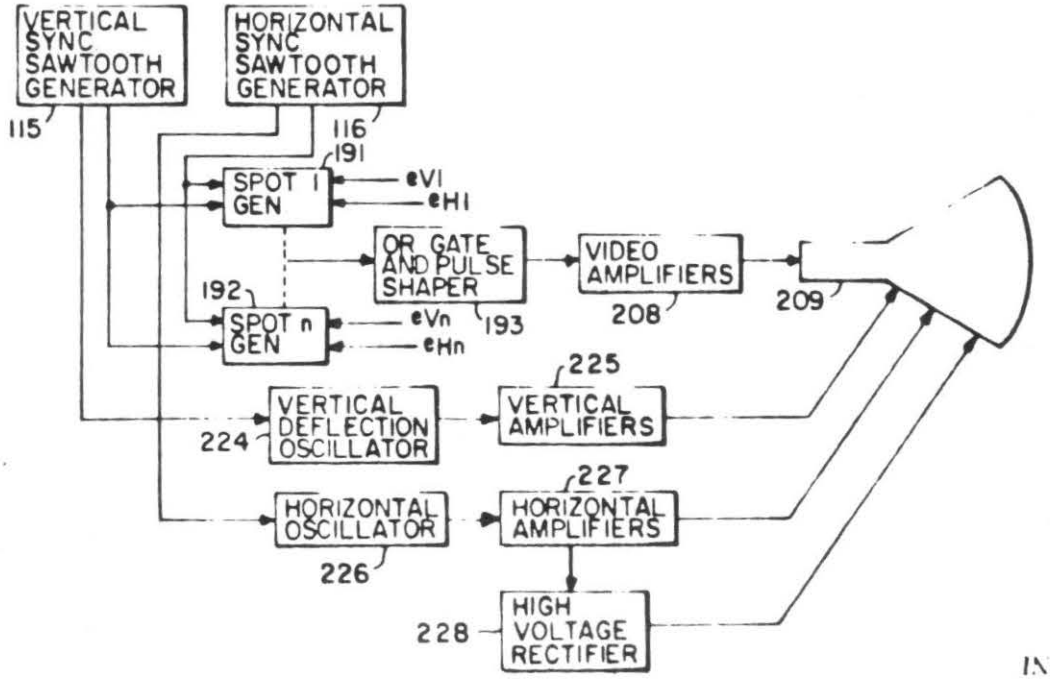


FIG. 19

INVENTOR.
WILLIAM T. RUSCH
BY
Richard J. Seligman
ATTORNEY

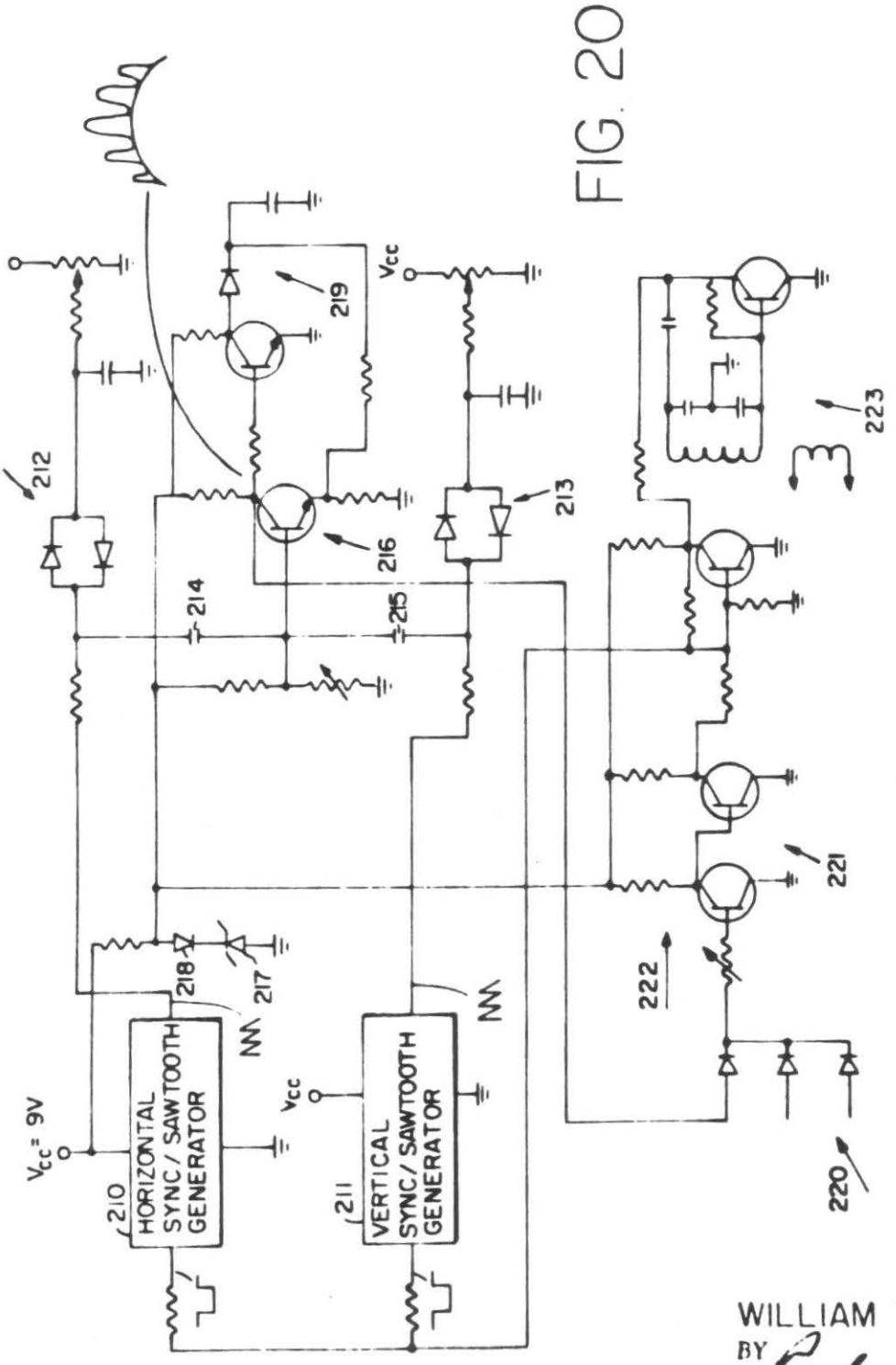


FIG. 20

INVENTOR.
WILLIAM T. RUSCH
BY Richard L. Feligno
ATTORNEY

TELEVISION GAMI[illegible] APPARATUS

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This invention relates to the subject matter disclosed in application Ser. No. 126,966 filed Mar. 22, 1971, a continuation of application Ser. No. 697,798 filed Jan. 15, 1968, now abandoned; and application Ser. No. 713,862, filed Mar. 18, 1968, now U.S. Pat. No. 3,497,829.

BACKGROUND OF THE INVENTION

This invention relates to an apparatus and method by means of which standard television receivers can be utilized as active rather than passive instruments. This is accomplished in certain embodiments by having participants manipulate controls of a control unit connected to the television receiver to cause a symbol, such as a rectangle, circle, ring, star, cross, spot or a plurality of spots, to be displayed upon the television screen by means of which the participants can play a variety of games, participate in simulated training programs, as well as carry out other activities. By way of example, modified versions of the well-known game of ping-pong may be played by two participants by physically or electronically placing an appropriate mask representing the net upon the screen of the television receiver. Three displayed spots represent two paddles and a ball wherein the ball is moved in a particular direction when "hit" by a paddle.

Heretofore, color and monochrome television receivers have been used generally by the home and other viewers as passive devices; i.e., the television receiver is used only as a display means for programming originating at a studio. The viewer is limited to selecting the presentations available for viewing and is not a participant to the extent that he can control or influence the nature of, or add to the presentation displayed on the receiver screen.

A standard receiver employed with auxiliary equipment to provide an active form of home entertainment is described in a patent application for "Television Gaming and Training Apparatus," Ser. No. 126,966 filed Mar. 22, 1971 a continuation of Ser. No. 697,798, filed Jan. 15, 1968, and assigned to the assignee of this application. Since most homes are equipped with television receivers, the only expense required to provide added family enjoyment is the expense of a control unit of one type or another.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide apparatus and methods for displaying video signals on the screen of a television receiver, where some or all of the video signals are both generated and controlled by apparatus external to the television receiver.

It is another object of the present invention to provide an apparatus and method wherein a standard color or monochrome television receiver is utilized as an active instrument for playing various types of games involving one or more participants.

It is a further ob[illegible] of the present invention to provide a device whe[illegible]by an individual may pit his alertness, skill, manual dexterity and visual acuity against automatically controlled video displays.

It is yet a further object of the present invention to provide an apparatus which will generate spots such as squares, rectangles, circles, rings, stars, etc. which may be controlled by one or more participants for playing various types of games.

It is another object of the present invention to provide a cathode ray tube apparatus for displaying symbols to be manipulated by participants.

It is yet another object of the present invention to provide an apparatus which will allow one or more participants to actively use a standard television set while receiving background and other pertinent pictorial information from a cooperative commercial TV, closed-circuit TV, or CATV station, thus combining or alternating studio and home-generated information on the TV screen.

It is still another object of the present invention to allow the use of standard TV set for gaming or other activities without the need for any kind of internal electrical connection to the TV set for the introduction of video and/or chroma signals, connections being required to be made only to the externally-accessible antenna terminals.

In accordance with one embodiment of the present invention, a television gaming apparatus is provided for generating video signals in accordance with the standardized television format, which signals may be controlled by an individual operator by means of a joystick or other manually operative means. The television gaming apparatus comprises control apparatus having included therein the necessary electronic circuits to produce video signals which are compatible with standard television receivers.

The control apparatus has video signal control means mounted thereon for each access and connecting means are provided for coupling the video signals generated within the control box to the television receiver.

By way of illustration, the television gaming apparatus can be used for playing a game of ping-pong by providing on a TV screen two spots which represent paddles. Means are provided for enabling the players to control the vertical movement of the spots. Means are also provided for generating on the screen of the television receiver a third spot which represents the ping-pong ball, which spot automatically moves from an off-screen left position on an off-screen right position and vice versa unless "hit" by a paddle spot whereupon the ball spot will change direction. The players have further controls for changing the vertical position of the ball spot.

Suitable overlays or presentations from a cooperative TV station may be used in conjunction with said games to enhance the asthetic appeal thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

The above-mentioned and other features and objects of this invention will become more apparent by reference to the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a pictorial view illustrating the principle components of an embodiment of the invention;

FIG. 1A is a pictorial view illustrating an alternate embodiment for the control unit of FIG. 1;

FIG. 2 is a sketch illustrating a typical TV screen and overlay mask as employed in an embodiment of this invention,

FIG. 3 is a sketch illustrating the manner in which spots are formed on a TV screen,

FIG. 4 is a block diagram illustrating the spot generation,

FIG. 5 is a block diagram of the preferred mode of generating spots on a TV screen,

FIG. 6 is a plurality of sketches illustrating shapes of representative spots,

FIG. 7 is a schematic of a sync/sawtooth generator employed in the embodiment of FIG. 5,

FIG. 8 are schematics of circuits employed in the embodiment of FIG. 5,

FIG. 9A is a schematic of potentiometer controls used to generate slicer control voltages,

FIG. 9B is a schematic of joystick controlled potentiometers used to generate slicer control voltages,

FIG. 9C is a schematic of joystick controlled potentiometer-integrator control used to generate slicer control voltages,

FIG. 10A is a schematic of a position flip-flop circuit used to control spots in certain applications of this invention;

FIG. 10B are sketches of representative waveforms of the circuit of FIG. 10A;

FIG. 11A is a block diagram of apparatus of controlling a "hit" spot;

FIG. 11B is a sketch illustrating the manner in which the apparatus of FIG. 11A controls a "hit" spot, [supplies]

FIG. 11C is a schematic of the horizontal gated differentiator of FIG. 11A;

FIG. 11D is a schematic of the bilateral switch, integrator and wall bounce control of FIG. 11A;

FIG. 12A is a diagram of apparatus for a simulated ping-pong game;

FIG. 12B is a sketch of a TV screen illustrating the manner of play of the ping-pong game of FIG. 12A;

FIG. 12C is a sketch of a TV screen illustrating the manner of play of a simulated hockey game using the apparatus of FIG. 12A;

FIG. 12D is a sketch of a TV screen illustrating the manner of play of a simulated baseball game;

FIG. 13 is a sketch illustrating a class of games ("chase" games) which can be played using the apparatus of this invention;

FIG. 14 is a diagram of apparatus for a simulated hockey game;

FIG. 15A is a diagram of apparatus for the simulated handball game;

FIG. 15B is a sketch of a TV screen illustrating the manner of play of a simulated handball game using the apparatus of FIG. 15A;

FIG. 16A is a diagram of apparatus for a simulated pinball game;

FIG. 16B is a sketch of a TV screen illustrating the manner of play of a pinball game using the apparatus of FIG. 16A;

FIG. 17A is a diagram of apparatus for a simulated bowling game;

FIG. 17B is a sketch of a TV screen illustrating the manner of play of a bowling game using the apparatus of FIG. 17A;

FIGS. 18A-18C are block diagrams of "built-in" embodiments of the invention,

FIG. 19 is a simplified block diagram of another embodiment of TV gaming apparatus, and

FIG. 20 is an alternate embodiment of circuits employed in the embodiment of FIG. 5.

DESCRIPTION OF PREFERRED EMBODIMENTS

The principal components of one embodiment of a television gaming system configured according to the invention are illustrated in FIG. 1 which is a pictorial view showing a television receiver 10, a control unit 14 and means 12 for connecting control unit 14 to receiver 10. The television receiver 10 employed can be any of the standard commercially available models that are generally used for home entertainment. Either a monochrome or color television set may be used with the present invention since the basic principles of the invention apply to both types. The connection means 12 is in this embodiment a shielded cable, for example, shielded twin lead, and is attached to the antenna terminals of receiver 10 in conventional fashion.

Control unit 14 generates video signals shown as spots 20_1, 20_2 and 21. The spots 20_1 and 20_2 are positioned on the receiver screen 18 by knobs 16_1, 17_1, and 16_2, 17_2, respectively. For clarity, the spot 21 is illustrated as a circle and the spots 20 are illustrated as diamonds, however, many shapes can be generated. In the devices to be described hereinafter, circles are generally employed.

Knob 16 controls the vertical position of spot 20_1 while knob 17 controls the horizontal position thereof. Thus, it can be seen that the spot 20_1 may be positioned at any point on the screen by the proper manipulation of knobs 16 and 17. Spot 20_2 is positioned in like manner by knob 16_1, 17_1. In this embodiment spot 21 is automatically positioned on screen 18 without manual control. This will be described more fully hereinafter. A reset switch 26 is shown on the control unit 14 and is used to reset the picture on the television screen. For example, a game may be played in which one spot is to be positioned over the other and when this is accomplished one spot will disappear and the background will change color. When games of this nature are played, a reset means is required before play can be resumed. Reset switch 26 performs this function.

A knob 15 controls background color for color TV receiver applications wherein a chroma generator is employed in the manner set forth in said application Ser. No. 126,966. Alternatively, control unit 14 may be broken up into a master control unit containing the electronic circuits and individual control units containing control knobs 16_1, 17_1, and 16_2, 17_2, whereby each participant may operate from a position away from the other and so not to interfere with other players. This is illustrated in FIG. 1A wherein control unit 14 is broken up into a master control unit 27 and individual control units 22 and 23. The master control unit 27 contains the electronic circuitry found in control unit 14 and controls 26 and 15. Knobs 16, 17 and 16_1, 17_1 which position the spots 20_1 and 20_2 are situated on individual control units 22 and 23 respectively.

The knobs 16, 17 may be combined into a single joystick permitting control of the horizontal and vertical spot positioning by a single control means.

Other spot position and control means (not shown) can be incorporated into the control unit(s) and these will be described hereinafter.

Rather than provide a separate control unit, the electronic circuitry of the control unit could be built into the television receiver as a constituent part thereof and the receiver sold as both an active and passive home entertainment system. Control units containing the actual manipulating controls can be provided as above.

A typical sequence of steps to play a game using the present invention would be as follows. 1. Attach connection means **12** to TV set **10** at the antenna terminals thereof, if not already attached, 2. turn the TV set on, 3. select the proper channel on the set for the control unit being used, 4. apply power to the control unit, 5. attach a mask on the face of the TV screen, if required for the game to be played, 6. begin the game.

Referring now to FIG. **2**, a television screen **18** is illustrated having three spots 24_1, 24_2, and **25** displayed thereon. Spots **24** are "hitting" spots and spot **25** is a "hit" spot. Spots 24_1 and 24_2 represent, for example, hockey players while spot **25** represents a hockey puck. An overlay mask **30** of some type of transparent material such as plastic or the like, having some type of pattern, picture or other illustration pertaining to the particular game to be played is shown in a lifted position. Prior to engaging in a game, the overlay mask **30** is temporarily attached to television screen **18** and in such close proximity to it as not to create any distortion when viewed with reference to spots **24** and **25**. One type of overlay mask represents a hockey field to be used for playing a modified game of hockey. Still another pattern could represent a ping-pong table, baseball diamond, etc. These are but a few of the many type games that can be adapted for use with the present invention.

Alternatively, rather than employ overlay mask **30**, the pattern to be provided could be displayed directly on the screen **18**. The pattern could be broadcast by TV stations or alternatively could be sent to a non-used channel over closed-circuit or CATV lines. It could also be generated electronically in the video control system.

The basic theory of TV gaming devices as described herein is now set forth.

Referring to FIG. **3**, at time zero the TV electron beam is at the upper left of screen **18**. It starts moving quickly to the right and slowly downwards. Sixty-three and one-half (63.5) microseconds later a 5 microsecond horizontal sync pulse is fed into the TV set, causing the beam to fly back rapidly to the left of the screen. The beam then moves to the right for 63.5 microseconds until the next horizontal sync pulse causes the next flyback to the left. After about 250 such horizontal scans (lines) the beam has progressed to the bottom of the screen. A vertical sync pulse fed into the TV set causes rapid (1 millisecond) vertical flyback to the top of the screen and another cycle begins.

Now, still referring to FIG. **3**, assume that the major portion of the screen is dark (beam blanked) except for the areas shown as SPOT **1** and SPOT **2**. The spots are made by passing a (positive) unblanking video signal to the TV set when, and only when, the "beam" is passing over the areas of the spots. (Quotes are used around beam because although there is no real beam when blanking is in effect, the scanning signals occur and can be thought of as still moving the "non-existent beam" in the scanning pattern).

The video (unblanking) signals required for spot generation as described with the aid of FIG. **3**. To derive

SPOT **1**, assume that a pluse of width W_H is generated T_H microseconds after the occurrence of each horizontal sync pulse. Define these new pulses as P_H – horizontal video pulse for SPOT **1**. If these P_H pulses were used as unblanking (video) in the TV set, the beam would brighten whenever it had moved a distance equivalent to T_H from the left side of the screen. If would stay bright for a length equivalent to W_H and then darken. This would happen all during the vertical scan and 250 bright little line segments of width W_H would appear to the eye as a vertical column (shown shaded in FIG. **3**).

Now, SPOT **1** vertical video pulses P_{V1} are made to be of width W_V and to occur T_{V1} milliseconds after the start of the vertical sweep. W_V is on the order of 63.5 microseconds, permitting some 10 horizontal scans to take place with P_{V1} is on. If P_{V1} were used alone as the unblanking (video) signal to the TV set, ten lines the width of the set would be brightened while P_{V1} was on and a bright horizontal bar of width W_V (shown shaded in FIG. **3**) would be viewed.

As the last step in spot generation, SPOT **1** horizontal video pulses (P_{H1}) and vertical video pulses (P_{V1}) are passed through a coincidence gate. The gate has an output only when both P_{H1} and P_{V1} are on. The gate output becomes SPOT **1** video (unblank) signal. From FIG. **3** it is obvious that the beam is now unblanked only where the P_{H1} vertical shaded column and the P_{V1} horizontal shaded bar overlap. Thus, a bright spot SPOT **1**, comprised of about 10 small line segments, each W_H wide, is developed. SPOT **2** is developed in the like manner.

FIGS. **4** and **5** are block diagrams illustrating the manner in which the signals discussed with respect to FIG. **3** are generated.

The timing for the television gaming system is established by a horizontal sync/sawtooth generator **31** and a vertical sync/sawtooth generator **32**. The horizontal sync/sawtooth generator **31** generates a series of negative horizontal sync pulses **33** having a repetition rate equivalent to the standard horizontal scanning frequency used in United States commercial television receivers and the vertical sync/sawtooth generator generates a series of negative vertical sync pulses **34**.

The vertical snyc/sawtooth generator **31** also generates a 15.75 KHz sawtooth wave **35** (refer now to FIG. **5**). Sawtooth wave **35** has end limits of +E and O. It is directly coupled to a SPOT **1** horizontal slicer **36**. A "slice" of the sawtooth ramp of length W_H is passed through the slicer. By varying voltage e_{H1}, delay T_{H1} can be varied for spot positioning from left to right of the TV screen.

A 60Hz sawtooth **37** is generated by vertical sync-/sawtooth generator **32** and is similarly sliced in a SPOT **1** vertical slicer **29**, to give ramp width W_V and voltage controlled delay T_{V1}. The two sliced waves are differentiated by capacitors **38** and **39** which connect to the low input impedance of a SPOT **1** coincidence gate **40**. Since the current through a capacitor is C de/dt, current pulses appear only during the ramp portions of the sliced waveforms. Although the slope of the vertical ramp is only about one two hundred and sixtieth times that of the horizontal ramp (60 Hz/15,750 Hz), by making capacitor **39** approximately 260 times the value of capacitor **38**, current pulses i_{H1} and i_{V1} are made equal in magnitude. Both i_{H1} and i_{V1} must be present to exceed in magnitude the (negative) threshold of the gate thus producing the SPOT **1** video signal.

If the invention is to be employed in conjunction with TV systems having different frequencies (number of horizontal lines and vertical flyback) then the vertical and horizontal sync/sawtooth generators would be constructed at the different frequencies. This would be particularly applicable in conjunction with foreign (other than U.S.) TV systems.

Other spots are generated in similar fashion. For example, SPOT 2 horizontal slicer 41 is also coupled to the horizotnal sync/sawtooth generator 31 and SPOT 2 vertical slicer 42 is also coupled to vertical sync/sawtooth generator 32. The horizontal and vertical slicers 41 and 42 are coupled to a SPOT 2 coincidence gate 43 by capacitors 44 and 45, respectively. All video spot signals are fed to an OR gate and pulse shaper 46. The OR gate prevents excessive brightening when spots are positioned on top of one another. The pulse shaper is required because in the present embodiment 6 volt sawtooth waveforms are used. With such low voltage the slicing action is soft (rounding at beginning and end of ramp slice). Consequently, the current pulses produced by differentiation of the ramp slicers are rounded pulses. Without shaping they produce a spot without sharply defined edges . . . the edges just "fade out" gradually into the dark background. The summer modulater and RF oscillator 28 are set forth in said patent application Ser. No. 126,966. The RF signal presented to the antenna terminals is detected and processed by the TV receiver in the standard manner and displayed on the screen thereof. The output from OR gate and pulse shaper 46 is applied to a summer which sums all the signals presented thereto (including sync pulses from the horizontal and vertical sync/sawtooth generators, outputs from chroma generator, if used, etc.). This forms the composite video signal. This signal is applied to a modulator and RF oscillator for modulating the video information with the RF oscillator carrier to generate the requisite modulated RF signal which is coupled to the TV antenna terminals.

One of the objects of the present invention is a system to produce a round spot which in some instances is more pleasant and interesting than a square or rectangular spot, (especially for "ball" games like ping-pong, baseball, etc.). This is achieved (even with the pulse shaper which just gives the round spot sharply defined edges) by the "round edges" of the current pulses going into the coincidence gate. For example, the leading and trailing edges of the current pulse i_{V1} are rounded. Thus any i_{H1} pulses which are added to i_{V1} at this time will have thinner portions protruding below the gate threshold level than those appearing during the full amplitude middle of i_{V1}. Subsequent pulse shaping of the pulses which "get past" the gate threshold steepens their sides (for sharp spot edges) but doesn't change their width. Thus the spot is narrower at top and bottom than it is in the middle.

Some of the various spot shapes which can be generated are shown in FIG. 6. Spots a, b and c are generated simply by varying the coincidence gate threshold 53. (For an individual spot. Or, all spots can be made to change shape together by changing the amplitude and slope of the common sawtooth generators.)

Spots d and e are made either by changing sawtooth slope (thus changing W_H and W_V), or by changing the slice amplitude (again changing W_H and W_V).

Various other shapes (four pointed star, cross, etc.) can be generated by simple adjustments of various component values or voltages and by switching. All spots can be made hollow as described hereinafter.

Referring now to FIG. 7, there is illustrated thereby schematically one embodiment of the sync/sawtooth generators. A generator of this type is described in detail in my co-pending patent application for "Linear Sawtooth Generator" Ser. No. 713,862, filed Mar. 18, 1968, now U.S. Pat. No. 3,497,829.

The SPOT 1 slicers 36, 29, the SPOT 1 coincidence gate 40 or the OR gate and pulse shaper 46 are illustrated schematically in FIG. 8. The horizontal 15.75 Hz sawtooth waveform 35 and the vertical 60 Hz sawtooth wave 37 waveform are sliced in the slicers 36 and 29, respectively. The slicers comprise means for generating a predetermined slice of the sawtooth waveforms and in the present embodiment include back-to-back diodes 47, 48, and 49, 50, respectively. The input sawtooth waveforms are applied to the one side of the diode pair, with the other side being capacitively coupled via capacitors 51, 52, respectively to ground and being supplied voltages e_{H1} and e_{V1}, respectively. Diodes 47 – 50 are preferably germanium diodes because their low conduction voltage drops permit the achievement of reasonably small spot size (determined by sliced ramp duration) with a 6 volt sawtooth. The capacitors 51, 52 serve to make delay control voltages e_{H1} and e_{V1} appear as true voltage sources in cases where they come from the sliders of relatively high impedance potentiometers. The differentiating capacitors 38, 39 producing i_{H1} and i_{V1} are followed by the coincidence gate 40. Variable threshold level is provided by a potentiometer 53 to produce desired spot size and shape as mentioned hereinbefore.

Spot video signals are passed through a diode OR gate 54 of the OR gate and pulse shaper 46. The "multi spot" OR'd video signal then passes through a pulse shaper 55 which steepens the sides and squares off the tops of the pulses, giving sharply defined spot edges and uniform brightness over the area of the spot.

The pulse shaped video signal is then fed, along with the negative horizontal and vertical sync signals (and chroma generator output, if applicable) to the summer and RF oscillator as indicated in FIG. 4.

If desirable, the 60 Hz sync can be extracted from a photosensor directed toward the front of the TV screen and horizontal sync can be obtained from a pickup coil as described in said patent application *Ser. No. 126,966*. Spots can be generated by using the video signal described above to short circuit or "crowbar" the antenna terminals; the RF oscillator not being used. These features are compatible with a cooperating TV or CATV station as described in said patent application Ser. No. 126,966.

Referring now to FIG. 20, there is illustrated thereby another embodiment of spot generation for TV gaming. This embodiment is very much like the embodiment of FIG. 8, however, changes have been made thereto for providing improved temperature and voltage stability such that the spots generated will maintain their size to a greater degree over wider temperature and voltage excursions.

The timing for the system is established by a horizontal sync/sawtooth generator 210 and a vertical sync-/sawtooth generator 211. These generators are like the generators 31, 32 illustrated in FIG. 7, however, they use a higher Vcc voltage, in the instant example, 9 volts.

The sawtooth outputs of the generators **210, 211** are applied to a horizontal slicer **212** and vertical slicer **213**, respectively. The slicers **212, 213**, are like the slicers **36, 29** of FIG. **8** with the exception that silicon diodes are used in place of germanium diodes for temperature stability. However, silicon diodes have a much greater voltage drop and, therefore, the 9 volt sawtooth is used in order to get a steeper sawtooth and thereby not increase spot size which would occur if the 6 volt sawtooth of FIG. **8** was used.

The two sliced waves are differentiated, as before, by capacitors **214** and **215** and applied to a spot coincidence gate **216**. The DC voltage for the spot coincidence gate **216** is stabilized by a zener diode **217**. A diode **218** is also used for temperature compensation. The principal change in spot coincidence gate **216** as contrasted to spot coincidence gate **40** of FIG. **8** is the addition of a peak detector **219** which detects the peak of the horizontal spot pulses which ride on the vertical spot pulses and feeds this signal back to appropriately bias the coincidence gate to maintain spot size.

