

## [54] EDUCATIONAL GAME PLAYING DEVICE

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[58] **Field of Search** ..... 273/131, 136; 35/8

[56] **References Cited**

## UNITED STATES PATENTS

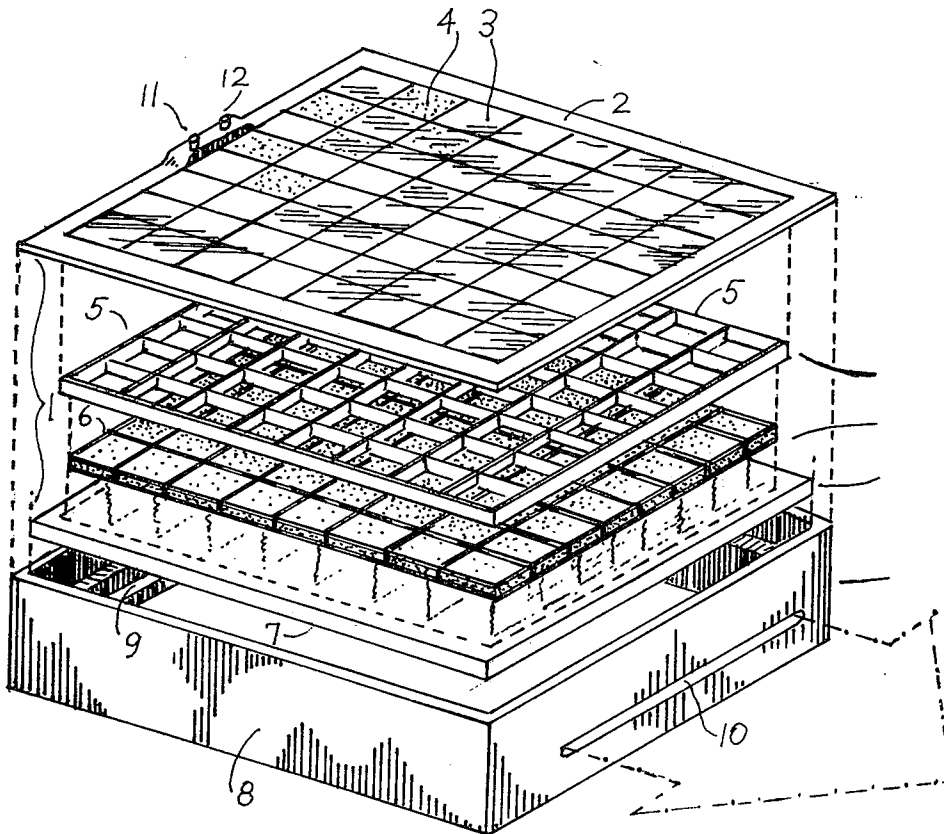
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|-----------|--------|--------------------|-----------|
| 2,647,749 | 8/1953 | Wales .....        | 273/136 A |
| 3,395,463 | 8/1968 | Worden et al. .... | 35/8 R    |
| 3,579,856 | 5/1971 | Way .....          | 35/8 R    |

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*Attorney, Agent, or Firm*—Stewart and Kolasch, Ltd.

## [57] ABSTRACT

A game playing device which is readily adaptable to a variety of purposes, such as, for example, textile design planning, battle games, board games such as chess, checkers, Chinese checkers, Go, and the like, wherein the player matches his wits against data cards which contain selective information depending upon the game which is being played. The game playing device contains a game board which, in the case of chess, would have 64 positions, a light source associated with each of the game positions, and data cards which contain information punched thereon and which, when fed into the game playing device, cause the light source to be illuminated beneath the game board to indicate the various moves to be contemplated by the player.