The OR gate **220**, pulse shaper **221**, summer **222** and RF oscillation and modulator **223** serve the same functions as described with respect to FIG. **8**.

Prior to describing various games that can be played using the present invention, several of the electronic functions which the system is capable of providing are described herein. Many of these depend strongly upon the voltage control positioning features of the system.

The voltages e_{Hn}, e_{Vn} (illustrated in FIGS. **5** and **8**) control a spot's horizontal and vertical position. Changing e_{Hn} from 0 volts to, for example, +6 volts moves a spot across the screen from off-screen right to off-screen left. A similar change in e_{Vn} moves a spot from off-screen bottom to off-screen top.

In one embodiment, the e_H and e_V voltages are derived from the slides of the potentiometer **56** and **57** which are connected between ground, and for example, +6 volts (see FIGS. **9A**). Knobs **16, 17** and **16, 17** of FIGS. **1** and **1A** are attached to the potentiometers controlling the positions of SPOT **1** and SPOT **2**. If more than two positioned spots are required, additional potentiometers and knobs 16_n, 17_n would be required in addition to spot horizontal and vertical slicers and spot coincidence gates. Alternatively, two potentiometers (one vertical, one horizontal) may be connected to a single joystick **58** in order to provide the user single handed control of position (see FIG. **9B**).

If the control potentiometers **57, 58** are followed by integrators **59, 60**, respectively, (see FIG. **9C**) with e_{Hn} and e_{Vn} obtained from the outputs of the integrators, a different type of spot positioning is obtained. For example, with the two potentiometers mechanically connected to a single joystick **58**, the spot will move as long as joystick **58** is away from its center position. The speed of spot movement is proportional to the distance the joystick is offset from its center position and the direction of spot motion is determined by the angular position of the joystick.

Whereas the simple H and V joystick of FIG. **9B** gives direct control in which the spot returns to center screen when the joystick is returned to center, this "integrator joystick" of FIG. **9C** merely stops the spot wherever it happens to be when the joystick is returned to center position.

The resulting "spongier" positioning action is much more interesting for certain types of games such as chase, hockey ("spongy" motion simulates gliding skaters very well) soccer, car racing, etc.

Referring now to FIG. **10A** there is illustrated thereby yet another arrangement for providing spot positioning voltages e_{Hn} and e_{Vn}.

When the flip-flop **61** is set so that output **62** is high and output **63** is low, the voltage at point **64** can be varied from approximately 0 to +V volts (for example, 6 volts) by adjusting potentiometer **65** (Potentiometer **66** has no effect since it is disconnected from the circuit by a pair of back biased diodes **67, 68**). With flip-flop **61** in its other stable state, potentiometer **66** controls the voltage at point **64** and potentiometer **65** is disconnected by a pair of diodes **69, 70**.

If the delay control voltage lead for a spot (the e_{Vn} or e_{Hn} input) is connected to point **64** the spot can be made to move (rapidly) between two stable positions. The stable positions being controlled by potentiometers **65** and **66**.

For certain applications, rapid motion is not desirable. In these cases an RC time constant provided by a resistor **71** and a capacitor **72** is added. The spot still moves between two stable positions but gives the effect of moving fast when "kicked" or "hit" and then gradually slowing down and finally stopping.

If the RC time constant is replaced by an integrator the spot will move at constant velocity. Naturally, if two flip-flops are used (one for horizontal and one for vertical) a spot can be made to move to any one of four pot-controllable stable positions.

Typical waveforms taken at points **62, 63**, and **64** are illustrated in FIG. **10B**. The trigger to flip-flop **61** can be the output from a coincidence circuit or a "serve" flip-flop as will be described hereinafter.

By changing the triggering sequence of two flip-flops different paths are obtained. A slow free-running flip-flop is useful to "serve" a ball which has gone off-screen when used in a ping pong game, etc. This is described in greater detail hereinafter.

For playing games, two functionally different types of spots are often generated, a hit spot and a hitting spot. The hit spot simulates a ball, a hockey puck, etc. A hitting spot simulates a paddle, a hockey stick, a golf club, a hand, etc. The uses for hit and hitting spots will become readily apparent when various games are described hereinafter.

Referring now to FIGS. **11A–11D**, there is illustrated yet another electronic function which is included in the present invention.

This electrical function provides the e_H and e_V spot positioning voltages to a hit spot such as spot **73** in FIG. **11B**. These voltages, the outputs of the circuit of FIG. **11A** are applied to the horizontal and vertical slicers of the hit spot generator. The inputs to the circuit of FIG. **11A** are the control voltages of a hitting spot, for example, spot **74** or spot **77** of FIG. **11B**. The embodiment shown is for applications having two hitting spots which could represent, for example, two ping-pong paddles in a simulated ping-pong game.

The hitting spots horizontal control voltages are applied to a horizontal gated differentiator **85** and the hitting spots' vertical control voltages are applied to a vertical gated differentiator **86**. Each of the gated differentiators has as further inputs thereto outputs from a pair of one shot multivibrators **81, 82**. The multivibrators **81, 82** are triggered by outputs from a pair of coincidence detectors **83, 84**, respectively. Coincidence detector **83** signifies coincidence between a first hitting spot, for example, spot **74**, and the hit spot, for exam-

ple, spot 73. Coincidence detector 8[illegible]nifies coincidence between a second hitting spot, for example, spot 77, and the hit spot.

The gated differentiators 85, 86 provide pulses whose amplitudes are proportional to the horizontal and vertical components of the velocity of the hitting spot at the instant of contact between the hitting and hit spots. The pulse width is that of the pulses from the one shot multivibrators 81, 82. Accordingly, this causes the hit spot to travel in the direction from which it was hit and at a speed proportional to how "hard" it was hit.

A preferred embodiment of horizontal gated differentiator 85 is shown in FIG. 11C. Vertical gated differentiator 86 is constructed in like fashion. The differentiator is comprised of capacitors 190 and 191 and feedback amplifier 78. The input signals H_1 and H_2 are coupled to the differentiator. A pair of switches, 75 and 76, follow the differentiating capacitors, 190 and 191. The switches 75, 76 are normally closed. One or the other is opened by a signal from either multivibrator 81 or 82 allowing the differentiator to differentiate the input signal of the spot which makes coincidence with the hit spot. The resistors 87, 88 prevent shorting to ground of the desired signal when the other signal switch 76 or 75 is closed. Resistor 89 is the differentiating feedback resistor. The output pulse of this circuit can be positive or negative depending upon the direction of the hitting spot when it coincides with the hit spot. Using the preferred gated differentiator of FIG. 11C, undesirable overshoots and preshoots are avoided since the switching is accomplished following the differentiating capacitors rather than before them.

Referring again to FIG. 11A, to provide the control voltages for the hit spot, the signal dHn/dt must be integrated for a period of time. If the signal is integrated for a period of time equivalent to the relatively short pulse width of the one shot multivibrators, the hit spot would move only during this time and this is too fast a spot movement. Accordingly, it is desirable to "stretch" the time of spot movement, by for example, providing an RC delay to the dHn/dt signal. This would be a simple matter if dHn/dt and dVn/dt were always one polarity. However, since dHn/dt and dVn/dt can be either polarity a more complex arrangement is necessary.

When either hitting spot makes coincidence with the hit spot a coincidence pulse from multivibrators 81 or 82 allows the bilateral gates 92 and 93 to pass positive or negative dHn/dt and dVn/dt pulses to stretching capacitors 94 and 95, respectively. After the coincidence pulse ends, the bilateral gates return to their open or high impedance state and the voltage on capacitors 94 and 95 delay at a rate determined by the capacitors and resistors 106 and 107.

The stretched pulses at capacitors 94 and 95 are coupled to integrators 90 and 91. The outputs of the integrators are voltages e_H and e_V. These voltages become the control voltages for the hit spot.

The resultant effect is that the hit spot moves in the same direction in which the hitting spot is moving when coincidence is made. If hit hard, the hit spot moves rapidly and far. If the hitting spot is moving slowly at coincidence, the hit spot is merely "nudged" a short distance and moves slowly.

In the embodiment illustrated, a wall-bounce feature is included. When the hit spot is to travel, for example, along the line 102 (see FIG. 11B), switch 104 is open and switch 105 is closed and the signal bypasses on inverter 108. When the hit [illegible]t reaches the edge of the TV screen, it is desired tha[illegible] "bounce" back as shown by line 103 of FIG. 11B, simulating, for example, a puck bouncing off the wall of a rink in a simulated hockey game or a billiard ball bounding from a cushion. The hit spot bounces from the sides of the screen with a reflection angle equal to the incidence angle. When the spot reaches the edge of the screen, switch 104 closes and 105 opens. The signal from the bilateral gate is thus now applied to the integrator via inverter 108. A horizontal or vertical wall sensor 109, 110, as the case may be provides the requisite signal to cause the switching of switches 104, 105 and 192, 193.

Note, in the event the wall bounce feature is not required, the horizontal system of FIG. 11A may be modified by deleting switches 104, 105, inverter 108 and the horizontal wall hit sensor 109, like components also being deleted from the vertical system.

The bilateral gate 92, integrator 90 and horizontal wall bounce circuitry is shown in greater detail in FIG. 11D. Like circuitry is also provided for the vertical portion of the system.

The differentiated signal pulse dHn/dt is applied to bilateral gate 92 which is comprised of a pair of transistors 180, 181. Signals indicative of coincidence between a hitting and hit spot are obtained from the two sides of the coincidence multivibrators and are applied to the bases of the transistors as shown, negative pulses turning 181 on and positive pulses turning 180 on. The switches 104, 105 of FIG. 11A are comprised of transistors 182, 183, respectively. The output hitting spot control signal e_H is obtained at the output of integrator 90.

The output from integrator 90 is also applied to horizontal wall hit sensor 109 which comprises a pair of zener diodes 242, 243 which cause the switching of a flip-flop 184 when voltage is reached equivalent to off-screen voltage (for example, 0 volts or +6 volts). Initially, flip-flop 184 is set to a given state upon coincidence between either hitting spot and the hit spot by an output from transistor 185 to insure correct direction of the hit spot. If the flip-flop were in the wrong state, the hit spot would move 180° from the desired direction.

The circuits 186 and 187 are provided to prevent oscillation of the flip-flop 184 and failure to flip correctly which can occur if the hit spot approaches an off-screen position very slowly such that only a poor rise time signal is available to trigger the flip-flop.

With voltage control of a spot's horizontal and vertical position it is obvious that its motion is similar to that of a spot on an oscilloscope. Thus, the TV spot can be made to follow any path that can be made on an oscilloscope.

One example of this is Lissajous pa[illegible]ns. Phase displaced sinusoids used for horizontal and vertical positioning (applied as the e_H and e_V inputs to the spot slicers) result in spot paths of circles, ellipses, "figure eights," etc.

As previously mentioned, spot size and configuration may be altered. For example, the shape of a spot can be changed to simulate 3D effects (e.g., a bowling ball which gets smaller as it rolls down the alley). This is accomplished by varying the threshold potentiometer 53 of the coincidence gate of FIG. 8. This can be readily accomplished electronically by a varying voltage input.

In certain embodiments a ho[illegible] spot or ring may be desired and this can be readily achieved by inverting the "non-square" pulses at the base of shaper **55** of FIG. **8** and subtracting from the original pulses to "hollow" them out.

Other electronic functions which may be generated are negative video, pumping action, kaledioscope effects, even-odd spot displacements and slave spots. These will now each be described in detail.

In certain gaming applications such as simulated hockey it is desirable to use a black spot (e.g. for a hockey puck). This is accomplished by inverting the video signal.

Colored spots can be generated by applying the video signal to the phase shifter portion of the chroma generator via, for example, a variable resistor.

If a pulse generator running at an integral multiple of 15.750 kc is synchronized with the horizontal sync signals and the pulses fed to the video summation stage, a background of black and white vertical columns is obtained. If the horizontal video signal from a "spot" is used to synchronize the pulse generator, the columns can be moved from side to side. Horizontal bars can be similarly obtained with a 60 cps pulse generator.

Coincidence gating the vertical columns with the horizontal bars so that the screen is brightened only where they cross one another yields a "checkerboard" pattern of bright squares or rectangles on a dark background; inversion of the signal of course give black squares on a white background.

When the horizontal and vertical positioning voltages of a spot are obtained from nominal quadrature sinusoids, various different patterns are obtained as the sinusoid frequency and phase shift are changed. Some patterns are stationary; others have motion; some are a combination. The effect is somewhat similar to that of a stroboscope or a kaleidoscope.

If the output of the photosensor is fed to a flip-flop the sensor and directed toward a bright spot on the TV set; even-odd "spot discernment" is obtained. This flip-flop is reset each time so that side **A** is high. When the spot comes on, the flip-flop flips at the 60 cps vertical scan rate. If the spot remains on for an even number of scans, side **A** of the flip-flop is high when the spot is removed. If the spot is on for an odd number of scans, side **A** stays low when the spot is removed. Thus, a coded spot, visually identical to others, can be discerned electronically. The flip-flop can, of course, ring a bell, light a light, etc.

Normally, the vertical and horizontal current pulses of a spot are coincidence gates as shown in FIGS. **5** and **8** in the coincidence gates **40** and **43.**

If the vertical pulse of one spot is coincidence gated with its own horizontal pulse and with the horizontal pulse of a second spot, then a third spot appears. It is called a "slave" spot because its horizontal position is controlled by one of the "real" spots and its vertical position by the other. Obviously, with two real spots two slave spots are easily generated.

The material which follows contains a description of typical games which can be played using the electronic functions set forth above. These games are only exemplary of the many games which can be played and are set forth to merely illustrate some of the ways in which the various electronic functions are combined.

One typical game is a simulated ping-pong game and this is illustrated in FIGS. **12A** and **12B**.

The simulated pi[illegible]ong ball **13** is generated by spot **3** generator **114** which has inputs thereto from vertical sync/sawtooth generator **115** and horizontal sync/sawtooth generator **116** (of the type set forth in FIG. **7**). The spot generators are similar to those set forth in FIG. **8**. The control voltages for the horizontal slicers of spot **3** generator **114** are derived from a flip-flop positioner **117** of the type described in FIG. **10A**. Flip-flop positioner **117** provides control voltages at outputs **118, 119** which move the ball between off-screen positions H_L, V_L and H_R, V_R. Flip-flop positioner **117** is controlled by a slow free-running or "serve" flip-flop **120** and by the output from a coincidence detector **121**. In one state flip-flop **122** will serve the ball from off-screen left to off-screen right and in the other state from off-screen right to off-screen left. The output from coincidence detector **121** is used to switch flip-flop states when the ball is hit by one of the two simulated paddles. The serve flip-flop **120** is coupled to both sides of flip-flop **122.** With this arrangement, if a paddle hits the ball first, the serve flip-flop cannot retrigger flip-flop **122** until the ball goes off screen on the other side of the screen.

The inputs to coincidence detector **121** are the spot **1** (paddle **123**) video pulse, the spot **2** (paddle **124**) video pulse and the spot **3** (ball **[13]** *113*) video pulse which are derived from the respective spot generators **125, 126** and **114.** The video pulses are obtained from the outputs of the coincidence gates of the spot generators, for example, the output of coincidence gate **40** of the spot generator shown in FIG. **8.**

The V_R and V_L off-screen positions of ball **113** are controlled by players **A** and **B**, respectively, by adjustments of potentiometers **125,** and **126** via knobs **127** and **128,** respectively.

The vertical position of paddles **A** and **B** are determined by the setting of potentiometers **129** and **130** which provide the vertical control voltages to the vertical slicers of the spot **1** and spot **2** generators **125, 126,** respectively. Knobs **131** and **132** control the potentiometers **129, 130.**

This simulated ping-pong game is played as follows:

The ball **113** is connected, with RC time constants **133, 134** to the flip-flop **122** which moves the ball between off-screen positions H_L, V_L and H_R, V_R. The RC time constant prevents instantaneous spot motion. Additionally, since the resulting velocity is exponential in nature the spot starts fast and slows down; by moving the potentiometers **134, 135** which control H_R and H_L in toward the screen the ball's motion is fairly slow. Moving H_R and H_L out gives a faster game.

Assume the ball is at H_L, V_L, it is served automatically when the free-running flip-flop **120** flips. The ball proceeds towards H_R, V_R. Player **B** moves paddle **B** vertically (by turning knob **132** connected to potentiometer **130**) to try to hit the ball. If he misses it he loses a point as it goes off-screen right (where it will be served automatically again by the free-running flip-flop).

However, if he hits the ball it bounces off his paddle and starts left toward H_L, V_L. Now he has control of its flight, and by adjusting V_L with his other hand (by turning knob **128** connected to potentiometer **126**) he can send the ball up or down and even try to "wiggle" it around player **A**'s paddle.

Player **A** controls the vertical motion of paddle **A** (by turning knob **131** connected to potentiometer **129**) and, if he hits the ball, gains control of its path by ad-

justing V_R (by turning knob **127** connected to potentiometer **125**).

Play can be made fast or slow by setting H_1 and H_R (potentiometer **135, 134**) or by setting the paddles in different horizontal positions (by adjusting potentiometers within the generators **125, 126**).

When color is used, the ball and paddles are white, the "table" green. Overlays or TV or CATV backgrounds showing a lined table and net enhance the effect. The game can be played by two man teams. One man controls the paddle, the other man the path of the ball.

By modification of the embodiment of FIG. **12**, a game of gun ping-pong can be played. In this embodiment the players use light sensor guns instead of paddle spots to hit the ball back and forth. An output from the light sensor is used to trigger flip-flop **122** instead of coincidence detector **121**. The control knobs **131** and **132** are not required. Whereas, it is difficult for one man to aim a gun and control a potentiometer, the game is best with two man teams. One man shoots, his partner controls the ball's path. Or, if a pistol is used a player can shoot with one hand and use a potentiometer with the other. Or, a ramdom or pseudo-random electronic change of V_R and V_1 can be used.

Illustrative electronics for performing this "gun" function is illustrated in said patent application 126,966. A light sensitive cell is contained, for example, within the barrel of a gun and used to trigger an SCR. A switch is provided for resetting same.

A simple hockey game can be played which uses the same mechanics (FIG. **12A**) as the above ping-pong games including the "automatic serve" flip-flop (see FIG. **12C**). The paddles (now "goalies") are moved closer in toward center where the puck is moving faster.

If player B (with spot **138**) hits the puck **137** it moves to the left and the controls its path by moving V_1. He trys to "wiggle" the puck around goalie A (spot **139**) and into the goal.

Player A controls V_R after he hits the puck.

In color TV application, it is preferred to use white goalies, a black puck (using negative video) and blue ice.

Again, this game is adaptable to two man teams, and even more if more spots are used.

Another game which can be played using most of the system shown in FIG. **12A** is a simulated baseball game. This is illustrated in FIG. **12D**.

The pitcher controls the path of a ball **140** by adjusting knobs **127** and **128** connected to potentiometers **125** and **126** which, therefore, controls V_1 and V_R. The ball, therefore, goes from position H_1, V_1 to H_R, V_R.

Another knob (not shown) is connected to potentiometer **134** and thereby permits speed control by the pitcher.

The batter tries to hit ball **140** by moving bat **141** (spot **2**) vertically by turning knob **132**. Spot **1** is not required for this game. If the batter connects, the ball will be hit left, back to position H_1, V_1. If the batter misses, the ball will be automatically returned as in the above games.

In an alternate embodiment, the free-running serve flip-flop **120** can be eliminated and a pushbutton set and reset of flip-flop **122** can be used for manual "pitch" and reset.

One class of games makes use of the electronic function illustrated in FIG. **9C** and is shown in FIG. **13**. This class of games requires one or more joystick controls **142** coupled to integrators **143**. The outputs from the integrators are applied to the horizontal and vertical slicers of their respective spot generators. With this setup race games, etc., may be played. The somewhat sluggish "spongy" effect of the integrator and the non-return to center requires more skill of the players than a "straight control" joystick.

Of course, appropriate backgrounds or overlays can be employed. A third (or more) "obstacle" spot can be used. If a player hits it, the coincidence pulse can be used to make all spots disappear or to change screen color, etc., as described in said patent application Ser. No. 126,966. For chase games, coincidence of the pursuer and pursued can do the same thing.

A more sophisticated hockey game than that described with respect to FIG. **12C** may be played employing the circuits previously set forth. This game is set forth in FIG. **14**. The vertical and horizontal sync/sawtooth generators, the spot generators, the OR gate and pulse shaper and the summer and RF oscillators serve the same function as previously described. The control voltages to the horizontal and vertical slicers of the spot **1** generator are obtained from the outputs of a joystick integrator **144** of the type illustrated in FIG. **9C** and the control voltages for the slicers of the spot **2** generator are obtained from the outputs of a second joystick integrator **145**.

The control signals for the horizontal and vertical slicers of the spot **3** generator are obtained at the outputs **147, 148** of his spot and wall bounce system **146**. Hit spot and wall bounce system is shown in detail in FIG. **11**. The inputs to the system **146** are the respective outputs of the joystick integrators **144** and **145**.

With two players on joystick integrators **144, 145** and a puck which moves "in direction hit," a realistic hockey game results. The semi-sluggish response of the integrators gives an effect similar to real hockey players gliding on ice. They can't stop or reverse direction instantaneously. The puck can be nudged along if hit easily of sent fast if hit rapidly. It may be noted here that the "ball moves in direction hit" function derives the hitting from differentiation of the hitting spot's positioning voltages. It comes as a surprise to a player "standing still guarding his goal" when the puck glides right through his stationary defending spot.

If the puck is hit very hard, it may bounce off several sides of the screen before stopping. With the sluggish joystick integrator spots and the bounce from screen sides, a player must anticipate the "bounce." He cannot usually go right after the puck, but must move to a spot which he anticipates the puck will pass after bouncing. This game may be simplified somewhat by deleting the wall bounce feature in the manner hereinbefore described.

A simulated handball game is achieved when the player's spots are on straight control joysticks without integrators (as shown in FIG. **9B**). The hit spot with wall bounce system of FIG. **11** is employed to supply the hit spot or ball generator's slicer control voltages with one minor variation. One of the comparator reference voltages is deleted so that the hit spot or ball will not bounce off the bottom of the screen.

Wall bounce is used on screen top, right and left. Player A hits ball. It must hit front (top) wall sometime

during its flight. Player B trie[illegible] hit ball. If he misses all, it disappears off-screen bo[illegible]n, he loses a point and ball is then automatically served from off-screen after a certain length of time by using a flip-flop arrangement like that shown in FIG. 10 in conjunction with a slow free-running flip-flop for automatically triggering same or a push button trigger for manual reset.

This handball game is illustrated in FIGS. 15A and 15B. The general system electrons 149 is the same as shown in FIG. 12A. The control voltages for the slicers of spot 1 generator are obtained from a straight control joystick 150 (see FIG. 9B) Spot 1 generator generates the spot 151 representing Player A. A second straight control joystick 152 provides control voltages for Player B, spot 153. The ball or hit spot 154 is generated by spot generator 3 and receives its slicer control voltages from a hit spot and wall bounce system 155, which is similar to that of FIG. 11A; however, comparator 111 does not have a 0 reference level so that the ball will bounce off all the walls but the bottom one. A position flip-flop 156 similar to that of FIG. 10A is used to return the ball to the "playing area" but being triggered from a switch 157. Alternatively, a slow free-running or serve flip-flop could be employed as described hereinbefore.

FIGS. 16A and 16B illustrate a simulated pinball game. The spot 3 or ball generator receives its vertical and horizontal slicer control voltages from a pair of integrators 158 and 159. Note in this application the spot 1 and 2 generator of general system 149 are not required. The player operates a joystick to cause ball 161 to move. The ball keeps moving as long as the joystick is off the center position. The ball will bounce off the walls or edges of the screen since a pair of comparators 162 and 163 will cause a pair of flip-flops 164 and 165 to change the direction of the ball by reversing the polarity of the signals applied to integrators 158, 159 in the manner previously described when discussing the circuit of FIG. 11.

Various "scoring" spots are placed on the screen by overlays, electronically, etc., as is a game end zone 167. Play is commenced by a player "throwing" joystick 160 in some off center position and removing his hand. Ball 161 then keeps moving. When it hits a side wall it bounces, when it hits scoring spots points are scored. Play continues until ball happens to go into "game end" zone 167.

Score is observed visually. However, the scoring spots can be generated electronically by additional spot generators and score made on occurrence of coincidence using a coincidence detector of the type described hereinbefore.

A simulated bowling game illustrated in FIGS. 17A and 17B is played by providing an "alley" 168 overlay or TV-CATV background. It should go from one corner bottom screen to opposite corner top screen, narrowing to give a 3-D effect. One or more spots simulating bowling pins are at upper end of alley. One spot 169 is illustrated. Player "bowls" a ball 170 by "throwing" a joystick 171. If pin (pins) are hit, they disppear. If missed, ball just keeps going past them off the screen. Ball can be returned to start point either with joystick or an instantaneous pushbutton reset (not shown).

The joystick 171 is connected to potentiometers 172, 173 whose outputs are connected via integrators 174, 175 to the control voltage outputs to the horizontal and vertical slicers of the spot 3 generator of the generator

system 149. If the b[illegible] 170 hits pin 169, coincidence detector and crow-b[illegible]rcuit 176 causes the pin to disappear. One embodiment of said coincidence detector and crow-bar circuit is disclosed in said patent application Ser. No. [697,798]726,966. The ball would be made smaller as it approaches the pins by using a varying voltage as the voltage applied to the threshold set resistor. In this game the vertical control voltage would be used.

The various games illustrated above are only a few of the multitude of games which can be played using the concepts taught by this invention. The electrical functions to generate various configurations can be combined in any number of possible ways. For example, a gold putting game can be played over a green background using a black negative video hole. A small white spot can be used as the golf ball and larger white spot used as the putter. The putter spot can be controlled by a straight joystick of the type illustrated in FIG. 9B. The ball can be controlled from circuitry like that shown in FIG. 11A, preferably without the wall bounce feature. The game can be further enhanced, if desired, by coincidence pulse timing such that if ball is moving very slowly when it hits the hole it will disappear. If the ball is moving very fast, it will go right across the hole.

A simpler version would not require coincidence circuitry. If the ball comes to rest over the hole, the ball's negative video signal overrides the ball's video and blanks out the ball.

In another example, cushion billiards can be played. The player's balls are on straight control joysticks (see FIG. 9B). Third ball is hit using control of FIG. 11A. Wall bounce is used on all four sides. Player hits a third ball. The latter must hit at least one cushion first and then hit opponent's ball to score a point.

For skilled players, the third ball must hit two cushions first, and the game can be elaborated to three cushion billiards.

Maze games can also be played using the various features. TV screens are not large enough to permit a normal "line type" maze. The "correct" path through the maze is too obvious. Therefore, a "number maze" was devised. An overlay or background divided into rectangles is used. A number is in each rectangle.

One of two players is designated as EVEN, the other as ODD. EVEN moves his spot (or ring) so that the sum of his and opponent's numbers is even. ODD moves so as to make the sum ODD.

The resulting coded pattern of moves enables the maze designer to keep the two players on separate paths or on shared paths. The maze paths are drawn first and the numbers and then inserted. Mazes can be simple or complex, containing many false paths and dead ends. Normally, moves are one space at a time horizontally or vertically.

As a variation, if one player can land on the same number his opponent occupies elsewhere, he takes an extra move. (ODD is permitted to do this also even though in so doing he makes a temporarily even sum).

Unless a large number of rectangles are used, the maze designer is limited when trying to keep players on separate isolated paths.

Considerably more pattern flexibility results if one path can jump across another. This is accomplished by jumps between identical numbers with one space in between them. For example, if a player is on a 2 and needs to move to an odd number such as 7, after he

moves to the 7 he can jump a space horizontal or vertical directions to another 7. Multiple jumps are permitted and can be incorporated in the maze.

More intricate and interesting patterns can be laid out if a three term sum is used, i.e., players make the sum of the two numbers they occupy and the one they intend to move to be even or odd accordingly.

An easier version of this is done with colors. The "code" available to the designer is the same. If red and white rectangles are used, for example, the "rule" for both players is simply "move to red, unless both on red."

A simple "ghost" game can be played wherein a lettered background or overlay is used. Players move spots to jointly spell a word. Player ending a word loses a point.

A spell check game is played by putting letters in columns. Players advance a column if they can add a letter to a jointly spelled word. They drop back one or more columns if they can find an appropriate letter only there.

As mentioned before, the control units or any parts thereof can be built into a television receiver as a constituent part thereof rather than be a separate unit and coupled to antenna terminals as described above. In other embodiments some of the elements contained in the gaming apparatus can be eliminated and replaced by some of the functions which are already provided in conventional television receivers.

FIGS. **18A** through **18C** are examples of television gaming apparatus which can be built into a conventional television receiver.

Referring now to FIG. **18A**, there is illustrated one embodiment of a built-in television apparatus. The entire apparatus of FIG. **18A** or any parts thereof can be built into a television receiver **190**. In the manner described hereinbefore, the spots are provided by spot generators **191** through **192**. The spot generators receive inputs from the vertical sync/sawtooth generator **115** and the horizontal sync/sawtooth generator **116**. The voltage control inputs to the spot generators can be derived from a potentiometer or a potentiometer in connection with an integrator or outputs of other spot generators etc. In other words, the voltage control inputs can be any and all voltage control inputs described hereinbefore.

The outputs from the spot generators are applied via an OR gate and pulse shaper **193** to a summer **194**. Summer **194** also receives the sync outputs from the vertical sync/sawtooth generator **115** and the horizontal sync/sawtooth generator **116**. Summer **194** is different from the summers previously described in that no RF oscillator or separate modulator is required since the output therefrom is coupled internally directly to the video circuitry of the TV receiver **190**.

The output from summer **194** is connected to, for example, a contact **203** of a switch **200**. The center arm **201** of switch **200** is coupled to the video amplifier **196** of the conventional TV receiver **190**. Another contact **202** of switch **200** is coupled to the video detector of the conventional TV receiver **190**. In this manner receiver **190** can be switched from the video detector or passive viewing mode of operation (to receive broadcast programs) to the summer or active mode of operation.

In certain embodiments, it is necessary to connect both contacts **202** and **203** to the video amplifier, where, for example, the active mode TV receiver will be used in conjunction with broadcast programs which broadcast background or other information. Broadcast is used herein in the broadest sense to include programs generated by a CATV station, programs generated by a closed-circuit TV arrangement information generated by a video tape recorder and by a slide projector. Many of the symbol generations herein described can be superimposed upon backgrounds generated by a broadcast station and games played in conjunction therewith.

Of course, the other systems previously described can also be built into the TV receivers with the outputs therefrom applied to the antenna input of the TV receiver.

Referring now to FIG. **18B**, there is illustrated another built-in TV gaming apparatus. In this embodiment the vertical sync/sawtooth generator **115** and the horizontal sync/sawtooth generator **116** are replaced by vertical sawtooth generator **197** and horizontal sawtooth generator **198** which generate merely sawtooth waves rather than sync pulses and sawtooth waves. The sawtooth generators **197** and **198** are synchronized to the sync of the conventional TV receiver **190** by a pair of outputs from a sync separator **199**. In this embodiment a separate summer **194** is not required since the sync pulses are derived from the conventional receiver as broadcast by a broadcasting station and thereby external sync pulses are not required. Therefore, the input of contact **203** in this embodiment is merely the output from pulse shaper **193**.

In another embodiment of a built-in TV gaming apparatus (see FIG. **18C**) the sawtooths required for spot generation are derived from the vertical and horizontal yoke deflection circuits **204, 205** within the conventional TV receiver **190**. Buffer circuits **206** and **207** change the current sawtooth of the deflection circuitry to voltage waveforms and provide the proper polarity and amplitude correction. Since the vertical and horizontal yoke deflection circuitry are already synchronized, no external sync is required nor is any additional internal connection required. Additionally, any waveform generated within the conventional television receiver can be utilized, where appropriate, for TV gaming symbol generation.

In a further embodiment of this invention a unit is set forth which is used solely for TV gaming and does not have capability to receive broadcast programs. This is illustrated in the simplified block diagram of FIG. **19**.

The spots are provided, in the same manner as hereinbefore described, by spot generators **191, 192** which receive sawtooth inputs from the sync/sawtooth generators **115, 116** and also receive voltage control inputs e_v and e_H. The outputs from the spot generators **191, 192** are coupled to OR gate and pulse shaper **193**.

The output from OR gate and pulse shaper **193** is applied to the intensity input of a cathode ray tube **209** via a video amplifier **208**. By appropriately selecting the parameters of the spot generators, appropriate video pulse size can be developed and, therefore, the video amplifiers eliminated.

The vertical sync pulses from vertical sync/sawtooth generator **115** are applied to the vertical yoke of CRT **209** via a vertical deflection oscillator **224** and vertical amplifiers **225** in known fashion.

The horizontal sync pulses from horizontal sync/sawtooth generator **116** are applied to the horizontal yoke

of CRT 209 via horizontal oscillator 226 and horizontal amplifiers 227 in known fashion. The horizontal amplifier also supplies the high voltage to CRT 209 via a high voltage rectifier 228.

Thus, it is to be understood that the embodiments shown are illustrative only, and that many variations and modifications may be made without departing from the principles of the invention herein disclosed and defined by the appended claims.

I claim:

1. In combination with a standard television receiver, apparatus for generating signals representing a symbol to be displayed on the screen of said television receiver, comprising:

means for generating sync signals;

means for generating a first sawtooth wave;

means for generating a second sawtooth wave;

means coupled to said first sawtooth wave generating means for generating first current pulses proportional to a predetermined slice of said first sawtooth wave; including a first slicer having first and second diodes connected back-to-back with one junction thereof coupled to said first sawtooth wave generating means, a capacitor coupled from the other junction to ground and means for receiving a control signal at said other junction, and first means for differentiating the output from said first slicer;

means coupled to said second sawtooth wave generating means for generating second current pulses proportional to a predetermined slice of said second sawtooth wave; including a second slicer having third and fourth diodes connected back-to-back with one junction thereof coupled to said second sawtooth wave generating means, a capacitor coupled from the other junction to ground and means for receiving a control signal at said other junction, and second means for differentiating the output from said second slicer;

a coincidence gate coupled to said first and second current pulse generating means;

means for summing the output from said coincidence gate and said sync signals;

an RF oscillator;

means for modulating the output of said RF oscillator with said summed signal; and

means for applying said modulated signal to said receiver.

2. Apparatus as defined in claim 1 wherein said first and second differentiating means includes:

a first capacitor coupled from said first slicer to said coincidence gate; and

a second capacitor coupled from said second slicer to said coincidence gate.

3. Apparatus as defined in claim 1 wherein said coincidence gate includes:

a transistor having first, second and third electrodes, said third electrode being coupled to ground, with the output of said coincidence gate obtained at said third electrode;

a voltage source;

a first resistor coupled from said second electrode to said voltage source;

a second resistor coupled from said second electrode to ground; and

a third resistor coupled from said third electrode to said voltage source.

4. Apparatus as defined in claim 3 wherein said second resistor is a variable resistor which adjusts the threshold of said coincidence gate and thereby symbol size and shape.

5. Apparatus as defined in claim 4, further including means for generating first and second control signals which determine said predetermined slices, said control signals being coupled to said first and second slicers.

6. Apparatus as defined in claim 5 wherein said first and second control signal generating means includes:

first and second voltage source;

a first potentiometer coupled across said first voltage source, the arm of said potentiometer being electrically coupled to said first slicer;

a second potentiometer coupled across said second voltage source, the arm of said potentiometer being electrically coupled to said second slicer; and

means for adjusting the position of said arms to thereby vary said control signals.

7. Apparatus as defined in claim 6 wherein said adjusting means includes:

a first knob coupled to said arm of said first potentiometer; and

a second knob coupled to said arm of said second potentiometer.

8. Apparatus as defined in claim 6 wherein said adjusting means includes a joystick coupled to both arms of said potentiometers.

9. In combination with a standard television receiver, apparatus for generating signals representing a symbol to be displayed on the screen of said television receiver, comprising:

a control unit including means for generating horizontal and vertical signals representing the symbol to be displayed, means for synchronizing a television raster scan, and means for manipulating the position of the symbol on the screen, said manipulating means including means for generating first and second control signals coupled to said means for generating horizontal and vertical signals, said control signal generating means including means for *automatically* causing the displayed symbol to travel back and forth between two predetermined positions off-screen; and

means for electrically coupling said control unit to said television receiver.

10. In combination with a standard television receiver, apparatus for generating signals representing a symbol to be displayed on the screen of said television receiver comprising:

a control unit including means for generating horizontal and vertical signals representing the symbol to be displayed, means for synchronizing a television raster scan, and means for manipulating the position of the symbol on the screen, said manipulating means including means for generating first and second control signals coupled to said means for generating horizontal and vertical signals, said control signal generating means including means for causing the displayed symbol to travel back and forth between two predetermined positions; and

means for electrically coupling said control unit to said television receiver;

wherein said means for causing said displayed symbol to travel between two predetermined positions includes:

a bistable multivibrator having at least a first input and first and second outputs;

a first resistor;

a first diode, the anode thereof being coupled to one side of said first resistor with the cathode thereof being coupled to the first output of said bistable multivibrator;

a second diode, the cathode thereof being coupled to the other side of said first resistor with the anode thereof being coupled to said second output of said bistable multivibrator;

a second resistor;

a third diode, the cathode thereof being coupled to one side of said second resistor with the anode thereof being coupled to the first output of said bistable multivibrator;

a fourth diode, the anode thereof being coupled to the other side of said second resistor with the cathode thereof being coupled to said second output of said bistable multivibrator;

a third resistor;

a fifth diode, the anode thereof being coupled to one side of said third resistor with the cathode thereof being coupled to the first output of said bistable multivibrator;

a sixth diode, the cathode thereof being coupled to the other side of said third resistor with the anode thereof being coupled to said second output of said bistable multivibrator;

a fourth resistor;

a seventh diode, the cathode thereof being coupled to one side of said fourth resistor with the anode thereof being coupled to the first output of said bistable multivibrator;

an eighth diode, the anode thereof being coupled to the other side of said fourth resistor with the cathode thereof being coupled to the second output of said bistable multivibrator;

means for applying triggering pulses to said first input of said bistable multivibrator;

means coupling said third and fourth resistors for providing a first control signal; and

means coupling said first and second resistors for providing a second control signal.

11. Apparatus as defined in claim **10** wherein said trigger applying means includes a slow free-running bistable multivibrator.

12. Apparatus as defined in claim **11** wherein the output from said slow free-running bistable multivibrator is also applied to a second input of said bistable multivibrator.

13. Apparatus as defined in claim **10** wherein said resistors are variable.

14. Apparatus as defined in claim **10**, further including:

a first RC network coupled to said means coupling said first and second resistors; and

a second RC network coupled to said means coupling said third and fourth resistors.

15. Apparatus as defined in claim **10**, further including:

a first integrator coupled to said means coupling said first and second resistors; and

a second integrator coupled to said means coupling said third and fourth resistors.

16. Apparatus as defined in claim **5** wherein said first and second control generating means includes means for generating a first sinusoid and a second sinusoid phase displaced from said first sinusoid whereby the symbol will traverse a path such as a circle, ellipse "figure eight" etc.

17. Apparatus for generating signals representing a "hitting" symbol and a "hit" symbol to be displayed on the screen of a television receiver, comprising:

means for synchronizing a television raster scan;

means for generating electrical signals representing a hitting symbol;

means coupled to said means for generating signals representing a hitting symbol for generating first and second control signals to vary the horizontal and vertical positions of said hitting symbol;

means for ascertaining coincidence between a hitting symbol and a hit symbol;

first means for differentiating a portion of the signal output of said first control signal generating means upon coincidence between said hitting symbol and said hit symbol;

second means for differentiating a portion of the signal output of said second control signal generating means upon coincidence between said hitting symbol and said hit symbol;

first means for integrating said first differentiated signal for providing a first hit symbol control voltage;

second means for integrating said second differentiated signal and for providing a second hit symbol control voltage;

a hit symbol generator having as control inputs thereto said first and second hit symbol control voltages whereby said hit symbol moves with a velocity proportional to the velocity of a hitting when coincident therewith.

18. Apparatus as defined in claim **17** further including first and second RC delay circuits coupled to said first and second differentiating means, respectively.

19. Apparatus as defined in claim **18**, further including means for reversing the polarity of said first and second hit symbol control voltages when the outputs of said first and second integrators reach at least a first predetermined voltage level.

20. Apparatus as defined in claim **19** wherein said polarity reversing means, includes:

a first and second comparators coupled to the outputs of said first and second integrators, respectively;

means for applying reference signals to said first and second comparators; and

means for reversing the polarity of the outputs of said differentiators responsive to outputs of said comparators.

21. Apparatus as defined in claim **20**, further including first and second bistable multivibrators coupled to said first and second comparators, respectively, the outputs of said bistable multivibrators signifying the desired relative polarity of said integrator outputs.

22. In combination with a standard television receiver, apparatus for generating signals representing a first and second hitting symbol and a hit symbol to be displayed on the screen of said television receiver, comprising:

means for generating sync signals;

means for generating a first sawtooth wave;

means for generating a second sawtooth wave;

a first hitting symbol generator;

a second hitting symbol generator;

a hit symbol generator;

means for applying said first and second sawtooth waves to said symbol generators;

means for generating first and second control signals for said first hitting symbol generator;

means for coupling said first and second control signals to said first hitting symbol generator;

means for generating third and fourth control signals for said second hitting symbol generator;

means for coupling said third and fourth control signals to said second hitting symbol generator;

means for generating fifth and sixth control signals for said hit symbol generator;

means for coupling said fifth and sixth control signals to said hit symbol generator;

means for coupling said first, second, third, and fourth control signals to said means for generating fifth and sixth control signals; and

means for coupling the outputs of said symbol generators and said sync signals to the television receiver.

23. Apparatus as defined in claim **22** wherein said means for generating fifth and sixth control signals includes:

first means for detecting coincidence between said first hit symbol and said hitting symbol;

second means for detecting coincidence between said second hit symbol and said hitting symbol;

a first monostable multivibrator coupled to said first coincidence means;

a second monostable multivibrator coupled to said second coincidence means;

first, second, third, and fourth gates having as inputs thereto said first, third, second, and fourth control signals, respectively;

means for coupling the output of said first monostable multivibrator to said first and third gates;

means for coupling the output of said second multivibrator to said second and fourth gates;

a first differentiator coupled to said first and second gates;

a second differentiator coupled to said third and fourth gates;

first sampling means coupled to said first differentiator;

second sampling means coupled to said second differentiator;

first and second OR gates, the outputs thereof being coupled to said first and second sampling means, respectively, the inputs thereof being coupled to both said monostable multivibrators;

first and second peak detectors coupled to said first and second sampling means, respectively; and

first and second integrators coupled to said first and second peak detectors, respectively, said fifth and sixth control signals being derived at the outputs of said first and second integrators, respectively.

24. Apparatus as defined in claim **23**, further including:

third and fourth OR gates, each coupled to both said monostable multivibrators;

a first and second bistable multivibrator, each having first and second inputs, said first inputs taken at the outputs of said third and fourth OR gates, respectively;

a first and second comparator, the outputs thereof being coupled to second inputs of said first and second bistable multivibrators, respectively;

said first and second comparators being coupled to said first and second integrators, respectively;

means for generating reference voltages;

means for applying said reference voltages to said comparators; and

first and second means for reversing the polarity of the outputs of said peak detectors, said polarity reversing means coupled to the outputs of said first and second bistable multivibrators, respectively.

25. In combination with a standard television receiver, apparatus for generating symbols upon the screen of the receiver to be manipulated by at least one participant, comprising:

means for generating a hitting symbol; and

means for generating a hit symbol including means for ascertaining coincidence between said hitting symbol and said hit symbol and means for imparting a distinct motion to said hit symbol upon coincidence.

26. The combination of claim **25** wherein said means for generating a hitting symbol includes means for providing horizontal and vertical control signals for varying the horizontal and vertical positions of said hitting symbol.

27. The combination of claim **26** wherein said means for providing horizontal control signals includes a voltage source, a potentiometer coupled across said voltage source and an integrator coupled to the arm of said potentiometer, said control signal being derived at the output of said integrator.

28. The combination of claim **25** wherein said means for generating a hit symbol includes means for providing horizontal and vertical control signals for varying the horizontal and vertical positions of said hit symbol.

29. The combination of claim **28** wherein said means for providing horizontal control signals for said hit symbol includes means for causing said hit symbol to move back and forth across the screen when triggered.

30. The combination of claim **29** wherein said triggering means includes a slow free-running multivibrator.

31. The combination of claim **29** further including means for detecting coincidence between a hit symbol and a hitting symbol and means for causing said hit symbol to change direction upon coincidence.

32. The combination of claim **25** wherein said means for generating a hit symbol further includes means for causing said hit symbol to move away from a predetermined position of the screen with a reflection angle equal to the incident angle at which said hit symbol approached said predetermined position.

33. In combination with a standard television receiver, apparatus for generating signals representing a symbol to be displayed on the screen of said television receiver, comprising:

means for generating sync signals;

means for generating a first sawtooth wave;

means for generating a second sawtooth wave;

means coupled to said first sawtooth wave generating means for generating first current pulses proportional to a predetermined slice of said first sawtooth wave, including a first slicer having first and second diodes connected back-to-back with one junction thereof coupled to said first sawtooth

wave generating means, a capacitor coupled from the other junction to ground and means for receiving a control signal at said other junction, and first means for differentiating the output from said first slicer;

means coupled to said second sawtooth wave generating means for generating second current pulses proportional to a predetermined slice of said second sawtooth wave, including a second slicer having third and fourth diodes connected back-to-back with one junction thereof coupled to said second sawtooth wave generating means, a capacitor coupled from the other junction to ground and means for receiving a control signal at said other junction and second means for differentiating the output from said second slicer;

a coincidence gate coupled to said first and second current pulse generating means;

means for summing the output from said coincidence gate and sync signals;

means for applying the output of said summing means to the video and sync circuits of said television receiver.

34. Apparatus as defined in claim **33**, further including means for disconnecting the video detector of said television receiver from said video amplifier.

35. In combination with a standard television receiver, apparatus for generating signals representing a first and second hitting symbol and a hit symbol to be displayed on the screen of said television receiver, comprising:

means for generating a first sawtooth wave;

means for generating a second sawtooth wave;

a first hitting symbol generator;

a second hitting symbol generator;

a hit symbol generator;

means for applying said first and second sawtooth waves to said symbol generators;

means for generating first and second control signals for said first hitting generator;

means for coupling said first and second control signals to said first hitting symbol generator for changing the position thereof;

means for generating third and fourth control signals for said second hitting symbol generator;

means for coupling said third and fourth control signals to said second hitting symbol generator for changing the position thereof;

[means for applying the output of said spot generator to the video amplifier of said television receiver.]

means for generating fifth and sixth control signals for said "hit" symbol generator;

means for coupling said fifth and sixth control signals to said "hit" symbol generator for changing the position thereof;

means for coupling said first, second, third and fourth control signals to said means for generating fifth and sixth control signals such that the motion of said "hit" symbol is dependent on the position of a "hitting" symbol; and

means for coupling the outputs of said symbol generators to the video amplifier of said television receiver.

36. In combination with a conventional television receiver, apparatus for generating signals representing a symbol to be displayed on the screen of said television receiver, comprising:

means for generating vertical and horizontal sawtooth waveforms,

means for synchronizing said vertical and horizontal sawtooth waveforms to the sync signals received in said television receiver from a broadcast signal,

a spot generator including a first slicer having first and second diodes connected back-to-back with one junction thereof coupled to said vertical sawtooth generating means, a capacitor coupled from the other junction to ground and means for receiving a first control signal at said other junction, and first means for differentiating the output from said first slicer, and a second slicer having third and fourth diodes connected back-to-back with one junction thereof coupled to said horizontal sawtooth generating means, a capacitor coupled [form] *from* the other junction to ground and means for receiving a second control signal at said other junction, and second means for differentiating the output from said second slicer, and a coincidence gate coupled to said first and second differentials; and

means for applying the output of said spot generator to the video amplifier of said television receiver

37. The combination of claim **36**, wherein said means for generating vertical and horizontal sawtooth waveforms includes means coupled to the horizontal and vertical deflection circuits of said television receiver

38. Apparatus for generating symbols upon the screen of a cathode ray tube, comprising:

a cathode ray tube;

means for generating horizontal and vertical sync signals;

means for generating first and second sawtooth waves;

means for generating a video signal proportional to predetermined slices of said sawtooth waves including a first slicer having first and second diodes connected back-to-back with one junction thereof coupled to said vertical sawtooth generating means, a capacitor coupled from the other junction to ground and means for receiving a first control signal at said other junction, and first means for differentiating the output from said first slicer, and a second slicer having third and fourth diodes connected back-to-back with one junction thereof coupled to said horizontal sawtooth generating means, a capacitor coupled from the other junction to ground and means for receiving a second control signal at said other junction, and second means for differentiating the output from said second slicer, and a coincidence gate coupled to said first and second differentials;

a horizontal deflection circuit coupled to said cathode ray tube;

a vertical deflection coupled to said cathode ray tube circuit;

means for coupling said video signal to the intensity input of said cathode ray tube;

means for coupling said horizontal sync signals to said horizontal deflection circuits, and

means for coupling said vertical sync signals to said vertical deflection circuit

39. Apparatus as defined in claim **38**, further including means for supplying high voltage to said cathode ray tube.

40. Apparatus as defined in claim **39** wherein said

video signal coupling means includes a video amplifier.

[44.] *41*. Apparatus for playing ping-pong type games by displaying and manipulating symbols on the screen of a cathode ray tube, comprising:

means for generating a first hitting spot;

means for generating a second hitting spot;

means for generating a hit spot;

means for changing the vertical position of said first hitting spot;

means for changing the vertical position of said second hitting spot;

means for causing said hit spot to move from an off-screen left position to an off-screen right position and vice versa;

means for changing said off-screen right and off-screen left positions;

means for denoting coincidence between said first hitting spot and said hit spot;

means for denoting coincidence between said second hitting spot and said hit spot;

means for causing said hit spot to change horizontal direction upon coincidence between said hit spot and either of said hitting spots, and

means for displaying said spots upon the screen of said cathode ray tube.

42. The apparatus of claim **41** further including means for causing said hit spot to move on-screen subsequent to said hit spot moving off-screen occurring when said hit spot does not make coincidence with one of said hitting spots when in vertical alignment therewith.

43. Apparatus for playing a gun ping-pong type game on the screen of a cathode ray tube, comprising:

means for generating a hit spot;

a first light sensitive gun;

a second light sensitive gun;

means for causing said hit spot to move from an off-screen right to an off-screen left position and vice versa;

means for causing said hit spot to change direction when one of said light guns receives a pulse of light energy from said hit spot; and

means for serving said hit spot when said hit spot goes off-screen.

44. Apparatus for playing a baseball type game on the screen of a cathode ray tube, comprising:

means for displaying a hit spot;

means for displaying a hitting spot;

means for adjusting the vertical position of said hitting spot;

means for serving said hit spot; and

means for varying the vertical position of said hit spot; and

means for denoting coincidence between said hit and said hitting spot whereby said hit spot will reverse directions.

45. Apparatus for playing a hockey type game upon the screen of a cathode ray tube, comprising:

means for displaying a first hitting spot;

means for displaying a second hitting spot;

means for displaying a hit spot;

means for controlling the position of said first and second hitting spots;

means for controlling the position of said hit spot including means for ascertaining coincidence between either of said hitting spots and said hit spot and means for imparting a distinct motion to said hit spot upon coincidence.

46. Apparatus as defined in claim **45** wherein said means for controlling said hit spot includes means for causing said hit spot to move in the direction hit by a hitting spot and means for causing said hit spot to bounce away from the sides of said cathode ray tube when coincidence therewith.

47. Apparatus for playing a simulated handball game upon the screen of a cathode ray tube, comprising:

means for displaying a first symbol representing a first player;

means for displaying a second symbol representing a second player; and

means for displaying a third symbol representing a ball;

means for controlling the position of said first symbol on said cathode ray tube;

means for controlling the position of said second symbol on said cathode ray tube;

means for controlling the position of said third symbol on said cathode ray tube;

said means for controlling the position of said third symbol on said cathode ray tube including means for causing said third symbol to change direction upon coincidence between either of said first or second symbols and

means for causing said third symbol to bounce off three of said four sides of said cathode ray tube upon coincidence therewith and to go off-screen when coincident with said fourth side of said cathode ray tube; and

means for serving said third symbol when it goes off-screen at said fourth side of said cathode ray tube.

48. Apparatus for generating signals representing a symbol to be displayed on the screen of a television receiver, comprising:

means for generating sync signals,

means for generating a first sawtooth wave;

means for generating a second sawtooth wave,

means coupled to said first sawtooth wave generating means for generating first current pulses proportional to a predetermined slice of said first sawtooth wave including a first slicer having first and second diodes connected back-to-back with one junction thereof coupled to said first sawtooth wave generating means, a capacitor coupled from the other junction to ground and means for receiving a control signal to said other junction, and first means for differentiating the output from said first slicer,

means coupled to said second sawtooth wave generating means for generating second current pulses proportional to a predetermined slice of said second sawtooth wave including a second slicer having third and fourth diodes connected back-to-back with one junction thereof coupled to said second sawtooth wave generating means, a capacitor coupled from the other junction to ground and means for receiving a control signal at said other junction, and second means for differentiating the output from said second slicer;

a coincidence gate coupled to said first and second current pulse generating means,

means for coupling the output from said coincidence gate and said sync signals to a television receiver.

49. Apparatus for generating signals representing a hitting symbol and a hit symbol to be displayed on the screen of a television receiver, comprising

means for generating synchronizing signals,

means for generating electrical signals representing a hitting symbol,

means coupled to said means for generating electrical signals representing a hitting symbol for generating first and second control signals to vary the horizontal and vertical positions of said hitting symbol,

first means for differentiating a portion of the signal output of said first control signal generating means,

second means for differentiating a portion of the signal output of said second control signal generating means,

first means for integrating said first differentiated signal for providing a first hit symbol control voltage,

second means for integrating said second differentiated signal and for providing a second hit symbol control voltage, and

a symbol generator having as control inputs thereto said first and second hit symbol control voltages whereby said hit symbol moves with a velocity proportional to the velocity of said hitting symbol when coincident therewith.

50. Apparatus for generating signals representing a first and second hitting symbol and a hit symbol to be displayed on the screen of a television receiver, comprising

means for generating sync signals;

means for generating a first sawtooth wave,

means for generating a second sawtooth wave,

a first hitting symbol generator,

a second hitting symbol generator,

a hit symbol generator;

means for applying said first and second sawtooth waves to said symbol generators;

means for generating first and second control signals for said first hitting symbol generator,

means for coupling said first and second control signals to said first hitting symbol generator,

means for generating third and fourth control signals for said second hitting symbol generator,

means for coupling said third and fourth control signals to said second hitting symbol generator,

means for generating fifth an sixth controls signals for said hit symbol generator,

means for coupling said fifth and sixth control signals to said hit symbol generator,

means for coupling said first, second, third, and fourth control signals to said means for generating fifth and sixth control signals, and

means for coupling the outputs of said symbol generators and said sync signals to a television receiver.

51. Apparatus for generating symbols upon the screen of a television receiver to be manipulated by at least one participant, comprising

means for generating a hitting symbol, and

means for generating a hit symbol including means for ascertaining coincidence between said hitting symbol and said hit symbol and means for imparting a distinct motion to said hit symbol upon coincidence.

52. The combination of claim 51 wherein said means for generating a hitting symbol includes means for providing horizontal and vertical control signals for varying the horizontal and vertical positions of said hitting symbol.

53. The combination of claim 52 wherein said means for providing horizontal control signals includes a voltage source, a potentiometer coupled across said voltage source and an integrator coupled to the arm of said integrator, said control being derived at the output of said integrator.

54. The combination of claim 51 wherein said means for generating a hit symbol includes means for providing horizontal and vertical control signals for varying the horizontal and vertical positions of said hit symbol.

55. The combination of claim 54 wherein said means for providing horizontal control signals for said hit symbol includes means for causing said hit symbol to move back and forth across the screen.

56. The combination of claim 55 wherein said means for causing said hit symbol to move back and forth across the screen includes a slow free-running multivibrator.

57. The combination of claim 55 further including means for detecting coincidence between a hit symbol and a hitting symbol and means for causing said hit symbol to change direction upon coincidence.