**12 Claims, 11 Drawing Figures**



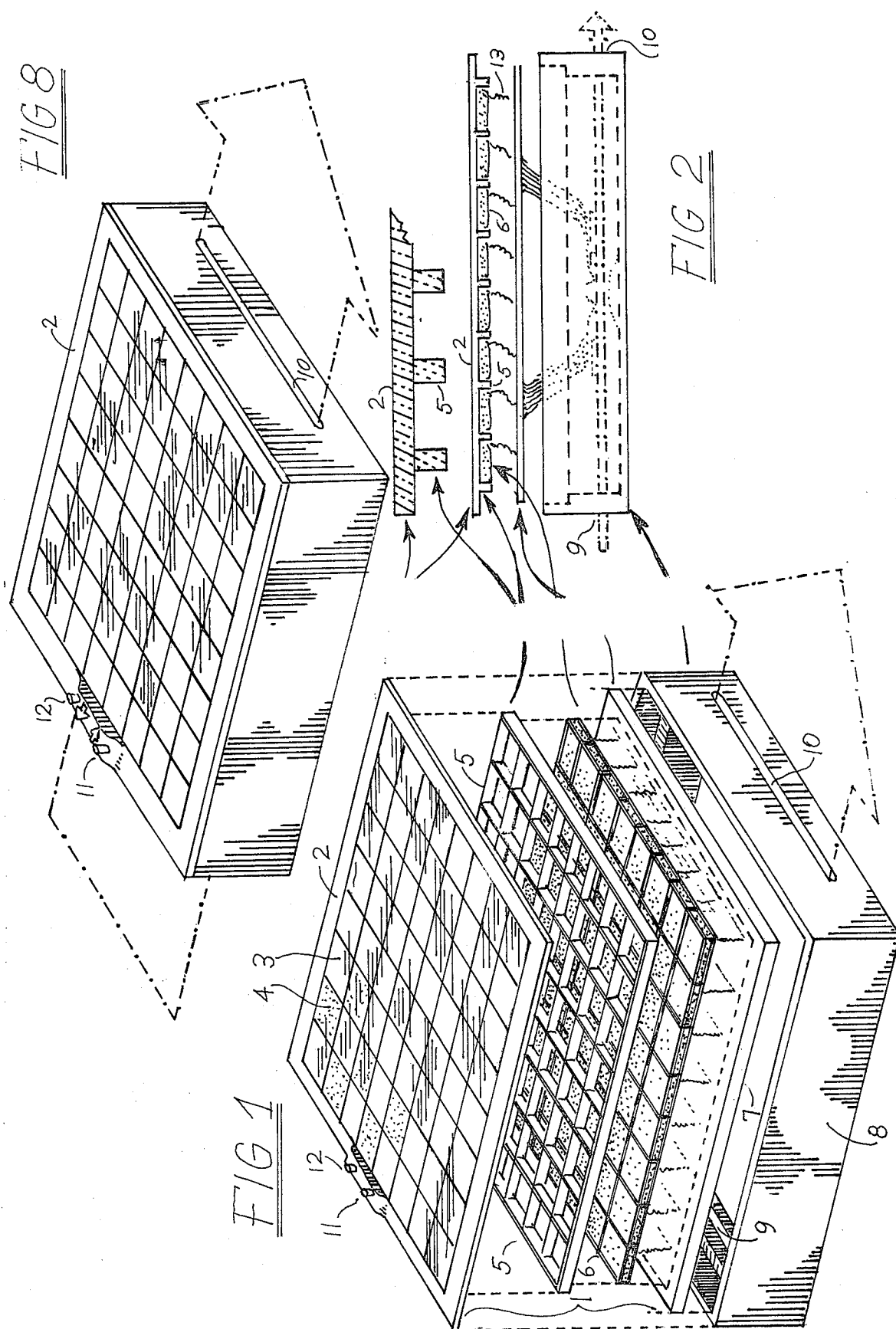


FIG 3A

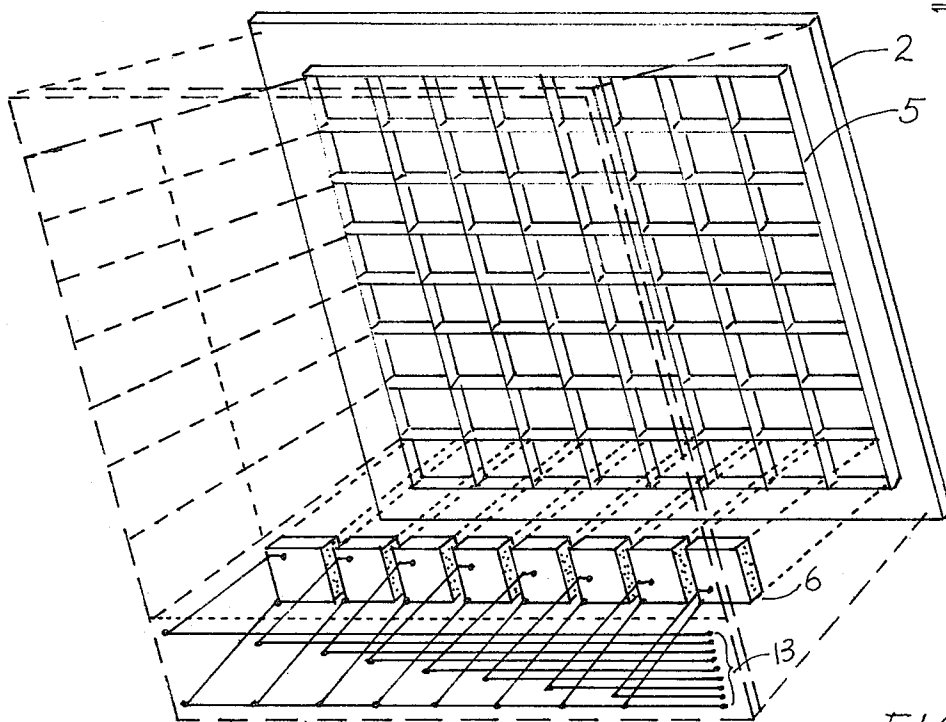


FIG 3B

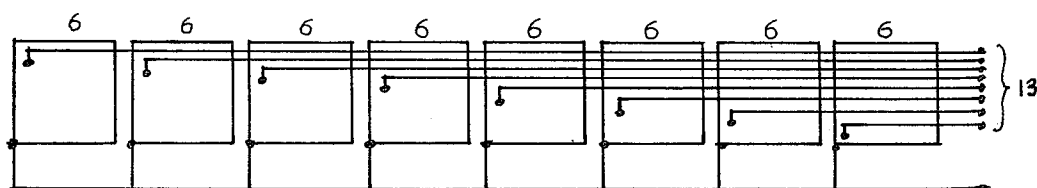
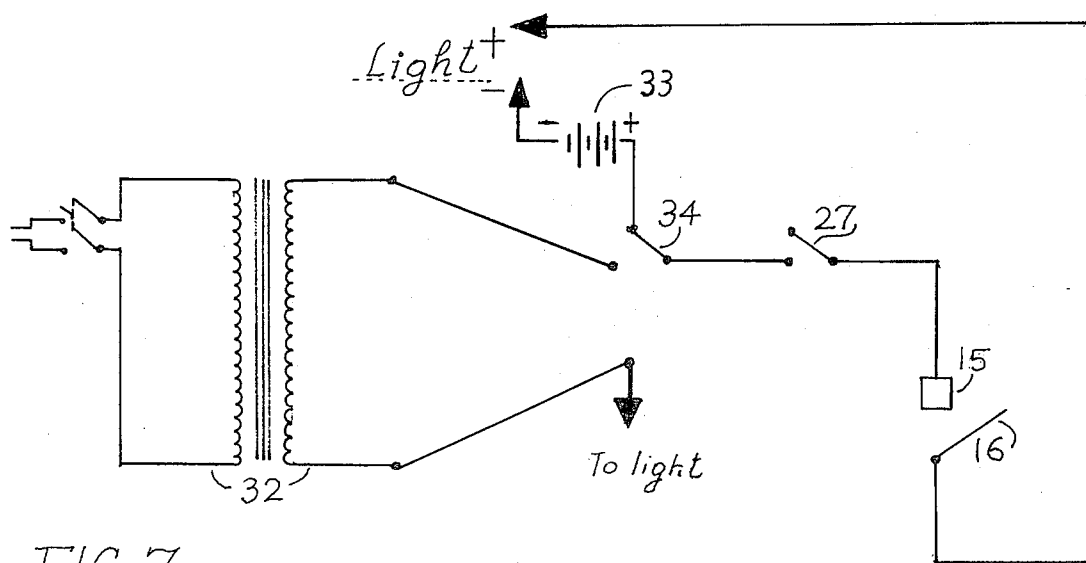