58. Apparatus for generating signals representing a symbol to be displayed on the screen of a television receiver, comprising

means for generating sync signals;

means for generating a horizontal sawtooth wave,

means for generating a vertical sawtooth wave,

means coupled to said horizontal sawtooth wave generating means for generating first current pulses proportional to a predetermined slice of said horizontal sawtooth wave including a first slicer having first and second diodes connected back-to-back with one junction thereof coupled to said horizontal sawtooth wave generating means, a capacitor coupled from the other junction to ground and means for receiving a control signal at said other junction, and first means for differentiating the output from said first slicer,

means coupled to said vertical sawtooth wave generating means for generating second current pulses proportional to a predetermined slice of said vertical sawtooth wave including a second slicer having third and fourth diodes connected back-to-back with one junction thereof coupled to said vertical sawtooth wave generating means, a capacitor coupled from the other junction to ground and means for receiving a control signal at said other junction and second means for differentiating the output from said second slicer,

a coincidence gate coupled to said first and second current pulse generating means,

means for summing the output from said coincidence gate and sync signals,

means for applying the output of said summing means to the video amplifier of a television receiver.

59. Apparatus for generating signals representing a first and second hitting symbol and a hit symbol to be displayed on the screen of a television receiver, comprising,

means for generating a first sawtooth wave,

means for generating a second sawtooth wave;

a first hitting symbol generator,

a second hitting symbol generator,

a hit symbol generator;

means for applying said first and second sawtooth waves to said symbol generators;

means for generating first and second control signals for said first hitting symbol generator;

means for coupling said first and second control signals to said first hitting symbol generator;

means for generating third and fourth control signals for said second hitting symbol generator;

means for coupling said third and fourth control signals to said second hitting symbol generator;

means for generating fifth and sixth control signals for said hit symbol generator;

means for coupling said fifth and sixth control signals to said hit symbol generator;

means for coupling said first, second, third, and fourth control signals to said means for generating fifth and sixth control signals; and

means for coupling the outputs of said symbol generators to the video amplifier of a television receiver.

60. Apparatus for playing games by displaying and manipulating symbols on the screen of a cathode ray tube comprising:

means for generating vertical and horizontal synchronization signals;

means responsive to said synchronization signals for deflecting the beam of said cathode ray tube to generate a raster on said screen;

means coupled to said synchronization signal generating means and said cathode ray tube for generating a first symbol on said screen at a position which is directly controlled by a player;

means coupled to said synchronization signal generating means and said cathode ray tube for generating a second symbol on said screen which is movable;

means coupled to said first symbol generating means and said second symbol generating means for determining a first coincidence between said first symbol and said second symbol; and

means coupled to said coincidence determining means and said second symbol generating means for imparting a distinct motion to said second symbol in response to said coincidence.

61. The apparatus of claim **60**, further including:

means coupled to said synchronization signal generating means and said cathode ray tube for generating a third symbol on said screen at a position which is controlled by a player;

means coupled to said third symbol generating means and said second symbol generatin means for determing a second coincidence between said third symbol and said second symbol; and

means coupled to said second and third symbol coincidence determining means and said second symbol generating means for imparting a distinct motion to said second symbol in response to said second coincidence.

62. The apparatus of claim **61** further including means for causing said second symbol to travel across said screen from one side of said raster to another side of said raster in the absence of an occurrence of coincidence between said second symbol and said first or third symbol after coincidence of said second symbol with said third or first symbol.

63. The apparatus of claim **61**, further including:

means for determining a third coincidence of a signal representing said second symbol and a signal bearing a specific time relationship with an edge of said raster; and

means coupled to said third coincidence determining means and said second symbol generating means for altering the motion of said second symbol in response to said third coincidence.

64. The apparatus of claim **63** wherein said motion altering means imparts to said second symbol a motion which is a reflection of its motion immediately prior to its motion at said third coincidence.

* * * * *

United States Patent [19]

Baer

[11] **3,728,480**

[45] **Apr. 17, 1973**

[54] TELEVISION GAMING AND TRAINING APPARATUS

[75] Inventor: **Ralph H. Baer, Manchester, N.H.**

[73] Assignee: **Sanders Associates, Inc., Nashua, N.H.**

[22] Filed: **Mar. 22, 1971**

[21] Appl. No.: **126,966**

Related U.S. Application Data

[63] Continuation of Ser. No. 697,798, Jan. 15, 1968, abandoned.

[52] **U.S. Cl.**.....**178/6.8, 178/6, 178/DIG. 1**

[51] **Int. Cl.**.....**H04n 7/18**

[58] **Field of Search**.....273/101.1, 101.2; 315/22, 26, 30, 10, 18; 178/DIG. 4, 7.83, DIG. 6

[56] **References Cited**

UNITED STATES PATENTS

2,489,883	11/1949	Hecht	250/217 CR
2,552,022	5/1951	Watson et al.	315/26
2,595,646	6/1952	Doba, Jr. et al.	328/187
2,648,724	8/1953	Enslein	178/6 TT
2,956,116	10/1960	Singleman	178/6 TT
3,014,724	12/1961	Cryder et al.	178/7.83
3,046,676	6/1962	Hermann et al.	35/25
3,151,248	9/1964	Glaser et al.	273/101.1
3,401,331	9/1968	Mussulman	178/6 TT
2,621,246	12/1952	Clayden et al.	178/DIG. 6
1,180,470	6/1959	France	

FOREIGN PATENTS OR APPLICATIONS

OTHER PUBLICATIONS

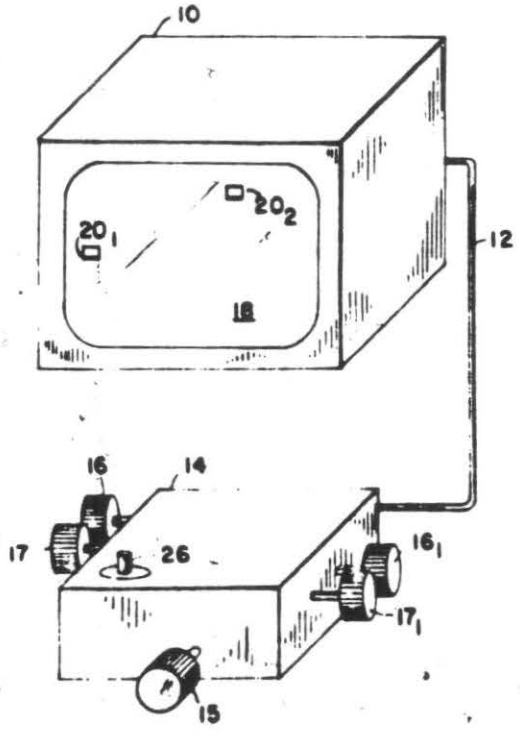
Radio and Television News; August 1956, pp. 63.
Radio Electronics, May 1956, pp. 38.

Primary Examiner—Richard Murray
Attorney—Louis Etlinger

[57] **ABSTRACT**

The present invention pertains to an apparatus and method, in conjunction with standard monochrome and color television receivers, for the generation, display, manipulation, and use of symbols or geometric figures upon the screen of the television receivers for the purpose of training simulation, for playing games, and for engaging in other activities by one or more participants. The invention comprises in one embodiment a control unit, connecting means and in some applications a television screen overlay mask utilized in conjunction with a standard television receiver. The control unit includes the control means, switches and electronic circuitry for the generation, manipulation and control of video signals which are to be displayed on the television screen. The connecting means couples the video signals to the receiver antenna terminals thereby using existing electronic circuits within the receiver to process and display the signals. An overlay mask which may be removably attached to the television screen may determine the nature of the game to be played or the training simulated. Control units are provided for each of the participants. Alternatively, games, training simulations and other activities may be carried out in conjunction with background and other pictorial information originated in the television receiver by commercial TV, closed-circuit TV or a CATV station.

46 Claims, 26 Drawing Figures



Appendix B

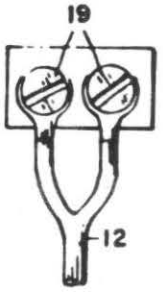


FIG. 1A

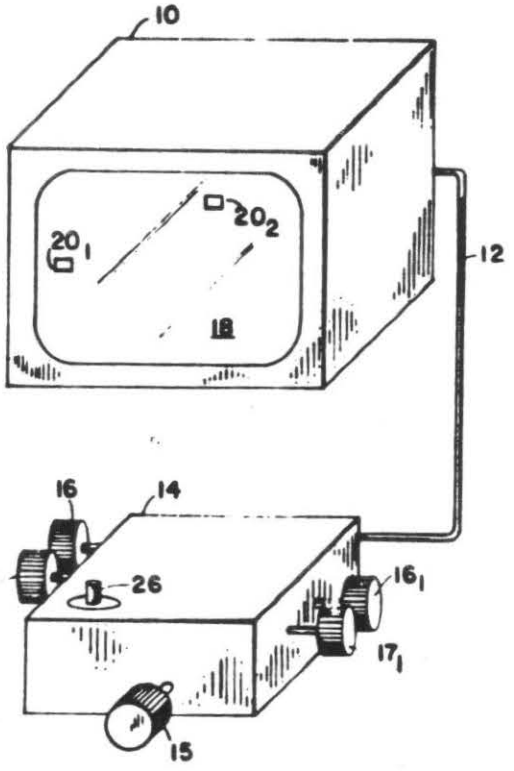


FIG. 1

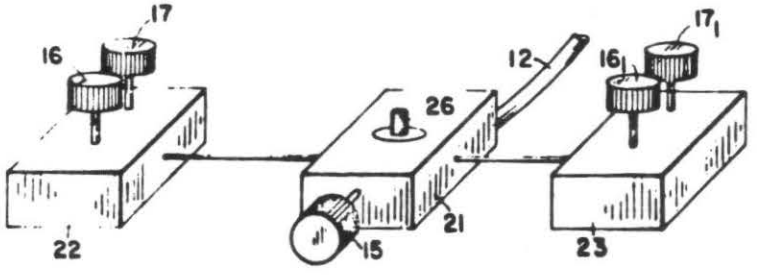


FIG. 1B

INVENTOR
RALPH H. BAER
BY Richard S. Seligman
ATTORNEY

3728480

FIG. IC

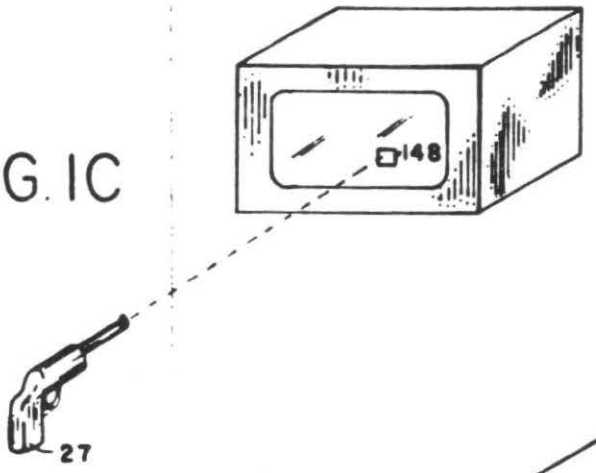


FIG. ID

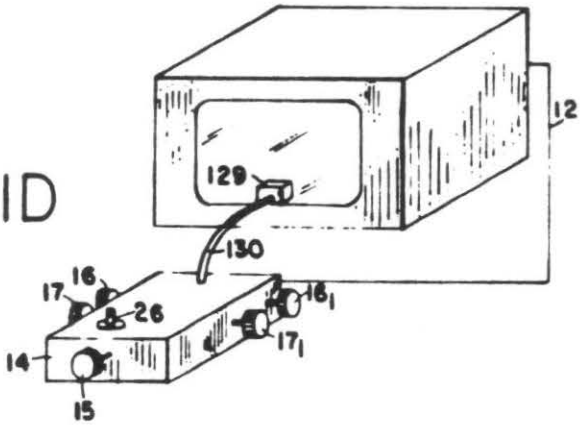
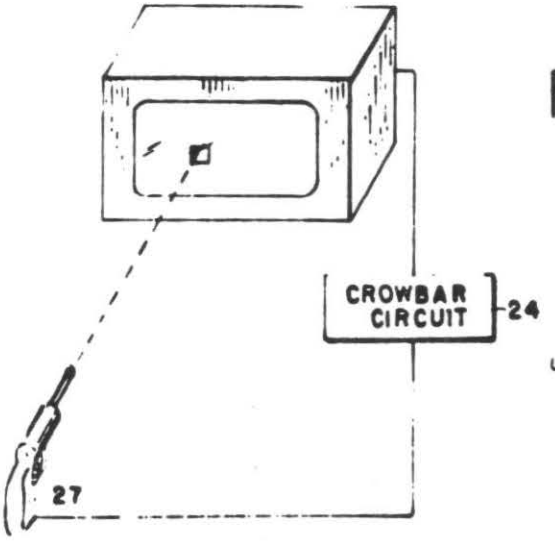


FIG. IE



INVENTOR

RALPH H. BAER

BY Richard S. Seligman

ATTORNEY

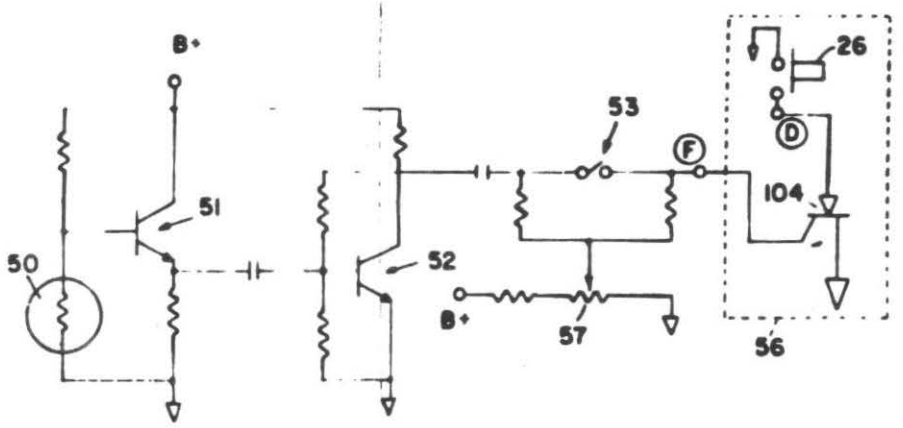


FIG. 4

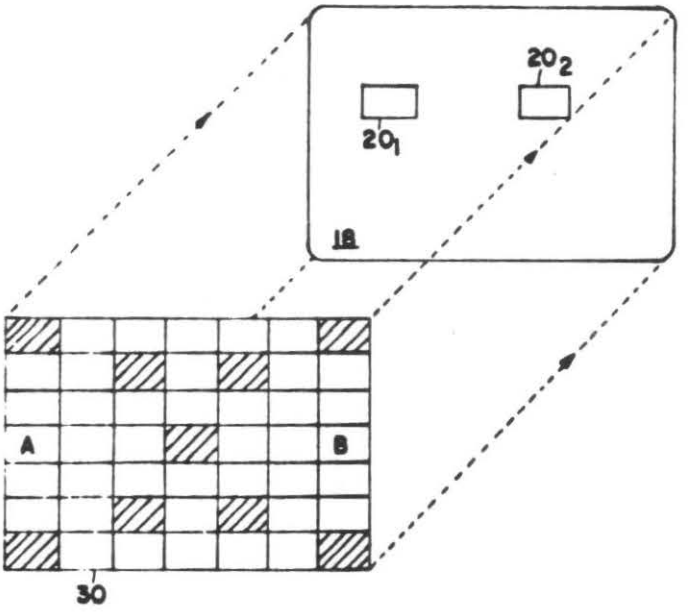


FIG. 2

INVENTOR

RALPH H. BAER

BY Richard J. Lehigman

ATTORNEY

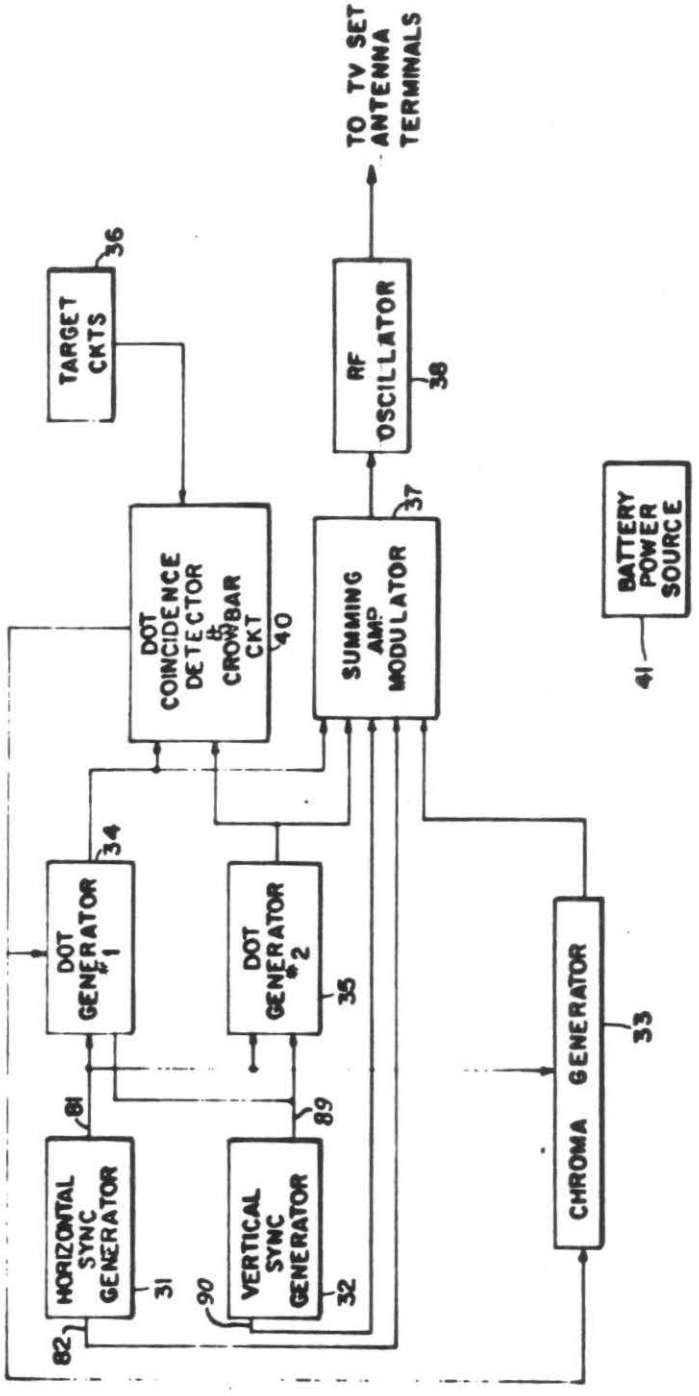


FIG. 3

INVENTOR

RALPH H. BAER

BY Richard L. Seligman

ATTORNEY

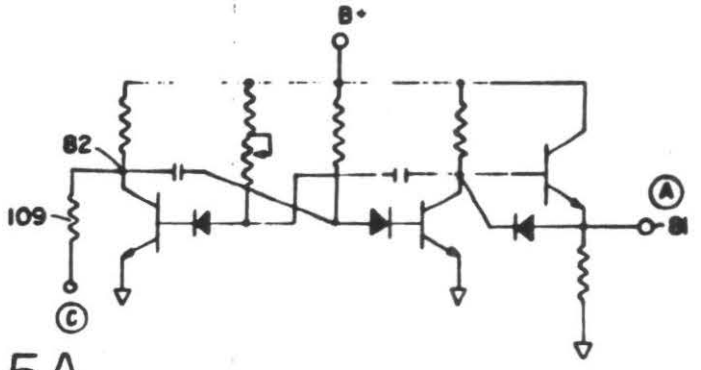


FIG. 5A

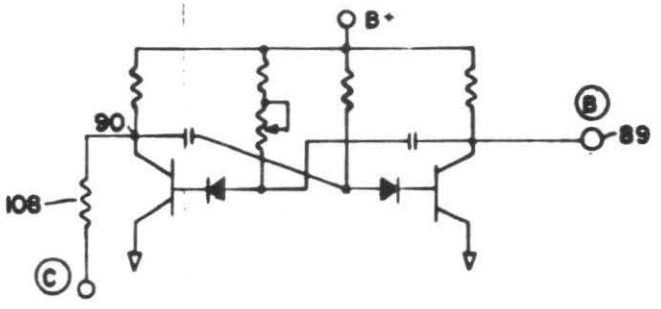


FIG. 5B

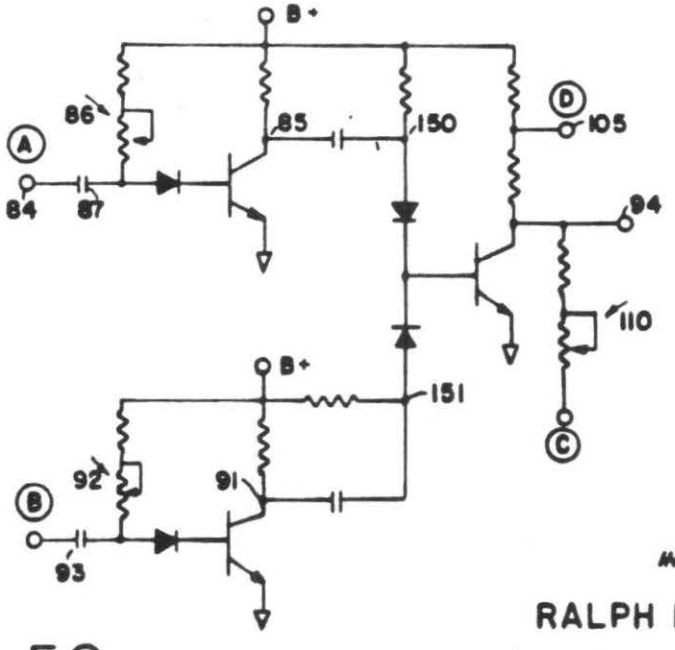


FIG. 5C

INVENTOR

RALPH H. BAER

BY Richard S. Seligman

ATTORNEY

3728480

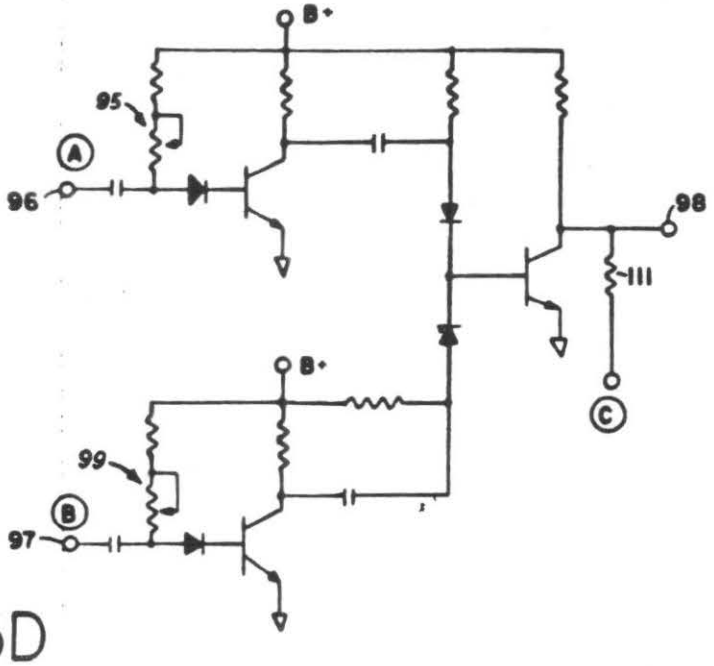


FIG. 5D

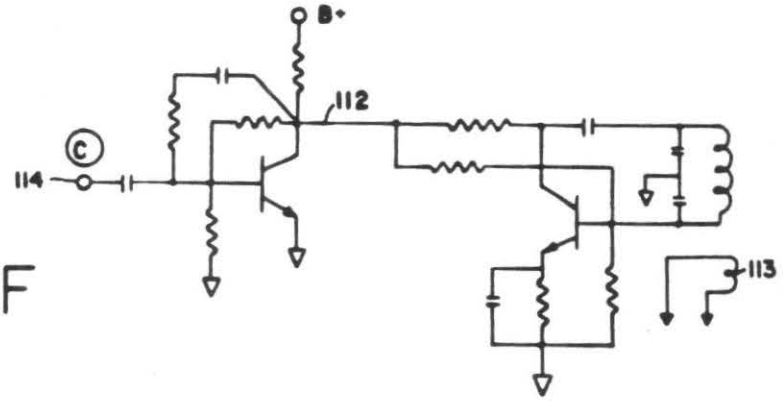


FIG. 5F

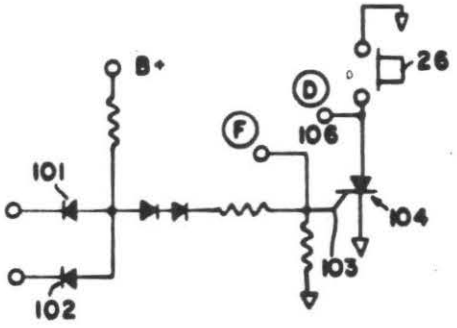


FIG. 5E

INVENTOR
RALPH H. BAER
BY Richard J. Seligson
ATTORNEY

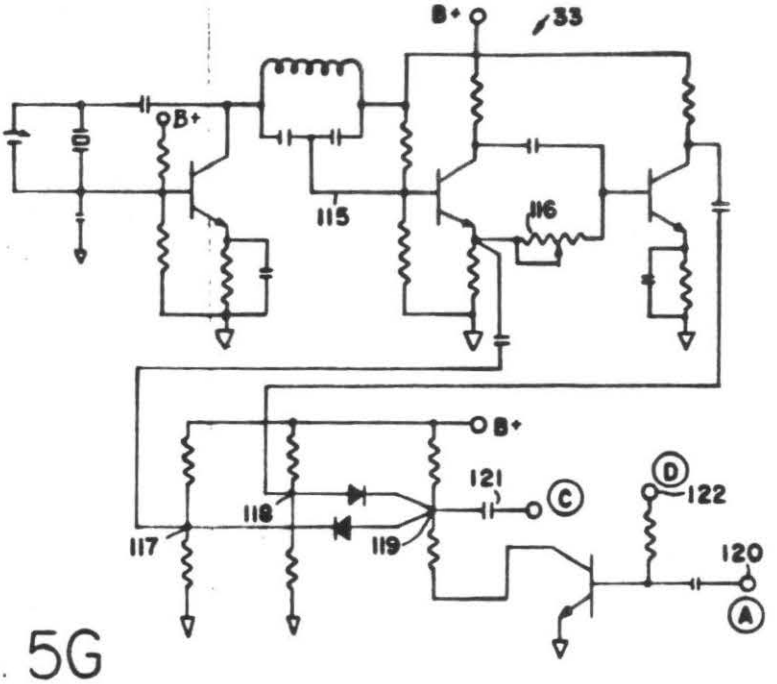


FIG. 5G

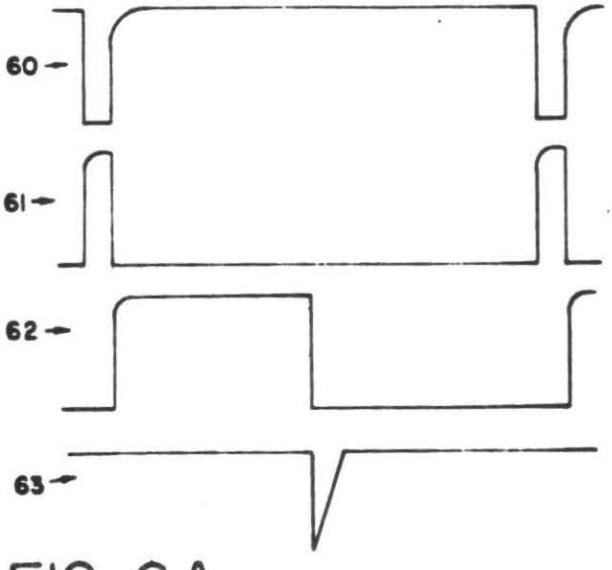


FIG. 6A

INVENTOR
RALPH H. BAER
BY
Richard S. Seligman
ATTORNEY

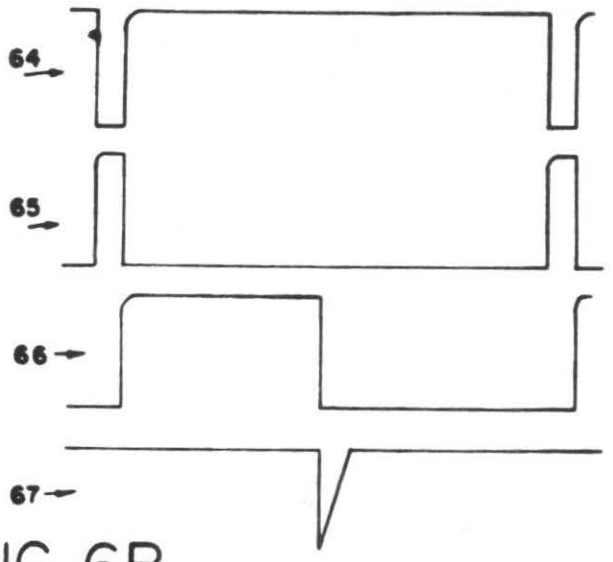


FIG. 6B

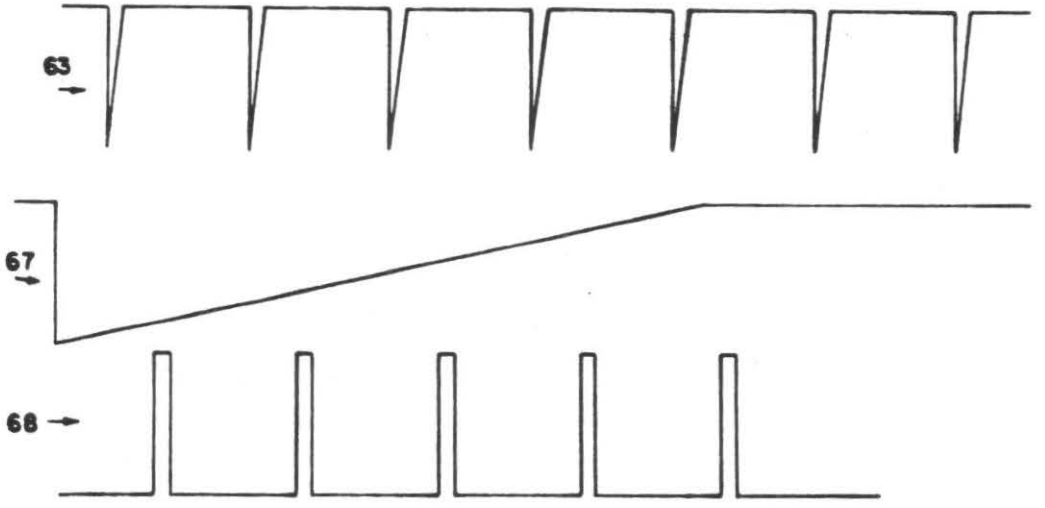


FIG. 6C

INVENTOR
RALPH H. BAER
BY Richard J. Seligman
ATTORNEY

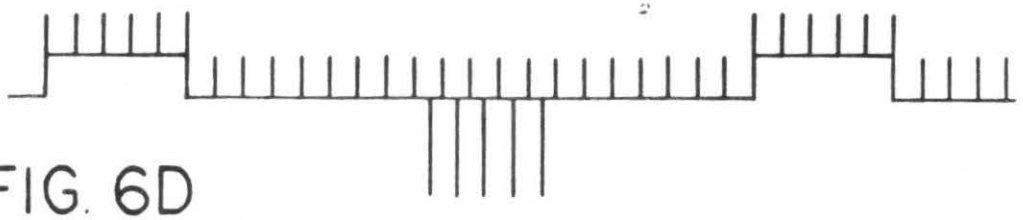


FIG. 6D

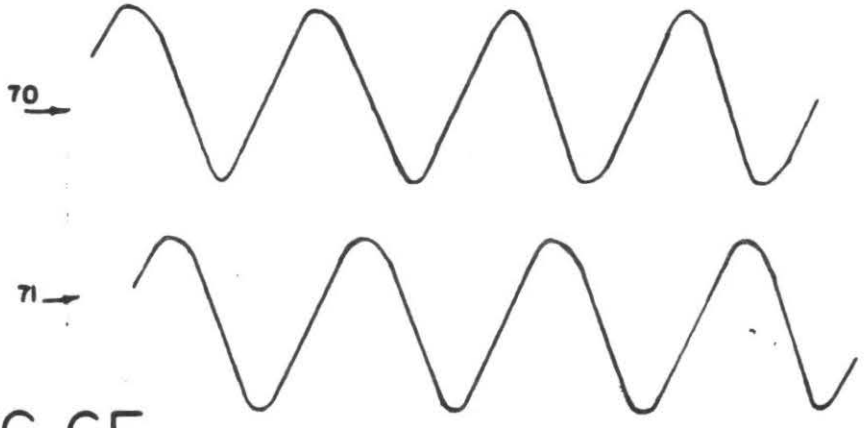


FIG. 6E

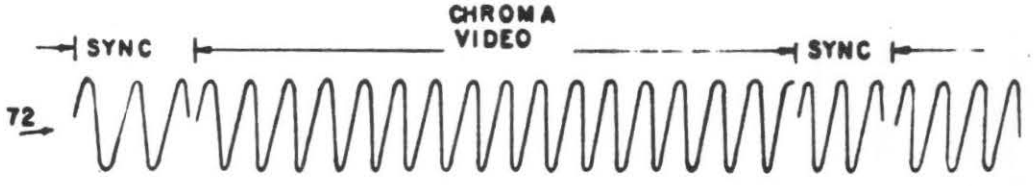


FIG. 6F

INVENTOR
RALPH H. BAER
BY Richard L. Seligson
ATTORNEY

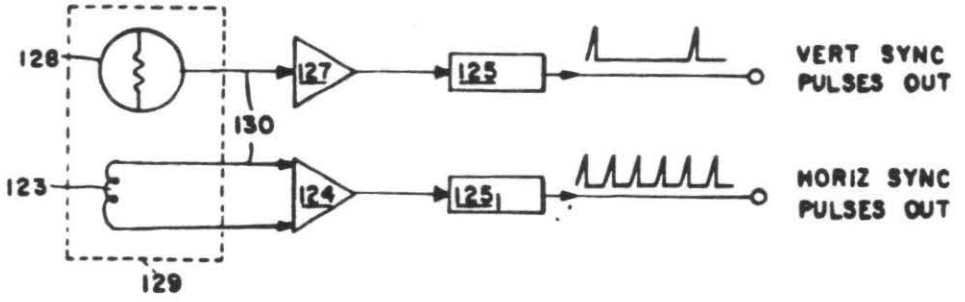


FIG. 7

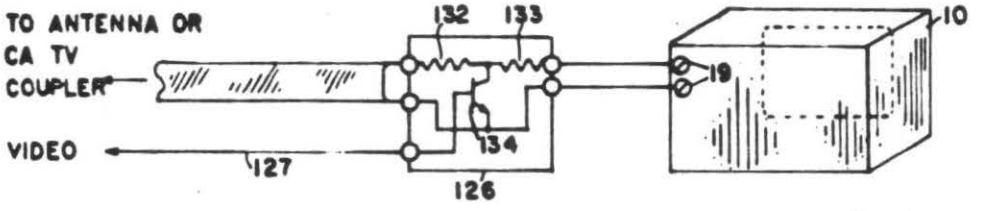


FIG. 8

INVENTOR

RALPH. H. BAER

BY Richard J. Seligman

ATTORNEY

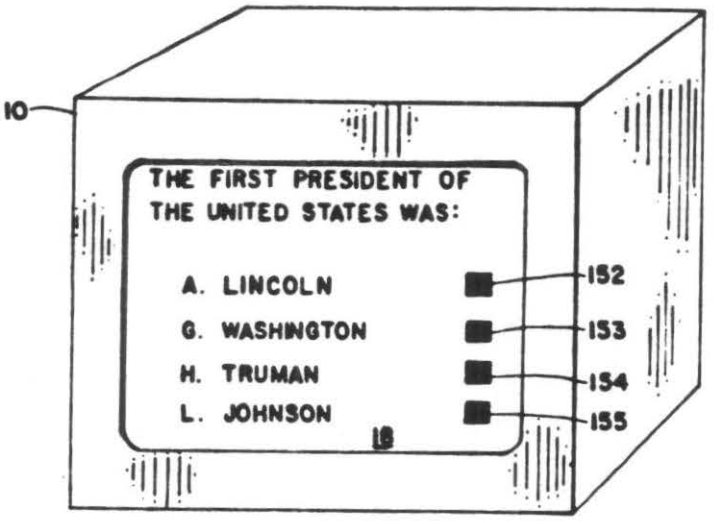


FIG. 9

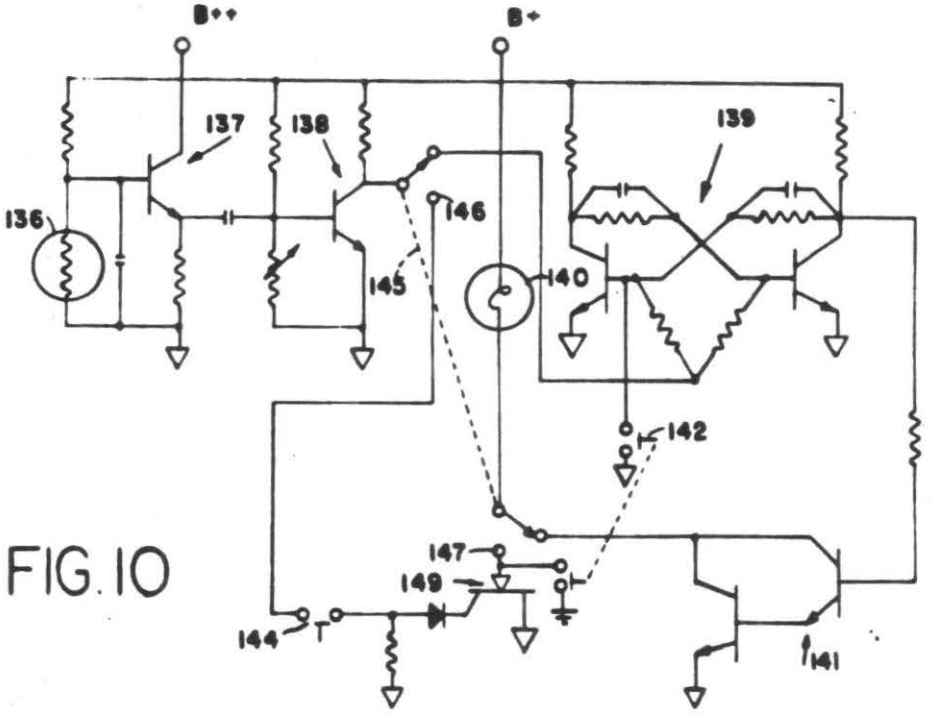


FIG. 10

INVENTOR
RALPH H. BAER
BY Richard J. Seligman
ATTORNEY

TELEVISION GAMING AND TRAINING APPARATUS

This is a continuation of application Ser. No. 697,798 filed Jan. 15, 1968 now abandoned.

BACKGROUND OF THE INVENTION

The invention relates to an apparatus and method by means of which standard television receivers can be utilized as active rather than passive instruments. This is accomplished by certain embodiments having participants manipulate controls of a control unit connected to the television receiver to cause a symbol, such as a rectangle, bar, "dot" or a pair of dots to be displayed upon the television screen by means of which the participants can play a variety of games, participate in simulated training programs, as well as carry out other activities. By way of example, modified versions of the well-known game of checkers may be played by two participants by placing an appropriate mask representing the checker board upon the screen of the television receiver. For a simulated training program, "dots" displayed on the TV screen could represent ships which would be maneuvered by operating manipulating controls.

Heretofore, color and monochrome television receivers have been used by the home and other viewers only as passive devices; i.e., the television receiver is used only as a display means for programming originating at a studio. The viewer is limited to selecting the presentations available for viewing and is not a participant to the extent that he can control or influence the nature of, or add to the presentation displayed on the receiver screen. A standard receiver is employed with auxiliary equipment to provide an active form of home entertainment. Since most homes are equipped with television receivers, the only expense required to provide added family enjoyment is the expense of a control unit of one type or another.

It is, therefore the primary object of the present invention to provide an apparatus and methods for displaying video signals upon the screen of a television receiver, where some or all of the video signals are both generated and controlled by the viewer.

It is another object of the present invention to provide an apparatus and method wherein a standard color or monochrome television receiver is utilized as an active instrument for simulated training programs and to play various types of games involving one or more participants.

It is a further object of the present invention to provide a device whereby an individual may pit his alertness, skill, manual dexterity and visual acuity on automatically controlled video displays.

It is still another object of the present invention to provide an apparatus which will also provide visual indication of the results of the games played and the simulated training programs.

It is yet a further object of the present invention to provide an apparatus which will generate "dots" or other geometric figures such as squares, rectangles, bars, stripes, etc. Which may be controlled by one or more participants for playing various types of games and for training simulation by the display and utilization of the "dots."

It is yet another object of the present invention to provide an apparatus which may allow one or more participants to use a standard television set while receiving background and other pertinent pictorial information from a cooperative commercial TV, closed-circuit TV, or CATV station, thus combining or alternating studio and home-generated information on the TV screen.

It is still another object of the present invention to allow the use of a standard TV set for gaming or other activities without the need for any kind of internal electrical connection to the TV set for the introduction of video and/or chroma signals, connections being required to be made only to the externally accessible antenna terminals.

It is still another object of the present invention to provide for interrogating a standard TV receiver through an optical photosensor in a manner allowing the identification of a suitably time-or frequency-coded message, not interpretable by the unaided eye, such message having been originated in the TV viewers equipment by a cooperative commercial TV, closed-circuit TV or CATV station.

It is still a further object of the present invention to provide apparatus for decoding messages on a TV screen.

SUMMARY OF THE INVENTION

In accordance with one embodiment of the present invention a television gaming apparatus is provided for generating video signals in accordance with the standardized television format, which signals may be controlled by an individual operator by means of a joystick or other manually operative means. The television gaming apparatus comprises a control box having enclosed therein all the necessary electronic circuits to produce video signals which are compatible with standard television receivers, both monochrome and color.

The control box has video signal control means mounted thereon for easy access and connecting means are provided for coupling the video signals generated within the control box to the television receiver. There is also provided suitable overlay masks which are adapted to be removably secured upon the television screen. These masks permit playing of games and training simulation which are adaptable to display upon a television screen.

By way of illustration, the television gaming apparatus can be used for electronic target shooting by providing a gun having a photo-electric cell which is activated when a trigger is depressed. Thus, when the gun is aimed at a "dot" displayed on the television screen, which "dot" serves as the target, and the trigger is depressed, a hit will be indicated directly on the television screen by a visual display when the photoelectric cell is in alignment with the "dot." The "dot" which serves as the target may be either fixed or moveable and can be swept across the screen in a predetermined or random fashion, at either a fixed or variable rate, either manually or automatically.

By way of further illustration, games may be played in which a cooperative TV station (commercial, closed-circuit or CATV) provides background data such as scenery for a simulated turkey-shoot game, or such as checkerboard game backgrounds, time-left-to-play-clocks and innumerable others designed to enhance the appeal of the activity. A cooperative TV

station can also provide targets for a target shooting game as well as messages to be decoded. For example, tests questions could be displayed on the TV screen with a multiple set of answers whereby the correct answer is coded in such a manner that a photocell circuit would detect the coding signifying selection of the correct answer.

From the above illustrations it will be apparent to those skilled in the art, that the present invention exhibits a great latitude of versatility.

BRIEF DESCRIPTION OF THE DRAWINGS

The aforementioned and other objects, features and advantages of the present invention will become more apparent from the following detailed description thereof when considered in conjunction with the drawings wherein:

FIG. 1 is a pictorial view illustrating the principal components of one embodiment of the invention;

FIG. 1A is a sketch illustrating the manner in which the components of the embodiment of FIG. 1 are connected;

FIG. 1B is a pictorial view illustrating an alternate embodiment for the control unit of FIG. 1;

FIG. 1C is a sketch showing a "light-gun" containing a photocell and electronic circuits.

FIGS. 1D and 1E are sketches illustrating the manner in which the components of the embodiment of FIG. 1 may be connected when used with a cooperative TV station.

FIG. 2 is a sketch illustrating a TV screen and overlay mask as employed in the embodiment of FIG. 1;

FIG. 3 is a block diagram of the control unit of FIG. 1;

FIG. 4 is a schematic illustrating the electronics for a target shooting game;

FIGS. 5A–5G are schematics of the blocks of FIG. 3;

FIGS. 6A–6F are waveforms (not drawn to scale) illustrating operation of the schematics of FIG. 5;

FIG. 7 is a schematic illustrating the method of extracting horizontal and vertical synchronization pulses from a TV receiver without making internal connections, when using a signal broadcast by a cooperative TV station;

FIG. 8 is a sketch illustrating apparatus for modulating a received TV signal by a video and/or chroma signal generated by the control unit of FIG. 1;

FIG. 9 is a sketch illustrating the TV screen of a receiver employed in a coded information mode; and

FIG. 10 is a schematic of a decoder used to decode the information present on the TV screen of FIG. 9.

DESCRIPTION OF PREFERRED EMBODIMENTS

The principal components of one embodiment of a television gaming system configured according to the invention are illustrated in FIG. 1 which is a pictorial view showing a television receiver 10, a control unit 14 and means 12 for connecting control unit 14 to receiver 10. The television receiver 10 employed can be any of the standard commercially available models that are generally used for home entertainment. Either a monochrome or color television set may be used with the present invention since the basic principles of the invention apply to both types. The connection means 12 is in this embodiment a shielded cable, for example, shielded twin lead and is attached to the antenna terminals of receiver 10 in conventional fashion (see FIG. 1A).

Control unit 14 generates video signals shown as "dots" 20_1 and 20_2 which are positioned on the receiver screen 18 by knobs 16, 17, and 16_1, 17_1, respectively. In this embodiment the "dots" 20 are squares or rectangles. However, any geometric shape is applicable. Knob 16 controls the vertical position of dot 20_1 while knob 17 controls the horizontal position thereof. Thus, it can be seen that the dot 20_1, may be positioned at any point on the screen by the proper manipulation of knobs 16 and 17. Dot 20_2 is positioned in like manner by knob 16_1, 17_1. A reset switch 26 is shown on the control unit 14 and is used to reset the picture on the television screen. For example, a game may be played in which one dot is to be positioned over the other and when this is accomplished one dot will disappear when a monochrome set is used, while in a color set, the dot will disappear and the background will change color. When games of this nature are played, a reset means is required before play can be resumed. Reset switch 26 performs this function.

A knob 15 controls background color for color TV receiver applications. Alternatively, control unit 14 may be broken up into a master control unit containing the electronic circuits and individual control units containing control knobs 16, 17 and 16_1, 17_1, whereby each participant may operate from a position not proximate the other and so not to interfere with other players. This is illustrated in FIG. 1B wherein control unit 14 is broken up into a master control unit 21 and individual control units 22 and 23. The master control unit 21 contains the electronic circuitry found in control unit 14 and controls 26 and 15. Knobs 16, 17 and 16_1, 17_1 which position the dots 20_1 and 20_2 are situated on individual control units 22 and 23 respectively.

The knobs 16, 17 may be combined into a single joystick permitting control of the horizontal and vertical dot positioning by a single control means.

Rather than provide a separate control unit, the control unit could be built into the television receiver as a constituent part thereof and the receiver sold as both an active and passive home entertainment system.

A typical sequence of steps to play a game using the present invention would be as follows: 1. Attach connection means 12 to TV set 10 at antenna terminals 19 if not already attached, 2. turn TV set on, 3. select the proper channel on the set for the control unit being used, 4. apply power to the control unit, 5. attach a mask on the face of the TV screen, if required for the game to be played, 6. begin the game.

Referring now to FIG. 2, a television screen 18 is illustrated having two "dots" 20_1 and 20_2 displayed. An overlay mask 30 of some type of transparent material such as plastic or the like, having some type of pattern, picture or other illustration pertaining to the particular game to be played is shown in a lifted position. Prior to engaging in a game, the overlay mask 30 would be temporarily attached to television screen 18 and in such close proximity to it as not to create any distortion when viewed with reference to the dots 20. One type of overlay mask could be a checkerboard pattern to be used for playing a modified game of checkers. Still another pattern could be a maze type, with the object

of the game being to escape within a specified time. These are but a few of the many games that can be adapted for use with the present invention.

Alternatively, rather than employ overlay mask **30**, the pattern to be provided could be displayed directly on the screen **18**. The pattern could be broadcast by TV stations or alternatively could be sent to a non-used channel over closed-circuit or CATV lines. This embodiment is described in greater detail hereinafter with respect to FIGS. **7** and **8**.

The control unit **14** will now be described in detail by referring to the block diagram shown in FIG. **3**. The timing for the television gaming system is established within the control unit by a horizontal sync generator **31** and a vertical sync generator **32**.

The horizontal sync generator **31** employed in this embodiment is a multivibrator whose output is a series of pulses rather than a square wave. The repetition rate of these pulses is the standard horizontal scanning frequency used in commercial television receivers. The positive sync pulse output **81** of the horizontal sync generator **31** is simultaneously applied to a first "dot" generator **34**, a second "dot" generator **35** and a chroma generator **33** (in color TV applications). The negative sync pulse output **82** of the horizontal sync generator **31** is applied directly to a summing amplifier-modulator **37**. The "dot" generators **34** and **35** when triggered by horizontal sync generator **31** generate a pulse which is the horizontal video information portion of the television composite signal that forms the "dots" **20** on the television receiver screen **18**. The manual control knobs **16**, **17** and 16_1, 17_1 on the control unit are attached to the shafts of potentiometers **86**, **92** and **95**, **99** in the dot generator circuits of the "dot" generators **34** and **35** respectively (see FIGS. **5C** and **5D**). Alternatively, a single control such as a joystick could be coupled to knobs **16**, **17** and a second joystick coupled to knobs 16_1, 17_1. Adjustment of these potentiometers establishes the position of the "dots" on the television screen.

The vertical sync generator **32** is coupled to the first and second symbol or "dot" generators **34** and **35** and triggers the "dot" generators to generate a pulse which is the vertical video information portion of the composite television signal. The combination of the horizontal and vertical signals form a "dot" on the television receiver screen. There are two manual control knobs for each "dot". One of the knobs controls the horizontal pulse position while the other controls the vertical pulse position. The output of the "dot" generator which is the delayed horizontal pulses that are gated by the delayed vertical pulse, describes the location of the "dots" on the television screen. The horizontal and vertical video information from the first and second "dot" generators **34** and **35** is summed together in the summing network of summing amplifier-modulator **37**. The summing network is a resistor matrix which sums all the signals presented to one point. Thus the composite video information is formed. The composite video information is then coupled to the modulator portion of summing amplifier-modulator **37** and to r-f oscillator **38** which modulates the video information with the carrier to generate the modulated RF signal. The RF signal is then coupled to the television antenna terminals **19**. The RF signal that is present at the antenna terminals is detected and processed by the television receiver in the standard manner and is displayed upon the screen. The two controllable "dots" are the means by which games may be played.

Alternatively the video signal could be applied internally to the receiver without rf carrier modulation.

The "dot" coincidence detector and crowbar circuit **40** receives an input from both the first and second "dot" generators **34** and **35** taken at outputs **94** and **98** thereof, respectively (see FIG. **5**). When the "dots" 20_1 and 20_2 are coincident, the first "dot" generator **34** is turned off by the "dot" coincidence detector and crowbar circuit **40**. Thus, when one "dot" is superimposed upon the other, one of the "dots" will disappear.

A variety of games may be adapted to use this particular aspect of the television gaming system. For example, a game of fox and hounds may be played with one "dot" representing the fox and other the hounds. When the hounds catch the fox, the fox's "dot" disappears indicating a catch. Any game requiring an indication of when contact is made between two objects may be adapted to this concept.

The chroma generator **33** is used when the control unit **14** is coupled to a color television receiver. Chroma generator **33** may be omitted for monochrome applications. The gaming system for color operation is the same as that for monochrome sets with the exception that the background color in the color receivers may be controlled. A color control knob **15** (see FIG. **1**) is provided on control unit **14** and is coupled to a potentiometer within the chroma generator **33** by which means the background color may be varied throughout its entire color spectrum. The horizontal sync generator **31** provides the trigger signal to the chroma generator **33** whose output is then summed in the summing network of the summing amplifier-modulator **37** with the other portions of video information. The resultant composite video information is then modulated with the carrier in the modulator and r-f oscillator **38**. The RF signal is then coupled as before to the television receiver antenna terminals **19** and is detected, processed and displayed in the standard manner.

One game which may be played employing the concepts of this invention is target shooting. A "toy" gun containing a photocell is electrically coupled to the control unit.

When a game is played using the target gun, also called a "light-gun," hits are shown on the screen by having one of the "dots" disappear. Signals detected by a target gun circuit **36** are used to trigger the crowbar circuit portion of "dot" coincidence detector and crowbar circuit **40**, which turns off the first dot generator **34**. Thus, one of the dots will disappear indicating a hit. The operation of the target gun circuits will be described in greater detail with reference to FIG. **4**.

The power source **41** is preferably a battern and provides the necessary power to operate the various circuits.

Referring now to FIG. **5**, there is illustrated thereby schematics of the blocks of FIG. **3**. The schematics are described in conjunction with the waveforms of FIG. **6**. Note that the circled capital letters A, B . . . designate connection points, that is A is coupled to A, B to B, etc. The horizontal oscillator **31** of FIG. **5A** is an astable

multivibrator that operates at approximately 15.75 KHz and generates the horizontal sync and timing pulses that are used within the control unit and the television receiver. One output signal taken at point **81** is a positive sync pulse which in one embodiment is approximately 8 volts in amplitude and has a pulse width of 4 microseconds. A second output signal taken at point **82** is a negative sync pulse which also is approximately 8 volts in amplitude and has a pulse width of 4 microseconds.

The vertical oscillator **32** of FIG. **5B** is an astable multivibrator that operates at 60 Hz and provides positive **89** and negative **90** vertical sync pulses of approximately 8 volts amplitude and 1 millisecond duration.

The first "dot" generator **34** is illustrated in FIG. **5C** and is comprised of an "and" gate, and horizontal and vertical delay and pulse-forming circuits. The delayed horizontal and vertical pulses (positive sync pulses) are AND-gated together to form the video information which produces one "dot" on the television screen. Both delay and pulse-forming circuits utilize the positive sync pulse transistor of their respective oscillators as its input transistor. The positive sync pulse from point **81** of the horizontal oscillator is used to trigger the horizontal delay and pulse-forming circuits portion of the first dot generator. When the positive sync pulse, taken at point **81**, is applied at point **84**, the pulse that appears at the output of the delay and pulse-forming circuit point **85** is delayed by the time constant established by the setting of potentiometer **86** and capacitor **87**. The delay and pulse-forming circuit output passes through a pulse shaper having an R-C time constant of very short duration relative to the horizontal oscillator frequency. The output of the pulse shaper is taken at a point **150**. The time delay may be varied from 9 microseconds to 57 microseconds which is substantially the entire range of the horizontal sweep period. The pulses which are generated by the horizontal oscillator, the horizontal delay and pulse-forming circuit and the pulse shaper, are shown in FIG. **6A** as waveforms **60**, **61**, **62** and **63**. Waveform **60** represents the negative horizontal sync pulses taken at point **82**, waveform **61** represents the positive horizontal sync pulses taken at point **81**; waveform **62** represents the output from the delay and pulse-forming circuit taken at point **85** and waveform **63** represents the output from the pulse shaper taken at point **150**.

The positive sync pulse taken at point **89** of vertical oscillator **32** is used to trigger the vertical delay and pulse-forming circuit portion of the first dot generator. The output signal appears at point **91** after a time delay which is determined by the setting of potentiometer **92** and capacitor **93**. The delay and pulse-forming circuit output passes through a pulse shaper having an R-C time constant of very short duration relative to the vertical oscillator frequency. The output of the pulse shaper is taken at point **151**. The time delay may be varied from 1.5 milliseconds to 15.5 milliseconds which is substantially the entire range of the vertical sweep period. The pulses which are generated by the vertical oscillator, the vertical delay and pulse-forming circuit, and the pulse shaper are shown in FIG. **6B** as waveforms **64**, **65**, **66**, and **67**. Waveform **64** represents the negative vertical sync pulses taken at point **90**, waveform **65** represents the positive vertical sync pulses taken at point **89**, waveform **66** represents the output from the delay and pulse-forming circuit taken at point **91**; and waveform **67** represents the output from the pulse shaper taken at point **151**.

The video information that will be displayed on the television screen **18** as a "dot" **20** is the summation of the outputs of the horizontal and vertical delay and pulse-forming circuit. When the delayed vertical pulse is at point **151**, the delayed horizontal pulses at point **150** will be gated through to the first "dot" generator output **94**. The waveforms of FIG. **6C** illustrate the signals **63** and **67** taken at points **150** and **151** respectively in expanded form and the output signal from the first "dot" generator **68** taken at point **94**. The signal **68** which is present at the first "dot" generator output **94** contains the horizontal and vertical data that will be processed by the television receiver and displayed as a "dot" 20_1 on the screen.

The settings of potentiometers **86** and **92** control the horizontal and vertical position of the "dot" 20_1 on screen **18**.

The second "dot" generator **35** (see FIG. **5D**) is configured exactly as the first "dot" generator and operates in the same manner to provide video information for the second "dot" 20_2. The input to the horizontal delay and pulse-forming circuit portion of the second "dot" generator is provided at a point **96**. The input to the vertical delay and pulse-forming circuit portion of the "dot" generator is provided at a point **97**. The output of the second "dot" generator is taken at a point **98**.

The "dot" coincidence and crowbar circuit **40** illustrated in Fig. **5E** is connected to the outputs of the first and second "dot" generators. The cathode end of a diode **101** is connected to the output **94** of the first "dot" generator while the cathode end of a diode **102** is connected to the output **98** of the second "dot" generator. When the outputs of both "dot" generators coincide, a positive signal will be applied to the gate **103** of a silicon controlled rectifier (SCR) **104**. The cathode of SCR **104** is tied to ground, while the anode thereof is connected at a point **106** to point **105** in the first "dot" generator. The SCR **104** will turn on and clamp point **105** of the first "dot" generator to ground. Thus, the output of the first "dot" generator will become zero as long as SCR **104** is conducting, causing the first "dot" on the television screen to disappear. After the "dots" are made non-coincident, the SCR **104** may be reset by momentarily depressing reset switch **26**, which removes the ground from point **105** of the first "dot" generator, allowing the first "dot" to reappear on the television screen.

The modulator and r-f oscillator illustrated schematically in FIG. **5F** is coupled by a resistive network comprising resistive element **108-111** (see FIGS. **5A-5D**) to the negative sync pulses of the horizontal and vertical oscillators and the output signals of the first and second "dot" generators. The r-f oscillator which operates at the selected television channel carrier frequency is collector-modulated by the output of the summing amplifier taken at point **112**. The composite video signal which is inductively coupled to pickup coil **113** is coupled to the television receiver antenna terminals **19**. The composite video signal is shown in FIG. **6D**.

The chroma generator 33 illustrated in FIG. 5G is used only when the control unit 14 is coupled to a color television receiver and is comprised of a crystal-controlled oscillator, a variable phase shifter and an OR gate. The output of the crystal-controlled oscillator which operates at 3.579545 MHz is taken at point 115. The phase shifter is variable over the approximate range of 0°– 180° by a potentiometer 116. The reference phase signal (0°) 70 is coupled to point 117. The variable phase signal 71 is coupled to point 118. These signals are shown in FIG. 6E and are displaced with respect to one another by the amount set in the phase shifter by potentiometer 116. The output signal of the chroma generator developed at point 119 is comprised of a chroma sync burst and the chroma signal. The composite chroma signal 72 which is the output of the chroma generator is shown in FIG. 6F. The chroma sync burst is the 0° phase reference signal. The chroma signal is the variable phase signal whose phase is compared by the television receiver against the chroma sync burst. The phase difference between the two signals determines the color to be displayed on the screen. The positive sync pulse from point 81 of the horizontal oscillator is used to gate 0° phase reference signal to point 119. The trailing edge of the positive going pulse at point 120 gates approximately 3–5 microseconds of the 0° phase referenced to point 119 to become the chroma sync burst. The composite color information is summed to the modulator input 114 by capacitor 121. The total composite video signal including the color information is then modulated, as explained before for the monochrome signal, with the carrier and coupled to the television antenna terminals 19.

Alternately the video and/or chroma signals may be applied to the crowbar modulator 126 of FIG. 8. (This will be described hereinafter).

When the gaming system is being used in either the target gun or "dot" coincident mode with a color TV receiver, the background color will change when the "dot" disappears from the television screen. The anode of SCR 104 of the coincidence detector and crowbar circuit 40 which is connected to point 105 of the first "dot" generator to make the "dot" disappear is also connected to point 122 of the chroma generator. When the chroma generator is adjusted for a red background, the background will change to blue when point 122 is clamped to ground by SCR 104. The SCR 104 will be fired either by coincidence of the "dots" or by alignment of the photo cell in the target gun with the target "dot".

Turning now to FIG. 4, the target gun circuits 36 are shown schematically. When the target gun is pointed at the target "dot" on the television screen, a photocell 50 mounted at the end of the target gun barrel will detect the intensity modulated "dot." The detected signal is amplified by transistors 51 and 52. When the gun trigger switch 53 is closed, the amplified detected signal is applied to the gate electrode of a silicon controlled rectifier (SCR) 104, which will file SCR 104. The SCR 104 now clamps the output of the "dot" generator 34 to ground and the "dot" 20_1 will disappear. Whether the first or the second "dot" is used as a target does not matter, since a hit will be indicated by the disappearance of the first "dot". If only one "dot" is to be displayed on the screen as a target, the first "dot" would be used. A reset button 26 is provided to make the target reappear after a hit has been scored. The portion of the circuit appearing within the dashed lines 56 is part of the "dot" coincidence and crowbar circuit 40.

An adjustment is provided by means of potentiometer 57 whereby the threshold level of photo cell 50 may be adjusted such that only when the gun is properly aligned with the target will the "dot" disappear. This procedure assures that false hits due to stray or scattered light from the room will not be scored. The setting should be made so that SCR 104 will now be triggered by the brightness of the room but only the intensity of the displayed "dot."

As previously mentioned, this invention may be employed in conjunction with information originating from a cooperative station such as a commercial TV, a closed-circuit TV or a CATV station. In these embodiments means are necessary for extracting the horizontal and vertical synchronization pulses from the TV receiver which is receiving a signal from a cooperative station. The horizontal and vertical synchronization pulses could be obtained from within the TV receiver directly. However, this necessitates making electrical connections to the internal circuitry of the TV receiver. Preferably, the apparatus illustrated in FIG. 7 is used to derive the synchronization pulses.

A device 129 is positioned in front of the receiver and attached to it by, for example, a suction cup at approximately the center bottom edge of the CRT glass face (see FIG. 1D). Device 129 contains both a photocell 128 and a pickup coil 123 responding broadly to 15,570 Hz. These devices pick up a 60 cycle signal component provided by a white stripe at the bottom of the CRT, (generated by the cooperative station) and a radiated 15,570 horizontal scan signal, respectively. These signals are applied via a cable 130 to a pair of amplifiers 127 (vertical) and 124 (horizontal) and fed to a pair of pulse shapers 125 (vertical) and 125_1 (horizontal). This yields synchronization pulses which duplicate in rate and phase those transmitted. Applying these pulses to points 82 and 90 in FIGS. 5A and 5B allows locking the horizontal and vertical oscillators into sync with the transmitted signals. Consequently, all of the functions previously described, such as the generation of "dots" for checker type games, target shooting, chase games and all other functions available to control by the "viewer," may now be overlaid the transmitted TV picture. Modulation in this mode of operation is accomplished by the "crowbar" modulation circuit 126 of FIG. 8.

In this Figure, use is made of an attenuator consisting of two series resistors 132 and 133 and a transistor 134 acting as a variable shunt resistor. Biasing this transistor sufficiently into conduction by applying modulation to its base, saturates the transistor, momentarily reducing the RF signal going from the antenna to the TV receiver antenna terminals 19. This corresponds to carrier reduction, which is negative modulation and is equivalent to generating a video signal going from black to white and back to the black level. Chroma signals can also be applied to the crowbar transistor modulator in the same fashion.

Note that the combination of apparatus described in FIGS. 7 and 8 describe a mode of interacting with a transmitted TV signal without requiring the attachment of connections to the internal circuitry of the TV receiver.

As mentioned above, the invention may be employed in conjunction with a cooperative TV station such as commercial TV, closed-circuit TV and CATV (community antenna television). In this mode the invention may be employed for target shooting or for decoding messages on a TV screen, such messages being the result of transmission from the cooperative station, as for example testing with coded answer supplied. Other transmissions can be transmissions from organizations offering services to the equipped viewer where the services offered may be typically Consumer Products Buying Recommendations, Stock "Buy-Sell-Hold" recommendations and others involving the presentation of valuable information available to the viewer equipped in accordance with this invention.

In FIG. 10 there is illustrated a combination target shooting and decoding apparatus. The decoding portion thereof is described in connection with the sketch of FIG. 9. Although the circuit shown is used for both decoding and target shooting it will be obvious that certain of the components can be eliminated to provide either of the functions alone.

The information is presented on the TV screen in such a manner that a portion thereof is coded. For example, FIG. 9 illustrates using the presentation for testing. The question and a group of possible answers is presented on TV screen 18 as illustrated with symbols 152–155 shown next to each answer. One of the symbols (in the example shown 153) is coded in such a manner that it will trigger the decoder of FIG. 10. For example, symbols 152, 154 and 155 may flash 60 times whereas the correct answer symbol 153, will flash 61 times. The decoder of FIG. 10 is arranged to respond to the odd number of flashes.

The electronics of FIG. 10 can be inserted into a "gun" or other suitable configuration and therefore be easily handled.

Referring now to FIG. 10, initially pressing a reset switch 142 sets the equipment. Reset switch 142 is a double pole single throw switch. The modulation from the coded symbol incident at a photocell 136 is supplied via a buffer amplifier 137, and an amplifier and pulse shaper 138 to a flip-flop 139 which is triggered. The output from flip 139 is applied via a buffer amplifier 141 to a lamp 140 which will light with a steady glow until reset indicating the correct answer was chosen.

If an incorrect answer was chosen, the lamp will flicker for a time equal to the time the symbol (152, 154, 155) is being modulated and then will go out.

To go to the next question, the decoder is returned to its starting position by operating reset switch 142. Note: initially reset switch had to be depressed so that the flip-flop would be in the proper state to provide a steady output to the lamp when photocell 139 receives an odd number of cycles.

To operate the circuit of FIG. 10 in its target shooting mode, a switch 145 is switched to the alternate contacts 146, 147.

In this mode, (see FIG. 1C) a "target" dot 148 is supplied by the cooperative station which also could supply background scenery for asthetic purposes. When the "gun" 27 (FIG. 1C) is aimed at the target 148 and the trigger (switch 144 FIG. 10) is depressed, photocell 136 will supply an output via buffer amplifier 137 and buffer amplifier and pulse shaper 138 to the gate electrode of a silicon controlled rectifier 149 which causes SCR 149 to fire and light lamp 140. Switch 142 also resets SCR 149 turning off lamp 140.

FIG. 1E illustrates an alternate embodiment to that described above. The output from the target shooter is applied to a crowbar circuit 24 the output of which is applied to antenna terminals 19 such that the screen 18 will also flash white when a "hit" is made.

The principles hereinabove set forth apply with equal strength to both monochrome and color applications. While the system that has been described has been basically for monochrome television sets, the provisions for color operation have been described and may be applied to games utilizing the aspects of the ability to adjust or change the background color. Thus, it can be seen that a game such as roulette may be played having for its object the guessing of the color that will appear when the wheel stops spinning. Very readily the system can be used to indicate a hit in the target game both by the disappearance of the square and by the change in background color. These are but a few of the countless variations that may be applied to this concept.

The number and variations of games which may be played are limited only by the imagination of the players. Some of the games which may be played are overlay games, target shooting games, chase games and color games.

FIG. 2 illustrates one type of overlay games, namely a modified checkerboard game. One player tries to move his "dot" 20_1 from A to B while the other player tries to move his "dot" 20_2 from B to A. The "dots" may be moved orthonogally only and only one square at a time. It is one object of this game to avoid checkmate. Other overlay games will be readily apparent.

Another type game is a chase game. For example, a fox hunt can be simulated. This requires 3 players, a hunter, a fox and a score keeper. The hunter tries to catch the fox (indicated by the fox's "dot" disappearing within a specified time. Numerous variations on this game are also possible with and without overlay patterns.

If the receiver employed is a color receiver then color games may be played. For example, an inertia wheel may be put on the shaft of potentiometer 116 in the chroma generator. The object of the game is for a player to guess the color which will appear when the wheel is spun.

The target shooting game is yet another game which is applicable to this invention. One player may manually move a "dot" while another tries to "hit" the "dot" with the photocell gun. Alternatively, the target may be automatically moved by, for example, driving the biasing voltage for the delay and pulse-forming circuit in a "dot" generator with a variable voltage source.

It should also be understood that the principles are not to be limited only to the gaming aspects but may be applied in the areas of scientific, educational, clinical and other applications. Hence, it is to be understood

that the embodiments shown are to be regarded as illustrative only, and that many variations and modifications may be made without departing from the principles of the invention herein disclosed and defined by the appended claims.

I claim:

1. In combination with a standard television receiver, apparatus for generating "dots" upon the screen of the receiver to be manipulated by a participant, comprising:

a control unit for generating signals representing the "dots" to be displayed, said control unit further including means for generating synchronizing signal to synchronize the television raster scan of said receiver and means for manipulating the position of the "dots" on the screen of said receiver; and

means for directly coupling the generated signals only to said television receiver whereby said "dots" are displayed only upon the screen of said receiver being viewed by the participant.

2. The combination of claim 1 wherein said control unit includes:

a horizontal sync generator;

a vertical sync generator;

at least one dot generator coupled to said horizontal and vertical sync generators;

means for generating an rf signal; and

means for modulating said rf signal with an output signal from said dot generator, said modulated rf signal being coupled to said television receiver.

3. The combination of claim 2 wherein said horizontal sync generator includes an astable multivibrator and said vertical sync generator includes as astable multivibrator.

4. The combination of claim 2 wherein said "dot" generator includes horizontal and vertical delays and an AND gate coupling the outputs from said delays.

5. The combination of claim 2 wherein said means for generating a modulated rf signal includes:

means for summing the signal outputs from said horizontal sync generator, said vertical sync generator and said dot generator to provide a video signal; and

means for modulating the video signal with a carrier signal the frequency of which is selected in accordance with which channel of the television receiver the "dots" are to be displayed.

6. The combination of claim 2 wherein said dot generator includes means for varying the position of the generated "dots" on the television receiver screen.

7. The combination of claim 2 wherein said control unit includes first and second dot generators coupled to said vertical sync generator and said horizontal sync generator.

8. The combination of claim 7 wherein said means for generating a modulated rf signal includes:

means for summing the signal outputs from said horizontal sync generator, said vertical sync generator and said first and second dot generators to provide a video signal, and

means for modulating the video signal with a carrier signal the frequency of which is selected in accordance with which channel of the television receives the "dots" are to be displayed.

9. The combination of claim 8 wherein each of said dot generators includes means for varying the position of the generated "dots" on the television receiver screen.

10. The combination of claim 9 wherein said position varying means includes a control for varying the vertical position of each generated "dot" and a control for varying the horizontal position of each generated "dot".

11. The combination of claim 9 wherein said position varying means includes one control for varying the horizontal and vertical position of each generated "dot."

12. The combination of claim 11, said control being a joystick.

13. The combination of claim 9, further including means for denoting coincidence when a "dot" generated by one of said dot generators is located in the same position on the television screen as a "dot" generated by another of said dot generators.

14. The combination of claim 13 wherein said coincidence denoting means includes a coincidence detector and crowbar circuit coupled to said first and second dot generators such that coincidence of position of said "dots" will be indicated by having said first dot generator turned off causing disappearance on the screen of the television receiver of its respective "dot."

15. The combination of claim 14 wherein said coincidence detector and crowbar circuit includes a semiconductor switch and means for turning on said switch when a signal is received simultaneously from said first and second dot generators.

16. The combination of claim 14, further including means for resetting said coincidence denoting means after the "dots" are made noncoincident.

17. The combination of claim 14, further including means operatively responsive to a displayed "dot."

18. The combination of claim 17, wherein said means responsive includes

means for sensing light; and

means for actuating said coincidence denoting means when said light sensing means detects a "dot" displayed on the television receiver screen.

19. The combination of claim 18 wherein said actuating means includes a switch which couples the output from said light sensing means to said coincidence denoting means.

20. The combination of claim 19 wherein said light sensing means is a photosensitive element arranged within the barrel of a toy gun.

21. The combination of claim 14 in which said television receiver is a color receiver, said combination further including a chroma generator having inputs from said horizontal sync generator and said coincidence denoting means and an output to said signal summing means, such that coincidence will also be indicated by a changing of background color of said television receiver screen.

22. The combination of claim 21 wherein said chroma generator includes a control for varying the background color of the television receiver screen.

23. The combination of claim 22 further including a wheel coupled to said control for varying background color which when spun will cause the background color to be of non-predetermined selection.

24. The combination of claim 1, further including an overlay mask attached to the television receiver screen, said overlay mask having a predetermined pattern thereon.

25. The combination of claim 1, further including means for automatically moving said "dots" about said television screen.

26. The combination of claim 25, further including means for "shooting" at said moving "dots", said "shooting" means including light responsive means responsive to a displayed "dot".

27. The combination of claim 1, further including means for "shooting" at said "dots," said "shooting" means including light responsive means responsive to a displayed "dot" when aligned therewith.

28. Television gaming apparatus as defined in claim 27, further including means for causing one of said "dots" to disappear when said "shooting" means receives light from a displayed "dot".

29. Television gaming apparatus as defined in claim 27 in which said television receiver is a color receiver, further including means for causing the background color of said television screen to change color when a "hit" is made.

30. The combination of claim 27 wherein said light responsive means includes a photocell.

31. The combination of claim 1, further including means for receiving background information generated on the television receiver screen by a cooperative television station.

32. In combination with a standard television receiver including horizontal and vertical deflection circuitry which is synchronized with horizontal and vertical synchronization signals, apparatus for generating "dots" upon the screen of the receiver to be manipulated by a participant, comprising:

a control unit responsive to the horizontal and vertical synchronization signals for generating signals representing "dots" to be displayed, including means for manipulating the position of the "dots" on the screen of the receiver; and

means for directly coupling the generated signals only to said television receiver whereby said "dots" are displayed only upon the screen of said receiver being viewed by the participant.

33. The combination of claim 32, further including:

means for receiving information generated by a cooperative television station; and

means for applying the received information to said television receiver to be displayed thereby.

34. The combination of claim 33 wherein said applying means includes means for modulating said received information by said generated signals.

35. The combination of claim 34 wherein said modulating means includes means for momentarily causing a reduction of signal strength of said received information when generated signals are being applied, whereby the generated "dots" are displayed at their particular position of the screen in place of the received information.

36. The combination of claim 33, further including means synchronizing the generated signals with the received information.

37. The combination of claim 36 wherein said synchronizing means includes:

means for receiving a horizontal scan signal generated by the television station, and

means for detecting a vertical synchronizing component provided on the screen of the television receiver.

38. The combination of claim 37 wherein said means for receiving a horizontal scan signal includes a pickup coil and said means for detecting a vertical synchronizing component includes a photocell.

39. The combination of claim 36 wherein said synchronizing means is mechanically coupled to the television screen.

40. Apparatus for generating "dots" upon the screen of a television receiver to be manipulated by a participant, comprising:

a control unit for generating signals representing the "dots" to be displayed, said control unit further including means for generating synchronizing signals to synchronize a television raster scan of a receiver and means for manipulating the position of the "dots" on the screen; and

means for directly coupling the generated signals only to a single television receiver whereby said "dots" are displayed only upon the screen of the single receiver being viewed by the participant.

41. Apparatus as in claim 40, further including means for "shooting" at said "dots," said means including light responsive means responsive to a displayed "dot."

42. The combination of claim 1 wherein said control unit includes

means for providing horizontal sync signals;

means for providing vertical sync signals;

a first RC network coupled to said means for providing horizontal sync signals;

a second RC network coupled to said means for providing vertical sync signals;

a first transistor coupled to said first RC network;

a second transistor coupled to said second RC network;

first pulse shaping means coupled to the output of said first transistor;

second pulse shaping means coupled to the output of said second transistor; and

an AND gate coupled to said first and second pulse shaping means.

43. The combination of claim 1 wherein at least two "dots" are displayed on the screen of said receiver.

44. Apparatus for use within a television receiver, which receiver includes horizontal and vertical deflection circuitry which is synchronized with horizontal and vertical synchronizing signals, said apparatus including means for generating "dots" upon the screen of said receiver to be manipulated by a participant, comprising:

a control unit responsive to the horizontal and vertical synchronizing signals for generating signals representing "dots" to be displayed, including means for manipulating the position of the "dots" on the screen of said receiver whereby said "dots" are displayed only upon the screen of said receiver.

45. Apparatus as in claim 44 wherein said horizontal and vertical synchronization signals are received from a television station.

46. Apparatus as in claim 45 wherein said received synchronization signals are the standard synchronization signals generated by the television station.

* * * * *

GENERAL SERVICES ADMINISTRATION
National Archives and Records Service

To all to whom these presents shall come, Greeting:

By virtue of the authority vested in me by the Administrator of General Services, I certify on his behalf, under the seal of the United States General Services Administration, that the attached reproduction(s) is a true and correct copy of documents in his custody.

(seal)

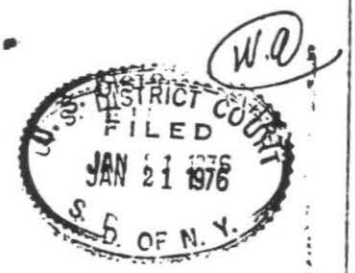
SIGNATURE: Lawrence J. Hines	
NAME: Lawrence J. Hines	DATE: 12-23-82
TITLE: Chief, Operations Branch	
NAME AND ADDRESS OF DEPOSITORY: Federal Archives and Records Center, GSA Building 22 - MOT - Bayonne Bayonne, N.J. 07002 2NC	

GSA FORM APR 66 6791E

Appendix C

MEMO ENDORSED

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK



W.A.

MIDWAY MFG. CO., a corporation, Plaintiff,	:	
v.	:	CIVIL ACTION NO. 74-1657 (CBM)
THE MAGNAVOX COMPANY, a corporation	:	
and	:	
SANDERS ASSOCIATES, INC., a corporation, Defendants.	:	

RECEIVED
JAN 28 1976
JUDGE MOTLEY'S CHAMBERS

TO: John Thomas Cella, Esq.
Fitzpatrick, Cella, Harper & Scinto
277 Park Avenue
New York, New York 10017

NOTICE OF MOTION AND MOTION FOR LEAVE TO AMEND COMPLAINT

PLEASE TAKE NOTICE THAT on February 2, 1976, or as soon thereafter as counsel may be heard in the United States District Court for the Southern District of New York before Honorable Judge Constance Baker Motley, plaintiff will move the Court as follows:

Pursuant to Paragraph 15(a) of the Federal Rules of Civil Procedure, plaintiff hereby moves the Court for leave to file the Amended Complaint annexed hereto as Exhibit A.

The Amended Complaint is divided into three counts. Count I is substantially similar to the allegation contained in the original Complaint alleging patent invalidity and non-infringement and adds, in addition, two United States reissue patents Nos. RE 28,507 issued August 5, 1975 and RE 28,598 issued October 28,

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

MIDWAY MFG. CO., a corporation,	)	
Plaintiff,	)	
v.	)	ACTION NO. 74 CIV. 1657 CBM
THE MAGNAVOX COMPANY, a corporation,	)	
and	)	
SANDERS ASSOCIATES, INC., a corporation,	)	
Defendants.	)	

AMENDED COMPLAINT

Plaintiff, Midway Mfg. Co., for its Amended Complaint against defendants, The Magnavox Company and Sanders Associates, Inc. alleges that:

COUNT I

1. Plaintiff, Midway Mfg. Co. (MIDWAY), is a corporation organized and existing under the laws of the State of Illinois, and has its principal place of business at 3750 North River Road, Schiller Park, Illinois.

2. Defendant, The Magnavox Company (MAGNAVOX), is a corporation organized and existing under the laws of the State of Delaware and has its executive offices at 345 Park Avenue, New York City, New York.

3. Defendant, Sanders Associates, Inc. (SANDERS), is a corporation of the State of Delaware, having an office at Daniel Webster Highway South, Nashua, New Hampshire.

Jurisdiction

4. Count I is an action for declaratory judgment under 28 U.S.C. § 2201 and § 2202. Jurisdiction and venue are based on 28 U.S.C. §§ 1338 and 1391(c) and the Patent Laws of the United States.

Statement of Claim

5. This action arises from an actual and justiciable controversy now existing between plaintiff and defendants with respect to the following United States Letters Patents and the alleged infringement thereof by plaintiff:

W.T. Rusch		Pat. No. 3,659,284	Issued Apr. 25, 1972
W.T. Rusch	Reissue	Pat. No. Re.28,507	Issued Aug. 5, 1975
R.H. Baer, et al.		Pat. No. 3,659,285	Issued Apr. 25, 1972
R.H. Baer, et al.	Reissue	Pat. No. Re.28,598	Issued Oct. 28, 1975
R.H. Baer		Pat. No. 3,728,480	Issued Apr. 17, 1973
W.T. Rusch		Pat. No. 3,778,058	Issued Dec. 11, 1973

Each of said patents was issued to defendant SANDERS.

6. Defendant SANDERS asserts that it is the owner of the entire right, title and interest in said patents, and defendant MAGNAVOX asserts that it is the exclusive licensee of the entire right, title and interest in said patents and that it has the right to bring suit thereon.

7. Plaintiff is in the business of manufacturing and selling various types of coin-operated amusement machines and devices. Defendant MAGNAVOX has charged that the manufacture, use and sale of certain of such coin-operated amusement machines and devices constitute infringement of said patents and has threatened plaintiff with suit for infringement of said patents unless plaintiff takes a license and becomes a sub-licensee of defendant MAGNAVOX under said patents. Thus, there is an actual controversy existing between these parties with respect to which plaintiff seeks a declaration of its rights.

8. Plaintiff avers that it has not infringed and is not infringing the patents in suit, Nos. 3,659,284; 3,659,285; Re.28,507; Re,28,598; 3,278,480 and 3,778,058, and denies that the manufacture, use or sale of any of its amusement devices constitutes infringement of said patents, or that such devices embody the subject matters of the claims of said patents.

9. Plaintiff avers that said patents in suit were not duly and legally issued, and further that they are invalid and void for one or more of the following reasons:

(a) The applicants for said patents were not the original and first inventors or discoverers of any material or substantial part of the subject matter of the claims of said patents.

(b) The subject matter of the claims of said patents insofar as the same may have been original with the applicants was not sufficiently new and useful to warrant the issuance of a patent thereon.

(c) The descriptions of the alleged inventions of the claims of said patents are not made in such full, clear, concise and exact terms as to enable one skilled in the art to make and use the same, nor do said patents set forth the best mode contemplated by the applicants for carrying out the alleged inventions.

(d) The claims of said patents fail to point out particularly and to claim distinctly what the applicants regard as their inventions.

(e) The subject matter of the claims of said patents, prior to the supposed invention or discovery thereof by the applicants, or more than one year prior to the filing of the respective applications therefor, was

described in patents and in printed publications.

(f) The subject matter of the claims of said patents was described in application(s) for patents of the United States filed by another prior to any date of invention to which said applicants may be entitled for such claims.

(g) The subject matter of the claims of said patents, more than one year prior to any filing date to which said applicants may be entitled for such claims, was in public use or on sale in the United States.

(h) The subject matter of the claims of said patents, before the alleged invention or discovery thereof by said applicants, (1) was invented by others in the United States who had not abandoned, suppressed, or concealed the same, and (2) was known or used by others in the United States.

(i) Said applicants did not themselves, as alleged in each of said patents, invent the subject matter patented in any of the claims of said patents in suit.

(j) Any differences between the subject matter of said claims and the prior art are such that the subject matter as a whole would have been obvious to a person of ordinary skill in the

art to which the claimed subject matter pertained at the time of the alleged invention thereof by said applicants.

(k) The applicants for said patents have unlawfully extended the patent monopoly by obtaining more than one patent on the same, or merely colorable variations of the same, alleged invention.

(l) Said patents are invalid, void and unenforceable on the ground of double patenting.

10. Plaintiff avers that the state of the prior art at the time of the alleged invention of the subject matter of the claims of said patents in suit was such; and the proceedings in the United States Patent & Trademark Office which resulted in the issuance of the claims of said patents were such; and the disclosures in said patents are so limited, that the claims of said patents cannot properly be construed to cover any subject matter made, used or sold by plaintiff or sold or used by any of its customers, mediate or immediate, subsequent to the issuance of any of said patents in suit.

11. Plaintiff avers that by reason of the proceedings in the United States Patent & Trademark Office during the prosecution of the applications which resulted in the patents in suit, and the admissions and the representations therein made by or on behalf of the applicants for said patents in order to induce the grant of a patent, defendants are estopped to claim for any of the patents a construction, even if this were otherwise possible, which would cause the patent to cover or include the acts of plaintiff of which defendants have complained.

12. If said patents in suit are construed to cover coin-operated amusement games and/or devices manufactured and sold by plaintiff, the patents are invalid for want of patentable invention in view of the prior art, knowledge and uses.

13. Plaintiff avers that the Reissue Patents Re.28,507 and Re.28,598 are invalid and void for the following additional reasons:

(a) That, although the original patents 3,659,284 and 3,659,285, were "partly inoperative by reason of a defective specification" and contained claims which were "inadequate to fully protect" the alleged invention, as stated by the applicants for said reissue patents in their respective Declarations filed in the U.S. Patent & Trademark Office on April 25, 1974, such defects and inadequacies did not, in fact, occur "through error and without any deceptive intention" as stated by said applicants in their Declarations.

(b) That, each of said reissue patents is not for the same invention as was disclosed in the corresponding original patent.

(c) That, said applicants applied for said reissue patents only after being informed of the amusement devices of the plaintiff or others, which did not employ the subject matter patented in said original patents, and then said applicants sought to

improperly extend said original patents to cover the devices through reissue of said patents.

(d) That, said Declarations filed in the U.S. Patent & Trademark Office to induce it to reissue said original patents contained false statements, and that such statements were made intentionally and willfully, and render said reissue patents invalid.

14. Plaintiff avers that it has "intervening rights" and other rights provided under Title 35, U.S. Code § 252, which provide for the absence of any liability for infringement of said reissue patents in suit.

15. Plaintiff avers that it has the right to continue the manufacture, use and sale of the accused devices made, purchased or used, and the accused devices for the manufacture, use or sale of which substantial preparation was made, before the grant of said reissue patents.

16. Plaintiff avers that reissue patents Re.28,507 and Re.28,598 are invalid by reason of the applicants' non-compliance with the provisions of Title 35, U.S. Code § 251 relating to the reissue of inoperative, defective and invalid patents.

17. Plaintiff avers that the Patent & Trademark Office did not cause a proper examination to be made as to the purported inventions recited by the claims of said patents in suit, and each of said patents was inadvertently and erroneously issued; and had such proper examination been made, it would have appeared that the applicants for each of said patents was not entitled thereto, and said patents in suit would not have issued.

18. Plaintiff avers that said patents in suit are invalid and unenforceable and that, in violation of the duty of

the applicants for said patents and of the defendants herein, the Patent & Trademark Office was not fully informed by the applicants or the defendants of the true state of the relevant prior art and the pertinency thereof or of the true nature of the alleged inventions during the prosecution of the respective applications for the patents in suit; that the applicants as well as the defendants herein well knew or should have known of such prior art and of its pertinency and of the true nature of the alleged inventions during the prosecution of the respective applications for the patents in suit; that the failure to supply such information and the lack of knowledge by the Patent & Trademark Office was a material factor in the decision by the Patent & Trademark Office to issue said patents; and that the omissions were such that the Patent & Trademark Office would not have issued said patents in suit if it had been correctly and completely informed by the applicants or defendants of such omissions of fact.

19. Plaintiff avers that said patents in suit are unenforceable because of defendants' misuse of said patents by their attempts to impose a "package license" on the plaintiff and others.

20. Plaintiff avers that said patents in suit are unenforceable against plaintiff because defendants have misused said patents by wrongful exploitation, including, inter alia, attempting to enforce them against plaintiff and, upon information and belief, others, including Seeburg Industries, Inc., The Seeburg Corporation of Delaware and Williams Electronics, Inc., knowing that such patents are not infringed, are invalid, void and improperly issued and by attempting by economic coercion to compel The Seeburg Corporation of Delaware to pay for a license under said patents as well as certain other patents allegedly owned by defendant SANDERS and under which defendant MAGNAVOX allegedly had an exclusive license with a right to sublicense even though The Seeburg Corporation of Delaware had

informed MAGNAVOX that it had no conceivable interest in taking a license under this entire group of patents.

21. Plaintiff avers that said patents in suit are invalid and void and that defendants have disentitled themselves from seeking any relief in this Court because of their unclean hands, and because they have been and are subverting the public policy of the patent laws of the United States by misusing said patents in suit in the manner specifically alleged in Count II hereof, the allegations of which are incorporated by reference herein.

22. WHEREFORE, in Count I of its Amended Complaint plaintiff respectfully prays:

(a) That this Court grant and enter a judgment or decree that United States Letters Patent Nos. 3,659,284; 3,659,285; Re.28,507; Re.28,598; 3,728,480 and 3,778,058 are each invalid and that said patents are not infringed by the manufacture, sale or use of amusement devices of plaintiff.

(b) That such decree declare that it is the right of plaintiff to continue to make, use and sell its amusement devices without threat or other interference whatsoever from defendants or their successors in title based on or arising out of the ownership or licensing of said patents or any interest therein.

(c) That the defendants be enjoined, both preliminarily and permanently, from charging or asserting that the manufacture, sale or use of amusement devices made or sold by plaintiff violate or infringe defendants' alleged rights under said patents, and from bringing any actions against sellers or users of plaintiff's amusement devices.

(d) That the costs of this action be awarded against defendants and that the plaintiff have such other and further relief as to the Court may seem just, including plaintiff's attorneys fees and other disbursements on account of this litigation.

COUNT II

1. Count II is an action which arises under Sections 1 and 2 of the Sherman Act and Sections 4 and 16 of the Clayton Act, 15 U.S.C. §§ 1, 2, 15 and 26.

2. This Court has jurisdiction of the action of Count II pursuant to Section 1331 of the Judicial Code, 28 U.S.C. §1331 and Section 12 of the Clayton Act, 15 U.S.C. § 22.

3. This Court is the proper venue for this action pursuant to Section 12 of the Clayton Act, 15 U.S.C. § 22.

4. With respect to identification of the parties herein, plaintiff realleges the allegations of Paragraphs 1, 2 and 3 of Count I by reference thereto.

5. Beginning at a date unknown to plaintiff, but believed to be some time in or prior to 1972, defendants have engaged in a plan and program to monopolize and attempt to monopolize and have engaged in a conspiracy and concert of action with each other and others to monopolize and restrain trade in the manufacture, sale and use of apparatus for playing games by displaying and manipulating symbols on the screen of a cathode ray tube, and particularly such apparatus in coin-operated amusement devices.

6. Pursuant to said plan, program, conspiracy and concert of action and as a part thereof, defendants and others have engaged in the following overt acts and practices for the purpose and with the effect of monopolizing, attempting to monopolize and restraining trade in the manufacture, sale or use of apparatus for playing games of the type involving the display and manipulation of symbols on the screen of a cathode ray tube and particularly such apparatus in coin-operated amusement devices:

(a) The applicants for said patents, the defendants and their counsel have fraudulently obtained issuance by the U.S. Patent & Trademark

Office of patents in suit, Nos. 3,659,284; 3,659,285; Re.28,507 and Re.28,598 by omitting disclosure or making misrepresentations in the disclosure to the Patent & Trademark Office of the following and other material facts which were known to them at the time the applications for such patents were filed or when said applications were pending in the Patent & Trademark Office:

(i) The fact that there was in existence and was publicly known prior to the alleged inventions of any of such patents apparatus for playing the game of Space War by displaying and manipulating symbols on the screen of a cathode ray tube, and various other games of a similar nature, which apparatus anticipated or embodied the subject matter claimed by the applicants for such patents as their invention and which was not brought to the attention of the Patent & Trademark Office.

(ii) The fact that the alleged inventions of such patents were placed on sale by defendant SANDERS more than one year prior to the filing date of any of the applications for such patents was not brought to the attention of the Patent & Trademark Office.

(iii) The fact that SANDERS' prior application S.N. 126,966 issued as U.S. Patent No. 3,728,480 on April 17, 1973 and thereby became prior art with respect to each of the applications for such patents was not brought to the attention of the Patent & Trademark Office.

(iv) The fact that the subject matter of the alleged invention of Patent No. 3,728,480 was known by the applicants for such patents prior to any alleged invention of any of such patents was knowingly withheld from the Patent & Trademark Office during the prosecution of such patents. Further, in seeking allowance of such patents, the applicants argued that the prior art relied upon by the Patent & Trademark Office was deficient in respects as to which there was no such deficiency in Patent No. 3,728,480.

(v) The fact that there existed prior patents which were known to applicants, the defendants and their counsel and which disclosed subject matter argued by the applicants to be absent from the prior art which the Patent & Trademark Office cited

during the prosecution of the applications for such patents.

(vi) The fact that the applicants for the applications for the reissue patents in suit, with the knowledge of defendants and their counsel, made false declaration that the corresponding original patents contained defects and inadequacies "through error and without any deceptive intention" when in fact such defects and inadequacies did not so occur, but were the result of deliberate and intentional acts. Further, each of the reissue patent applications was filed for a different invention than that disclosed in the corresponding original patent and said applicants applied for said reissue patents only after being informed of the amusement devices of the plaintiff or others which did not employ the subject matter patented in the original patents. As a result, said applicants sought to improperly extend the original patents to cover plaintiffs' devices through the reissue of said patents. Thus, the declarations filed by said applicants

to induce the Patent & Trademark Office to reissue the original patents contained false statements, and such statements were made intentionally, knowingly and willfully.

(b) Defendants attempted to improperly coerce plaintiff and others to accept a package license including the patents in suit under which plaintiff and others had absolutely no interest in obtaining any license, and some of the patents in this package defendants at first charged were infringed by plaintiff and later, after the filing of this declaratory judgment action on April 21, 1974, dropped the charge of infringement. Defendants' attempted coercion of plaintiff and others was done knowing that plaintiff and others did not desire any license under all of such patents, and knowing further that such patents were not infringed and were invalid, void and improperly issued.

(c) Defendants engaged in other acts and practices for the purpose and with the effect of depriving plaintiff and others of a fair opportunity to compete and of monopolizing and restraining trade in the manufacture, sale and use of apparatus for playing games by displaying and manipulating symbols on the screen of a cathode ray tube and particularly such apparatus for coin-operated amusement devices.

7. The omissions and misrepresentations referred to in Paragraph 6(a) above and the resulting lack of knowledge by the

Patent & Trademark Office was a material factor in the decision by the Patent & Trademark Office to issue such patents, Nos. 3,659,284; 3,659,285; Re.28,507 and Re.28,598, and the omissions and misrepresentations were such that the Patent & Trademark Office would not have issued such patents if it had been correctly and completely informed by the applicants or defendants of such omissions of fact which applicants and defendants had the uncompromising duty to disclose fully to the Patent & Trademark Office.

8. Notwithstanding their knowledge that such patents in suit are invalid, defendants have conspired and sought to use such patents in an attempt to achieve and to maintain an illegal monopoly in the manufacture, sale and use of apparatus for playing games of the type involving displaying and manipulating symbols on the screen of a cathode ray tube in contravention of the Patent Laws and also of the Antitrust Laws of the United States, by asserting said patents by suit and threat of suit against plaintiff, its customers, and others.

9. Plaintiff avers that the suit against it on May 22, 1974 by defendants in the U.S. District Court for the Northern District of Illinois, Eastern Division, and the Counterclaim filed by defendants herein, were brought in furtherance of said attempt and a conspiracy to monopolize interstate commerce, and that said attempt and conspiracy have continued since the filing of said Illinois suit as evidenced by the notification to the trade of the bringing of said suit and by the attempted intimidation of plaintiff and its customers.

10. By reason of the acts of defendants performed in furtherance of their violation of Sections 1 and 2 of the Sherman Act, plaintiff has been damaged in its property, reputation and business in an amount which is not presently known, but which includes its actual incurred expenses for the defense of said Illinois suit and this litigation, such damages, upon information and belief, being in an amount exceeding one million dollars.

11. Plaintiff believes that it will suffer further and irreparable injury if defendants are permitted to continue their illegal acts as aforesaid.

12. WHEREFORE, on Count II of its Amended Complaint, plaintiff respectfully prays:

(a) That the patents in suit which are the subject of plaintiff's Amended Complaint and defendants' counterclaim be declared invalid and void, and unenforceable against plaintiff.

(b) That injunctions, preliminary and permanent, be ordered to restrain defendants from further assertion of the patents in suit against plaintiff and its customers and from charging plaintiff's customers with infringement.

(c) That plaintiff be awarded as damages its attorneys fees and all of its disbursements on account of the said Illinois suit brought by defendants against plaintiff and on account of this litigation against defendants, and any other damages resulting from the illegal acts of defendants as aforesaid.

(d) That said damages be trebled as provided by law, and that plaintiff be awarded an assessment of interest and costs against defendants.

COUNT III

1. For Count III of its Amended Complaint against defendants, plaintiff realleges the allegations of Paragraphs 4 through 9 of Count II hereof, and alleges that the assertion of the patents in suit against plaintiff on account of the manufacture, sale or use of any amusement devices by plaintiff or its customers is unfair competition.

2. Jurisdiction of this count is predicated upon the pendant jurisdiction of 28 U.S.C. § 1338(b) and also upon diversity under 28 U.S.C. § 1332, and venue is predicated upon the provisions of 28 U.S.C. § 1391.

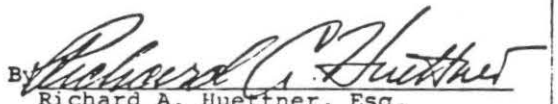
3. WHEREFORE, on Count III of its Amended Complaint, plaintiff prays:

(a) That injunctions, preliminary and permanent, be granted, prohibiting defendants and their successors, agents and attorneys from further asserting the patents in suit against plaintiff and its customers.

(b) That plaintiff be awarded as damages its attorneys fees and all of its disbursements on account of this litigation against defendants and any other litigation brought by defendants against plaintiff, and any other damages incurred by plaintiff as a result of the unfair competition by the defendants as aforesaid.

(c) That plaintiff be awarded an assessment of its interest and costs against defendants.

MIDWAY MFG. CO.

By 

Richard A. Huettner, Esq.
Kenyon & Kenyon Reilly Carr
& Chapin
59 Maiden Lane
New York, New York 10038
(212) 425-7200

Of Counsel:

Donald L. Welsh, Esq.
A. Sidney Katz, Esq.
Fitch, Even, Tabin & Luedeka
135 South LaSalle Street
Chicago, Illinois 60603
(312) 372-7842

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

APF ELECTRONICS, INC. and MASSACHUSETTS INSTITUTE OF TECHNOLOGY,

Plaintiffs,

v.

THE MAGNAVOX COMPANY, SANDERS ASSOCIATES, INC., NORTH AMERICAN PHILIPS CORPORATION, and GENERAL INSTRUMENTS CORPORATION,

Defendants.

Civil Action No.

79 C. 1129 LWP

ANSWER OF DEFENDANTS MAGNAVOX, SANDERS, AND PHILIPS AND COUNTERCLAIM OF DEFENDANTS MAGNAVOX AND SANDERS

Defendants THE MAGNAVOX COMPANY (MAGNAVOX), SANDERS ASSOCIATES, INC. (SANDERS), and NORTH AMERICAN PHILIPS CORPORATION (PHILIPS) hereby answer the complaint filed against them in the above-headed action as follows:

1. MAGNAVOX, SANDERS, and PHILIPS admit the allegations of paragraph 1 of the complaint.

2. MAGNAVOX, SANDERS, and PHILIPS admit that plaintiff MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT) has an office at 77 Massachusetts Avenue, Cambridge, Massachusetts 02139 but are without knowledge or information sufficient to form a belief as to the remaining allegations of paragraph 2 of the complaint and therefore deny each and every one of same.

3. MAGNAVOX, SANDERS, and PHILIPS admit that MAGNAVOX is a corporation organized and existing under the laws of the State of Delaware but otherwise deny each and every allegation of paragraph 3 of the complaint.

4. MAGNAVOX, SANDERS, and PHILIPS admit the allegations of paragraph 4 of the complaint.

5. MAGNAVOX, SANDERS, and PHILIPS admit the allegations of paragraph 5 of the complaint.

6. MAGNAVOX, SANDERS, and PHILIPS are without knowledge or information sufficient to form a belief as to the allegations of paragraph 6 of the complaint and therefore deny each and every one of same.

COUNT I

Count I is directed only to defendant MAGNAVOX and therefore requires no answer by defendants SANDERS and PHILIPS.

7. MAGNAVOX admits that this Count I is for patent infringement, that it is brought by plaintiffs APF ELECTRONICS, INC. (APF) and MIT against MAGNAVOX, that it is brought under Title 35, United States Code, § 271, and that jurisdiction of this Court over the subject matter of this Count I is based on Title 28, United States Code, § 1338(a), but denys that plaintiffs APF and MIT are entitled to any relief under Count I and otherwise denys each and every allegation of paragraph 7 of the complaint.

8. MAGNAVOX admits that United States Letters Patent 4,034,983 issued on July 12, 1977 entitled "Electronic Games" showing plaintiff MIT as the assignee of Glen R. Dash, David J. Agans, and Gabor L. Szakocs, but MAGNAVOX denies that said patent was duly and legally issued and is without knowledge or information sufficient to form a belief as to the remaining allegations of paragraph 8 of the complaint and therefore denys each and every one of same.

9. MAGNAVOX is without knowledge or information sufficient to form a belief as to the allegations of paragraph 9 of the complaint and therefore denys each and every one of same.

10. MAGNAVOX denys each and every one of the allegations of paragraph 10 of the complaint.

11. MAGNAVOX denys each and every one of the allegations of paragraph 11 of the complaint.

12. MAGNAVOX admits the allegations of paragraph 12 of the complaint in this action.

COUNT II

13. MAGNAVOX, SANDERS, and PHILIPS admit that this Count II is for a declaratory judgment, that it is brought by APF against MAGNAVOX, SANDERS, and PHILIPS, that it is brought under Title 28, United States Code, §§ 2201 and 2202, that jurisdiction of this Court over the subject matter of this Count is based on Title 35, United States Code, § 271, but deny that plaintiff APF is entitled to any relief under Count II and otherwise deny each and every other allegation of paragraph 13 of the complaint.

14. MAGNAVOX, SANDERS, and PHILIPS admit that this Count II arises from a justiciable controversy now existing between plaintiff APF and defendants MAGNAVOX and SANDERS with respect to U.S. Letters Patent 3,659,284 issued to SANDERS as the assignee of William T. Rusch on April 25, 1972, and reissued to SANDERS as the assignee of William T. Rusch on August 5, 1975 as U.S. Letters Patent Re. 28,507 and the infringement thereof by plaintiff APF, but otherwise deny each and every other allegation of paragraph 14 of the complaint.

15. MAGNAVOX, SANDERS, and PHILIPS admit that SANDERS asserts that it is the owner of the entire right, title and interest in said U.S. Letters Patent 3,659,284 and its reissue Re. 28,507 and that MAGNAVOX asserts that it is the exclusive licensee in said patents and has the right to bring suit thereon, but otherwise deny each and every allegation of paragraph 15 of the complaint.

16. MAGNAVOX, SANDERS, and PHILIPS admit that APF is in the business of having manufactured and selling various types of electronic TV games, admit that on August 25, 1977 MAGNAVOX and SANDERS filed a complaint in the United States District for the Northern District of Illinois in an action entitled The Magnavox Company and Sanders Associates, Inc. v. APF Electronics, Inc. et al., Civil Action No. 77 C 3159, admit that APF moved the court, as to it, to dismiss said action or to transfer it to this Court on the basis of improper venue and the convenience of APF, admit that in a Memorandum Opinion and Order dated December 19, 1978 the Honorable John Powers Crowley dismissed that action as to APF and refused to transfer it to this Court, but otherwise deny each and every allegation of paragraph 16 of the complaint.

17. MAGNAVOX, SANDERS, and PHILIPS admit that MAGNAVOX and SANDERS commenced an action against a customer of APF, Sears, Roebuck & Co., in the Northern District of Illinois for patent infringement under U.S. Letters Patent 3,659,284 and its reissue Re. 28,507 and have charged that the sale of certain electronic TV games sold to Sears, Roebuck & Co, constitutes infringement of said patents but deny that said action was commenced since the dismissal of their action against APF in Chicago and otherwise deny each and every other allegation of paragraph 17 of the complaint.

18. MAGNAVOX, SANDERS, and PHILIPS admit that MAGNAVOX and SANDERS continue to charge APF with having manufactured, using and selling electronic TV games that constitute infringements of U.S. Letters Patent 3,659,284 and its reissue Re. 28,507 and admit that there is a justiciable controversy between plaintiff APF and defendants MAGNAVOX and SANDERS but otherwise deny each and every allegation of paragraph 18 of the complaint.

19. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments and denials referred to in paragraph 19 of the complaint but deny the correctness of those averments and denials and otherwise deny each and every allegation of paragraph 19 of the complaint.

20. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 20 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 20 of the complaint.

21. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 21 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 21 of the complaint.

22. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 22 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 22 of the complaint.

23. MAGNAVOX, SANDERS, and PHILIPS deny each and every allegation of paragraph 23 of the complaint.

24. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 24 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 24 of the complaint.

25. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 25 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 25 of the complaint.

26. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 26 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 26 of the complaint.

27. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 27 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragrpah 27 of the complaint.

28. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 28 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 28 of the complaint.

29. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 29 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 29 of the complaint.

30. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 30 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 30 of the complaint.

31. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 31 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 31 of the complaint.

32. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 32 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 32 of the complaint.

33. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 33 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 33 of the complaint.

34. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 34 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 34 of the complaint.

COUNT III

MAGNAVOX, SANDERS, and PHILIPS object to Count III of the complaint as failing to state a claim upon which relief may be granted because of the failure to identify the parties plaintiff and parties defendant in that Count III.

35. MAGNAVOX, SANDERS, and PHILIPS admit that Count III is brought under §§ 1 and 2 of the Sherman Act and §§ 14 and 16 of the Clayton Act, 15 U.S.C. §§ 1, 2, 15 and 16 but deny that it pleads a cause of action thereunder, and deny that plaintiffs APF and MIT are entitled to any relief under Count III, and otherwise deny any and every allegation of paragraph 35 of the complaint.

36. MAGNAVOX, SANDERS, and PHILIPS admit that this Court has jurisdiction over the subject matter of Count III but otherwise deny each and every allegation of paragraph 36 of the complaint.

37. MAGNAVOX, SANDERS, and PHILIPS admit the allegations of paragraph 37 of the complaint.

38. MAGNAVOX, SANDERS, and PHILIPS reallege their responses in paragraphs 1, 3, 4 and 5 hereof to the allegations of paragraphs 1, 3, 4, and 5 of the complaint by reference thereto.

39. MAGNAVOX, SANDERS, and PHILIPS deny each and every allegation of paragraph 39 of the complaint.

40. MAGNAVOX, SANDERS, and PHILIPS deny each and every allegation of paragraph 40 of the complaint.

41. MAGNAVOX, SANDERS, and PHILIPS deny each and every allegation of paragraph 41 of the complaint.

42. MAGNAVOX, SANDERS, and PHILIPS deny each and every allegation of paragraph 42 of the complaint.

43. MAGNAVOX, SANDERS, and PHILIPS admit that APF makes the averments referred to in paragraph 43 of the complaint but deny the correctness of those averments and otherwise deny each and every allegation of paragraph 43 of the complaint.

44. MAGNAVOX, SANDERS, and PHILIPS deny each and every allegation of paragraph 44 of the complaint.

45. MAGNAVOX, SANDERS, and PHILIPS deny each and every allegation of paragraph 45 of the complaint.

COUNT IV

Count IV is directed only to defendant GENERAL INSTRUMENTS CORPORATION and therefore Count IV and paragraphs 46 through 51 of the complaint require no answer by defendants MAGNAVOX, SANDERS, and PHILIPS.

COUNTERCLAIM

Further responding to the complaint herein, the defendants MAGNAVOX and SANDERS for their counterclaim against plaintiff APF allege that:

52. This counterclaim arises under the patent laws of the United States, Title 35, United States Code. Jurisdiction of this Court is based on Title 28, United States Code, Section 1338(a). Plaintiff APF has submitted to the jurisdiction of this Court by filing of the complaint in this action.

53. Defendant MAGNAVOX is a corporation organized and existing under the laws of the State of Delaware.

54. Defendant SANDERS is a corporation organized and existing under the laws of the State of Delaware.

55. Plaintiff APF is a corporation organized and existing under the laws of the State of New York.

56. On April 25, 1972, United States Letters Patent 3,659,284 were duly and legally issued to defendant SANDERS as assignee of William T. Rusch for an invention in TELEVISION GAMING APPARATUS and since that date and until August 5, 1975, defendant SANDERS was the owner of those Letters Patent 3,659,284.

57. On August 5, 1975, United States Letters Patent 3,659,284 were duly and legally reissued as United States Letters Patent Re. 28,507 to defendant SANDERS and since that date defendant SANDERS has been and still is the owner of those Letters Patent Re. 28,507.

58. By written agreement entered into between defendant SANDERS and defendant MAGNAVOX, effective January 27, 1972, defendant MAGNAVOX has been and still is the exclusive licensee under said United States Letters Patent 3,659,284 and Re. 28,507.

59. On April 15, 1974, defendant MAGNAVOX filed a complaint in the United States District Court for the Northern District of Illinois in the action The Magnavox Company v. Chicago Dynamic Industries, Inc., et al., Civil Action No. 74 C 1030, which complaint was subsequently amended to add as a party plaintiff the defendant here SANDERS, and on September 3, 1974, defendants MAGNAVOX and SANDERS filed a complaint in the United States District Court for the Northern District of Illinois in the action The Magnavox Company, et al. v. Seeburg Industries, Inc., et al., Civil Action No. 74 C 2510. The original complaints in both of those actions alleged infringement by the defendants named therein of United States Letters Patent 3,659,284 and were subsequently amended to allege infringement of United States Letters Patent Re. 28,507. On January 10,

1977, after a trial on the merits in Civil Action Numbers 74 C 1030 and 74 C 2510 before the Honorable John F. Grady, a decision was rendered finding said Letters Patent Re. 28,507 valid and infringed by the defendants in those actions and on June 1, 1977, a final judgment to that effect was entered which, among other things, enjoined certain of the defendants therein from further infringing said Letters Patent Re. 28,507.

60. Plaintiff APF in this action has infringed said United States Letters Patent 3,659,284 and/or Re. 28,507 and still is infringing said United States Letters Patent Re. 28,507 by making, using, selling and/or offering for sale television gaming apparatus which are not licensed under said Letters Patent and which embody the subject matter of the claims of said Letters Patent. Plaintiff APF's infringements of United States Letters Patent Re. 28,507 will continue unless enjoined by this Court.

61. Plaintiff APF's infringement of said United States Letters Patent 3,659,284 and/or Re. 28,507 was and is willful and with full knowledge of said Letters Patent.

62. Defendant MAGNAVOX has placed or caused to be placed the required statutory notice on television games manufactured or sold by it under said United States Letters Patent. Defendant MAGNAVOX has given plaintiff APF notice of said United States Letters Patent.

WHEREFORE, defendants MAGNAVOX, SANDERS and PHILIPS demand a judgment dismissing as to them Counts I, II, and III of the complaint herein and defendants MAGNAVOX and SANDERS demand a preliminary and final injunction

against continued infringement of said United States Letters Patent Re. 28,507 by plaintiff APF; an accounting of the damages to defendants MAGNAVOX and SANDERS and the profits to plaintiff APF caused by said infringements of said Letters Patent 3,659,284 and/or Re. 28,507; an assessment of three times the damages and profits so determined; an award of reasonable attorney fees; an assessment of interest and costs against plaintiff APF; and any other relief which the Court may deem just under the circumstances.

John Thomas Cella

Fitzpatrick, Cella, Harper & Scinto
Attorneys for Defendants
277 Park Avenue
New York, New York 10017
(212) 758-2400

Dated: March 26, 1979

Of Counsel:

Theodore W. Anderson
James T. Williams
Neuman, Williams, Anderson & Olson
77 West Washington Street
Chicago, Illinois 60602

CERTIFICATE OF SERVICE

It is hereby certified that the foregoing ANSWER OF DEFENDANTS MAGNAVOX, SANDERS, AND PHILIPS AND COUNTERCLAIM OF DEFENDANTS MAGNAVOX AND SANDERS was served on Harold I. Kaplan, Esq., and Steven B. Pokotilow, Esq., Blum, Moscovitz, Friedman & Kaplan, 730 Third Avenue, New York, New York 10017 and Stephen B. Judlowe, Esq. Hopgood, Calimafde, Kalil, Blaustein & Lieberman, 60 East 42nd Street, New York, New York 10017 by mailing a copy thereof to them on this 26th day of April, 1979.

James T. Williams, Esq.

A TRUE COPY
RAYMOND F. BURGHARDT, Clerk
By Thomas W. Clarke
Deputy Clerk

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

81 CIV. 0564

NORTH AMERICAN FOREIGN TRADING CORPORATION,

Plaintiff,

v.

THE MAGNAVOX COMPANY, SANDERS ASSOCIATES, INC., NORTH AMERICAN PHILIPS CORPORATION and GENERAL INSTRUMENTS CORPORATION,

Defendants.

Civil Action No.

JUDGE BRODERICK

FILED
JAN 29 3 35 PM '81
U.S. DISTRICT COURT
S.D. OF N.Y.

COMPLAINT

Plaintiff, NORTH AMERICAN FOREIGN TRADING CORPORATION, for its Complaint against the defendants, THE MAGNAVOX COMPANY, SANDERS ASSOCIATES, INC., NORTH AMERICAN PHILIPS CORPORATION and GENERAL INSTRUMENTS CORPORATION, allege that:

THE PARTIES

1. Plaintiff, NORTH AMERICAN FOREIGN TRADING CORPORATION, (NAFT), is a corporation of the State of New York, and has its principal place of business at 1115 Broadway, New York, New York.

2. Defendant, THE MAGNAVOX COMPANY (MAGNAVOX), is a corporation of the State of Delaware and has offices at 345 Park Avenue and 100 East 42nd Street, New York, New York.

3. Defendant, SANDERS ASSOCIATES, INC. (SANDERS), is a corporation of the State of Delaware, having an office at Daniel Webster Highway South, Nashua, New Hampshire.

4. Defendant, NORTH AMERICAN PHILIPS CORPORATION (PHILIPS), is a corporation of the State of Delaware, having its executive offices at 100 East 42nd Street, New York, New York.

Appendix E

5. Defendant, GENERAL INSTRUMENTS CORPORATION (GI), is a corporation of the State of New York, and has its corporate headquarters at 1775 Broadway, New York, New York.

COUNT I

6. Count I is an action by plaintiff, NAPT, against defendants MAGNAVOX, SANDERS and PHILIPS for declaratory judgment under Title 28, United States Code, §§2201 and 2202. Jurisdiction over the subject matter of this Count is based on Title 35, United States Code, §271 and Title 28, United States Code, §1338(a). Venue in this District is proper under Title 28, United States Code, §1391(c).

7. This Count arises from a justiciable controversy now existing between plaintiff NAPT and defendants MAGNAVOX, SANDERS and PHILIPS with respect to U.S. Letters Patent No. 3,659,284, issued to W. T. Rusch on April 25, 1972 and reissued to W. T. Rusch on August 5, 1975 as Reissue Patent Re. 28,507, and the alleged infringement thereof by plaintiff NAPT. Both said patent and its reissue were issued to defendant SANDERS.

8. Defendant SANDERS asserts that it is the owner of the entire right, title and interest in said patents and defendant MAGNAVOX asserts that it is the exclusive licensee of the entire right, title and interest in said patents and that it has the right to bring suit thereon. Defendant PHILIPS owns and controls defendant MAGNAVOX and is the licensing agent for MAGNAVOX.

9. On or about 1976, plaintiff NAPT imported or had manufactured and sold various types of electronic TV games.

10. On or about September 20, 1977, defendants MAGNAVOX and SANDERS filed a Complaint in the United States District Court for the Northern District if Illinois, in an action for

patent infringement of U.S. Letters Patents 3,659,284 and Re-28,507 entitled The Magnavox Co. and Sanders Associates, Inc. v. APF Electronics, Inc., Unisonic Products Corp. et al, Civil Action No. 77-C-3159. Defendants MAGNAVOX and SANDERS voluntarily dismissed the action against Unisonic Products Corp. on or about February 1, 1979.

11. Defendant SANDERS, on or about May 6, 1980, commenced an action against K-Mart Corporation, in the Northern District of Illinois, for patent infringement under U.S. Letters Patent No. 3,659,284 and Reissue Patent No. Re-28,507 (hereinafter the patents in suit), Civil Action No. 80-C-2409. On or about January 6, 1981, K-Mart filed a third party complaint against, inter alia, Unisonic Products Corp. and Royal Star, Ltd. and process was served on the former company on January 14, 1981.

12. The electronic TV games accused in said aforementioned civil actions were sold to Unisonic Products Corp. and to Royal Star, Ltd. by plaintiff NAFT and said civil actions thus constitute actions against plaintiff's customers or its customer's customers.

13. Defendants MAGNAVOX, SANDERS and PHILIPS, continue to charge electronic TV games imported by, manufactured for or sold by plaintiff NAFT as infringements of said patents and have sued or threatened suit for infringement of said patents unless a license is taken thereby, becoming a sub-licensee of defendant MAGNAVOX under said patents.

14. There is a justiciable controversy existing with respect to which plaintiff NAFT seeks a declaration of its rights.

15. Plaintiff NAFT avers that it has not infringed and is not infringing the patents in suit, denies that the manufacture, use or sale of any of its electronic TV games by itself or

by its customers or by its customer's customers constitutes infringement of said patents, or that such devices embody the subject matter of the claims of said patents.

16. Plaintiff NAFT avers that the patents in suit were not duly and legally issued, and further that they are invalid and unenforceable for one or more of the following reasons:

(a) The applicant for said patents was not the original and first inventor or discoverer of any material or substantial part of the subject matter of the claims of said patents.

(b) The subject matter of the claims of said patents, insofar as same may have been original with the applicant, was not sufficiently new and useful to warrant the issuance of a patent thereon.

(c) The description of the alleged invention in the claims of said patents are not made in such full, clear, concise and exact terms as to enable one skilled in the art to make and use the same, nor do said patents set forth the best mode contemplated by the applicants for carrying out the alleged inventions.

(d) The claims of said patents fail to point out particularly and to claim distinctly what the applicant regarded as his invention.

(e) The subject matter of the claims of said patents, prior to the proposed invention and discovery thereof by the applicant, or more than one year prior to the filing of the respective applications therefor, was described in patents and in printed publications.

(f) The subject matter of the claims of said patents was described in application(s) for patents of the United States filed by another prior to any date of invention to which said applicant may be entitled for such claims,

(g) The subject matter of the claims of said patents, more than one year prior to any filing date to which said applicant may be entitled for such claims, was in public use or on sale in the United States.

(h) The subject matter of the claims of said patents, before the alleged invention or discovery thereof by said applicant,

(1) was invented by others in the United States who had not abandoned, suppressed or concealed the same, and

(2) was known or used by others in the United States.

(i) Said applicant did not himself, as alleged in each of said patents, invent the subject matter patented in any of the claims of said patents in suit.

(j) Any differences between the subject matter of said claims and the prior art of such subject matter as a whole would have been obvious to a person of ordinary skill in the art to which the claimed subject matter pertains at the time of the alleged invention thereof by said applicant.

(k) The applicant for said patents has unlawfully extended the patent monopoly by obtaining more than one patent on the same, or merely colorable variations of the same, alleged invention.

(1) Said patents and claims of said patents are invalid, void and unenforceable on the ground of double patenting.

17. Plaintiff NAFT avers that the state of the prior art at the time the alleged invention of the subject matter of the claims of U.S. Letters Patent No, 3,659,284 and/or Reissue Patent No. Re-28,507 was such, and the proceedings in the United States Patent and Trademark Office which resulted in the issuance of the claims of said patents were such, and disclosures in said patents were so limited, that claims of said patents cannot properly be construed to cover any subject matter made, used or sold by Plaintiff NAFT, or sold or used by any of its customers, mediate or immediate, subsequent to the issuance of any said patents in suit.

18. Plaintiff NAFT avers that by reason of the proceedings in the United States Patent and Trademark Office during the prosecution of the applications which resulted in the patents in suit, and the admissions and the representations therein made by or on behalf of the applicant for said patents in order to induce the grant of a patent, defendants MAGNAVOX, SANDERS and PHILIPS are estopped to claim for any of the patents a construction, even if this were otherwise possible, which would cause the patent to cover and include the acts of plaintiff NAFT.

19. If said patents in suit are construed to cover electronic TV games manufactured and sold by plaintiff NAFT, the patents are invalid for want of patentable invention in view of the prior art, knowledge and uses.

20. Plaintiff NAFT began its activity pertaining to electronic TV games after said patent No. 3,659,284 was surrendered on or about August 5, 1975 and therefore could not infringe said patent.

21. Plaintiff NAFT avers that Reissue Patent No. Re-28,507 is invalid and void for the following additional reasons:

(a) That although the original patent 3,659,284 was "partly inoperative by reason of a defective specification" and contained claims which were "inadequate to fully protect" the alleged invention, as stated by the applicant for said Reissue patents in their respective Declarations filed in the United States Patent and Trademark Office on April 25, 1974, such defects and inadequacies did not, in fact, occur "through error and without any deceptive intention" as averred.

(b) That said Reissue patent is not for the same invention as was disclosed and claimed in the corresponding original patent.

(c) That said applicant applied for said Reissue patent only after being informed of the electronic TV games of plaintiff or others which did not employ the subject matter patented in the original patent, and then said applicant sought to improperly extend said original patent to cover devices through Reissue of said patent.

(d) That Declarations filed in the United States Patent and Trademark Office to induce it to reissue said original patent contained false statements, and that such statements were made intentionally, willfully and render said Reissue patents invalid.

22. Plaintiff NAFT avers that Reissue Patent Re-28,507 is invalid by reason of the applicants' non-compliance with the

provisions of Title 35, United States Code, §251, relating to the reissue of inoperative, defective and invalid patents.

23. Plaintiff NAFT avers that the Patent and Trademark Office did not cause a proper examination to be made as to the purported inventions recited by the claims of said patent in suit and that Reissue Patent No. Re-28,507 was inadvertently and erroneously issued, and had such proper examination been made, it would have appeared that the applicant for such Reissue patent were not entitled thereto and said Reissue patent in suit would not have issued.

24. Plaintiff NAFT avers that said patents in suit are invalid and unenforceable and that, in violation of the duty of applicants for said patents and of defendants MAGNAVOX, SANDERS and PHILIPS herein, the United States Patent and Trademark Office was not fully informed by the applicants or defendants MAGNAVOX, SANDERS and PHILIPS of the true state of the relevant prior art and the pertinence thereof or of the true nature of the alleged inventions during the prosecution of the respective applications for the Reissue patent in suit; that defendant SANDERS, as well as defendants MAGNAVOX and PHILIPS herein well know or should have known of such prior art and of its pertinency and of the true nature of the alleged invention during the prosecution of the respective applications for the patents in suit; that the failure to supply such information and the lack of knowledge by the United States Patent and Trademark Office was a material factor in the decision by the Patent and Trademark Office to issue said patents; and that the omissions were such that the United States Patent and Trademark Office would not have issued said patents in suit if it had been correctly and completely informed by applicant or defendants MAGNAVOX, SANDERS and PHILIPS of such omissions of fact.

25. Plaintiff NAFT avers that U.S. Letters Patent No. 3,659,284 and its Reissue Patent No. Re-28,507 are invalid and unenforceable and that in further violation of the duty of disclosure incumbent upon applicants for said patents and defendants MAGNAVOX, SANDERS and PHILIPS herein, defendants MAGNAVOX, SANDERS AND PHILIPS, through their counsel, conducted interviews with the Patent Examiner who examined United States Letters Patent No. 3,659,284, prior to the filing of Reissue Patent No. Re-28,507 and failed to make said interview of record.

26. Plaintiff NAFT further avers that the aforesaid act of interviewing the Examiner prior to the filing of Reissue Patent No. Re-28,507 was an overt and illegal attempt by defendants MAGNAVOX, SANDERS and to influence the Patent Office examination process and to prejudice plaintiff NAFT and others by not making of record negotiations with the Examiner which would otherwise lead to the interpretation of said patent and to otherwise deprive the public of information rightfully theirs and that such acts were made with an intent to otherwise further the enforcement of an otherwise unenforceable monopoly against plaintiff NAFT and others.

27. Plaintiff NAFT avers that said patents in suit are unenforceable because of defendants MAGNAVOX, SANDERS and PHILIPS' misuse of said patents by their attempts to impose and/or coerce others to accept a "package license" including the patents in suit.

28. Plaintiff NAFT avers that the SANDERS patents in suit are unenforceable against plaintiff NAFT because defendants MAGNAVOX, SANDERS and PHILIPS have misused Patent No. 3,659,284 and Reissue Patent No. Re-28,507 by wrongful exploitation, including, inter alia, attempting to tie-in the sale of cassette programmable TV game consoles not covered by the suit patent with

the sale of TV game cassettes, some of which are alleged to infringe the suit patents and by further attempts to tie in the sale of cassettes that do not infringe the suit patents with the sale of cassettes that are alleged to be covered by the suit patents and thereby tie the payment of royalties to defendants MAGNAVOX, SANDERS and PHILIPS to unpatented and unpatentable inventions.

29. Plaintiff NAFT avers that Patent No. 3,659,284 and Reissue Patent No. Re-28,507 are invalid and void and that defendants MAGNAVOX, SANDERS and PHILIPS have disentitled themselves from seeking any relief in this Court because of their unclean hands, and because they have been and are subverting the public policy of the patent laws of the United States by misusing said patents in suit in the manner specifically alleged in Count II hereof, the allegations of which are incorporated by reference herein.

COUNT II

30. Count II is an action which arises under §§1 and 2 of the Sherman Act and §§4 and 16 of the Clayton Act, 15 U.S.C. §§1, 2, 15 and 26.

31. This Court has jurisdiction of the action of Count II pursuant to §1331 of the Judicial Code, Title 28, United States Code §1331 and §12 of the Clayton Act, 15 U.S.C. §22.

32. This Court is the proper venue for this action, pursuant to §12 of the Clayton Act, Title 15, United States Code, §22.

33. Beginning at a date unknown to plaintiff NAFT, but believed to be some time in or prior to 1972, defendants MAGNAVOX, SANDERS, PHILIPS and others in concert therewith, have engaged in a plan or program to monopolize and attempt to monopolize and engage in a conspiracy and concert of action with each

other and others to monopolize and/or restrain trade in the manufacture, sale and use of apparatus for playing games by displaying and manipulating symbols on the screen of a cathode ray tube, and particularly electronic TV games.

34. Pursuant to said plan, program, conspiracy, concert of action and as part thereof, defendants SANDERS, MAGNAVOX and PHILIPS and others have engaged in the following overt acts and practices for the purpose and with the effect of monopolizing, attempting to monopolize or restraining trade in the manufacture, sale or use of apparatus for playing games of the type involving the display and manipulation of symbols on the screen of a cathode ray tube and, particularly, electronic TV games:

(a) The applicant for said patents, defendants MAGNAVOX, SANDERS and PHILIPS and their counsel, have fraudulently obtained issuance by the United States Patent and Trademark Office of patent in suit 3,659,284 and its Reissue Re-28,507 by omitting disclosures or making misrepresentations in disclosures to the Patent and Trademark Office of the following and other material facts which were known to them at the time applications for such patents were filed and when said applications were pending in the Patent and Trademark Office:

(1) The fact that there was in existence and was publicly known prior to the alleged invention by any of such patents, apparatus for playing the game of Space Wars by displaying and manipulating symbols on the screen of a cathode ray tube, and various other games of a similar nature, which apparatus anticipated or embodied the subject matter claimed by

applicants for such patents and their invention and which was not brought to the attention of the United States Patent and Trademark Office.

(2) The fact that the alleged invention of such patents was placed on sale by defendant SANDERS more than one year prior to the filing date of any of the applications for such patents was not brought to the attention of the United States Patent and Trademark Office.

(3) The fact that SANDERS' prior application Serial No. 126,966 issued as U.S. Patent No. 3,728,480 on April 17, 1973 and thereby became prior art with respect to U.S. Letters Patent No. 3,659,284 and its Reissue Re-28,507 was not brought to the attention of the United States Patent and Trademark Office.

(4) The fact that the subject matter of the alleged invention of Patent No. 3,728,480 was known by the applicant for such patents prior to any alleged invention of any of such patents was knowingly withheld from the Patent and Trademark Office during the prosecution of such patents. Further, in seeking allowance of such patents, the applicants argued the prior art relied upon by the Patent and Trademark Office was deficient in respect as to which there was no such deficiency in Patent No. 3,728,480.

(5) The fact that there existed prior patents which were known to applicants and to defendants MAGNAVOX and SANDERS and their counsel, and which disclosed subject matter argued by applicant to be absent from the prior art which the United States Patent and Trademark Office cited during the prosecution of the applications.

(6) The fact that applicant for the application for Re-28,507 with knowledge of defendants and their counsel, made false declarations that the corresponding original patent contained defects and inadequacies "through error and without any deceptive intention" when, in fact, such defects and inadequacies did not so occur, but were the result of deliberate and intentional acts. Further, the reissue patent applications were filed for different inventions from that disclosed in the corresponding original patent and said applicant applied for said reissue patent only after being informed of the electronic TV games of others which did not employ the subject matter patented in the original patent. As a result, said applicant sought to improperly extend the original patent to cover devices of others through the reissue of said patent. The declaration filed by said applicant to induce the United States Patent and Trademark Office to reissue the original patent, contained false statements,

(Dw)

and such statements were made intentionally, knowingly and willfully.

(7) That defendants MAGNAVOX, SANDERS and PHILIPS, through their counsel, did illegally and improperly conduct an interview with the Patent Examiner that issued Patent No. 3,659,284 prior to the filing of Re-28,507 and that by conducting said interview, defendants MAGNAVOX, SANDERS and PHILIPS did attempt to prosecute its patent applications without subjecting said applications to the normal consequences attendant to negotiations made before the Patent Office by reason of their failure to make mention of said pre-filing interview with the Examiner during the prosecution of said patents.

(b) Defendants MAGNAVOX, SANDERS and PHILIPS attempted to improperly coerce others to accept a package license including the patents in suit as applied to electronic TV games under which the others had absolutely no interest in obtaining any license.

(c) Defendants MAGNAVOX, SANDERS and PHILIPS engaged in other acts and practices for the purpose and with the effect of depriving plaintiff and others of a fair opportunity to compete and of monopolizing or restraining trade in the manufacture, sale and use of apparatus for playing games by displaying and manipulating symbols on the screen of a cathode ray tube and, particularly, electronic TV games.

(DW)

and such statements were made intentionally, knowingly and willfully.

(7) That defendants MAGNAVOX, SANDERS and PHILIPS, through their counsel, did illegally and improperly conduct an interview with the Patent Examiner that issued Patent No. 3,659,284 prior to the filing of Re-28,507 and that by conducting said interview, defendants MAGNAVOX, SANDERS and PHILIPS did attempt to prosecute its patent applications without subjecting said applications to the normal consequences attendant to negotiations made before the Patent Office by reason of their failure to make mention of said pre-filing interview with the Examiner during the prosecution of said patents.

(b) Defendants MAGNAVOX, SANDERS and PHILIPS attempted to improperly coerce others to accept a package license including the patents in suit as applied to electronic TV games under which the others had absolutely no interest in obtaining any license.

(c) Defendants MAGNAVOX, SANDERS and PHILIPS engaged in other acts and practices for the purpose and with the effect of depriving plaintiff and others of a fair opportunity to compete and of monopolizing or restraining trade in the manufacture, sale and use of apparatus for playing games by displaying and manipulating symbols on the screen of a cathode ray tube and, particularly, electronic TV games.

35. The omissions and misrepresentations referred to in paragraph 34(a) above and the resulting lack of knowledge by the United States Patent and Trademark Office was a material factor in the decision by the United States Patent and Trademark Office to issue U.S. Patent No. 3,659,284 and Reissue Patent No. Re-28,507 and the omissions and misrepresentations were such that the United States Patent and Trademark Office would not have issued such patents if it had been correctly and completely informed by the applicant or defendants MAGNAVOX and SANDERS of such omissions of fact which applicant and defendants MAGNAVOX and SANDERS had the uncompromising duty to disclose fully to the United States Patent and Trademark Office.

36. Notwithstanding their knowledge that such patents in suit are invalid, defendants MAGNAVOX, SANDERS and PHILIPS have conspired and sought to use such patents in an attempt to achieve and to maintain an illegal monopoly in the manufacture, sale and use of apparatus for playing electronic TV games of the type involving displaying and manipulating symbols on the screen of a cathode ray tube in contravention of the United States patent laws and also of the anti-trust laws of the United States by asserting said patents by suit and by threat of suit against plaintiff NAFT, its customers and others.

37. Plaintiff NAFT avers that the suits described in paragraphs 10 and 11 of this Complaint were brought in furtherance of said attempt and a conspiracy to monopolize interstate commerce, and that said attempt and conspiracy have continued since the filing of said Illinois suits as evidenced by the intimidation of plaintiff and its customers.

38. By reason of the acts of defendants performed in furtherance of their violation of §§1 and 2 of the Sherman Act, plaintiff has been damaged in its property, reputation and business in an amount which is not presently known, but which

includes its actual incurred expenses for this litigation, such damages, upon information and belief, will be in an amount exceeding one million dollars.

39. Plaintiff NAFT believes that it will suffer further and irreparable injury if defendants MAGNAVOX, SANDERS and PHILIPS are permitted to continue their illegal acts as aforesaid.

COUNT III

40. Count III is an action by plaintiff NAFT against defendant, GI, for indemnity under the common law of the State of New York. Jurisdiction of this state law claim is pendent to Count I seeking declaratory judgment relief against defendants MAGNAVOX, SANDERS and PHILIPS.

41. With respect to the allegations of Count I that form a basis for the pendent claim against defendant GI under the common law of the State of New York, paragraph 6-29 herein detail the common nucleus of operative facts of plaintiff NAFT's federal claim from which plaintiff states a claim herein against defendant GI and, accordingly, each of these paragraphs is incorporated by reference herein as if fully set forth herein.

42. Beginning in 1975 and continuing through about 1977, defendant GI manufactured, offered for sale and sold to plaintiff NAFT integrated circuit chips designed and manufactured by defendant GI especially for and having a use only in electronic TV apparatus to play games by displaying and manipulating symbols on the screen of a cathode ray tube in a manner allegedly described and claimed in U.S. Letters Patent No. 3,659,284 and Reissue Patent No. Re-28,507, which patents are charged by defendants MAGNAVOX, SANDERS and PHILIPS to be infringed by products of plaintiff NAFT.

43. Defendant GI actively induced, aided and encouraged plaintiff NAFT to purchase said integrated circuit chips

from GI and to use the same in such TV game apparatus which have been charged as infringements of said patents by defendants MAGNAVOX, SANDERS and PHILIPS.

44. To the extent that electronic TV games sold by plaintiff are an infringement of United States Letters Patent No. 3,659,284 and Reissue Patent No. Re-28,507, said electronic integrated circuit chips manufactured and sold to plaintiff NAFT by defendant GI are a material part of the invention, especially made and/or especially adapted for use in an infringement of such patents, and not a staple article or commodity of commerce suitable for substantial non-infringing use, rendering defendant GI liable as a contributory infringer under 35 U.S.C. §271(c).

45. Defendant GI induced and caused plaintiff NAFT to infringe said patents, should this court find that plaintiff NAFT has infringed said patents, and defendant GI is obligated to indemnify and hold plaintiff NAFT harmless against any claims made by defendants SANDERS, MAGNAVOX and PHILIPS, including the costs and disbursements of this action.

COUNT IV

46. Count IV is an action by plaintiff NAFT against defendant GI for contribution under the common law of the State of New York and jurisdiction of this state law claim is pendant to Count I seeking declaratory judgment relief against defendants MAGNAVOX, SANDERS and PHILIPS.

47. Plaintiff repeats and realleges paragraphs 41-45 and incorporates each of those paragraphs by reference herein as if fully set forth herein.

48. By reason of its actions, should the products of plaintiff NAFT be found to infringe said patents, defendant GI is a joint tortfeasor with plaintiff NAFT and is obligated to provide contribution to plaintiff NAFT in an amount to be determined by this court.

(D0)

COUNT V

49. Count V is an action by plaintiff NAFT against defendant GI for breach of warranty under the common law of the State of New York and New York Uniform Commercial Code, §3-312(3). Jurisdiction of this state law claim is pendent to Count I seeking declaratory judgment relief against defendants MAGNAVOX, SANDERS and PHILIPS.

50. With respect to the allegations of Count I that form a basis for the pendent claim against defendant GI under the common law of the State of New York and New York Uniform Commercial Code §2-312(3), paragraph 6-29, setting forth the allegations of Count I, detail the common nucleus of operative facts of plaintiff NAFT's federal claim from which plaintiff states a claim herein against defendant GI and, accordingly, each of these paragraphs is incorporated by reference herein as if fully set forth herein.

51. Beginning in 1975, and continuing to date, defendant GI has manufactured, offered for sale and sold to plaintiff NAFT integrated circuit chips designed and manufactured by defendant GI especially for and having a use only in electronic TV apparatus to play games by displaying and manipulating symbols on the screen of a cathode ray tube in the manner allegedly described and claimed in U.S. Letters Patent No. 3,659,284 and Reissue Patent No. Re-28,507, which patents are charged by defendants MAGNAVOX, SANDERS and PHILIPS to be infringed by products of plaintiff NAFT.

52. Plaintiff NAFT avers that the manufacture and sale by defendant GI of integrated circuit chips to plaintiff NAFT for use in electronic TV game apparatus manufactured by or for plaintiff NAFT to the extent that such TV game apparatus is found by this Court to be an infringement of U.S. Letters Patent No. 3,659,284 and Reissue Patent No. Re-28,507, is a breach of GI's

warranty to plaintiff NAFT that integrated circuit chips manufactured and sold by GI to plaintiff NAFT are free of the rightful claim of third parties and, in particular, defendants MAGNAVOX, SANDERS and PHILIPS.

53. As a consequence of the aforesaid breach by defendant GI of its warranty to plaintiff NAFT, plaintiff NAFT has been damaged to an extent that cannot be determined until and unless its rights with respect to the charges by defendants MAGNAVOX, SANDERS and PHILIPS are determined by this Court.

WHEREFORE, in accordance with Count I hereof, plaintiff NAFT demands a judgment or decree that United States Letters Patent No. 3,659,284 and Reissue Patent No. Re-28,507 are invalid and that said patents are not infringed by the manufacture, sale or use or electronic TV games sold by plaintiff NAFT; that defendants MAGNAVOX, SANDERS and PHILIPS be enjoined both preliminarily and permanently from charging or asserting that the manufacture, sale or use of electronic TV game apparatus manufactured by and for plaintiff NAFT violates or infringes any rights of defendants MAGNAVOX, SANDERS and PHILIPS; an assessment against defendants MAGNAVOX, SANDERS and PHILIPS of the costs of this action; an award of reasonable attorneys fees; and any other relief which the Court may deem just under the circumstances.

WHEREFORE, in accordance with Count II hereof, plaintiff NAFT further demands that U.S. Letters Patent No. 3,659,284 and/or Reissue Patent No. Re-28,507 be declared invalid, void and unenforceable against plaintiff NAFT; that injunctions be ordered to restrain defendants MAGNAVOX, SANDERS and PHILIPS from further asserting such patents against plaintiff NAFT and its customers; that plaintiff NAFT be awarded, as damages, attorneys' fees and all of its disbursements on account of this action, and any other damages resulting from the illegal acts of defendants MAGNAVOX,

(60)

SANDERS and PHILIPS, as aforesaid; and that the damages be trebled as provided by law and that plaintiff NAFT be awarded an assessment of interest and costs against defendants MAGNAVOX, SANDERS and PHILIPS and any other relief which the Court may deem just under the circumstances.

WHEREFORE, in accordance with Counts III, IV and V hereof, plaintiff NAFT further demands an accounting of the indemnification, contribution and/or breach of warranty damages to plaintiff NAFT by reason of defendant GI's sale of integrated circuit chips to plaintiff NAFT for use in electronic TV game apparatus to the extent that plaintiff NAFT may be damaged by such sales; an award of reasonable attorneys fees; an assessment of interest and costs against defendant GI and any other relief which the court may deem just under the circumstances.

OSTROLENK, FABER, GERB & SOFFEN
Attorneys for Plaintiff
260 Madison Avenue
New York, NY 10016
(212) 685-8470

New York, New York
January 26, 1981

By Edward A. Meilman
Edward A. Meilman

Of Counsel:

Jerome M. Berliner
Steven I. Weisburd