FIG 7

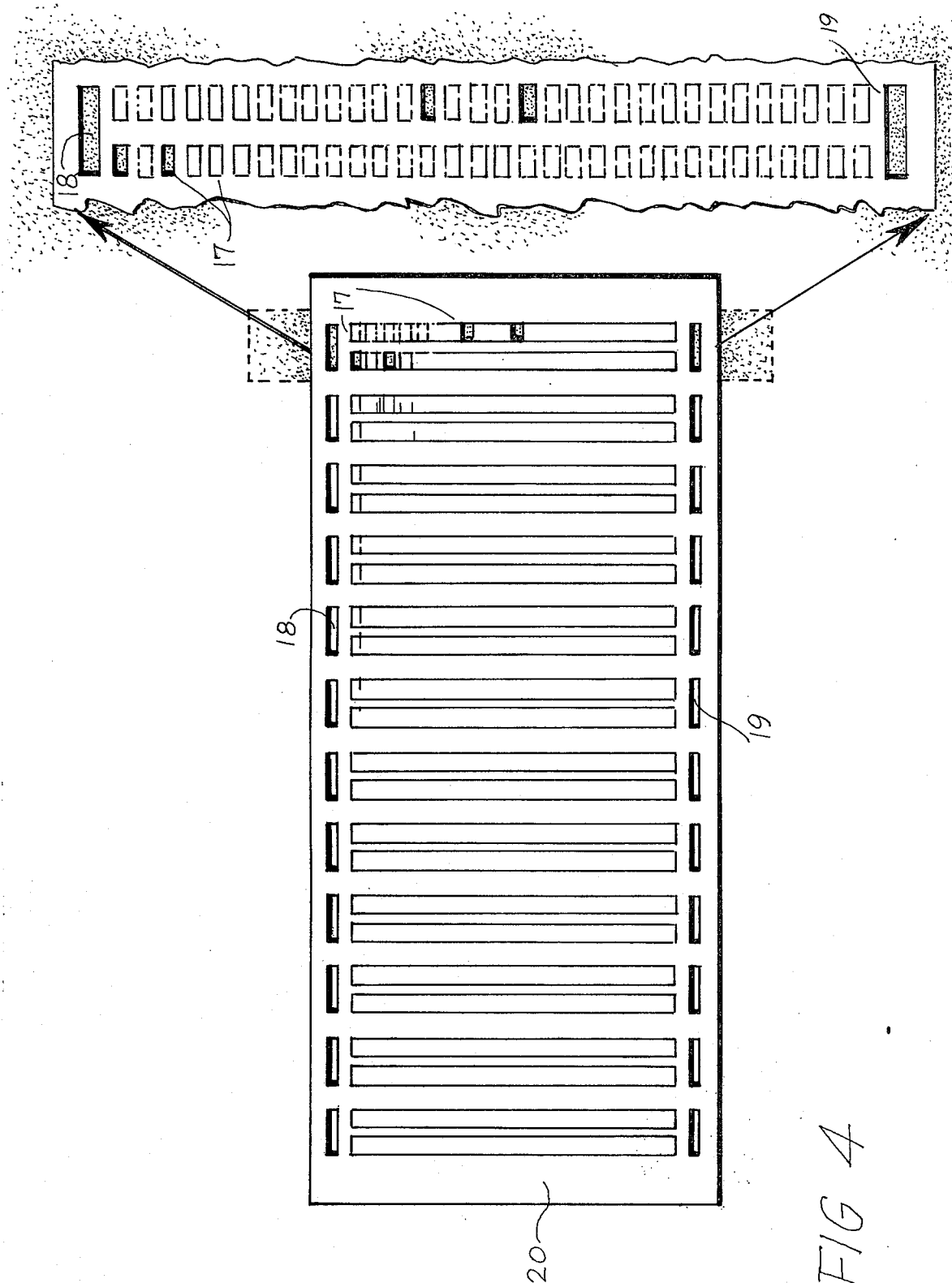


FIG 5A

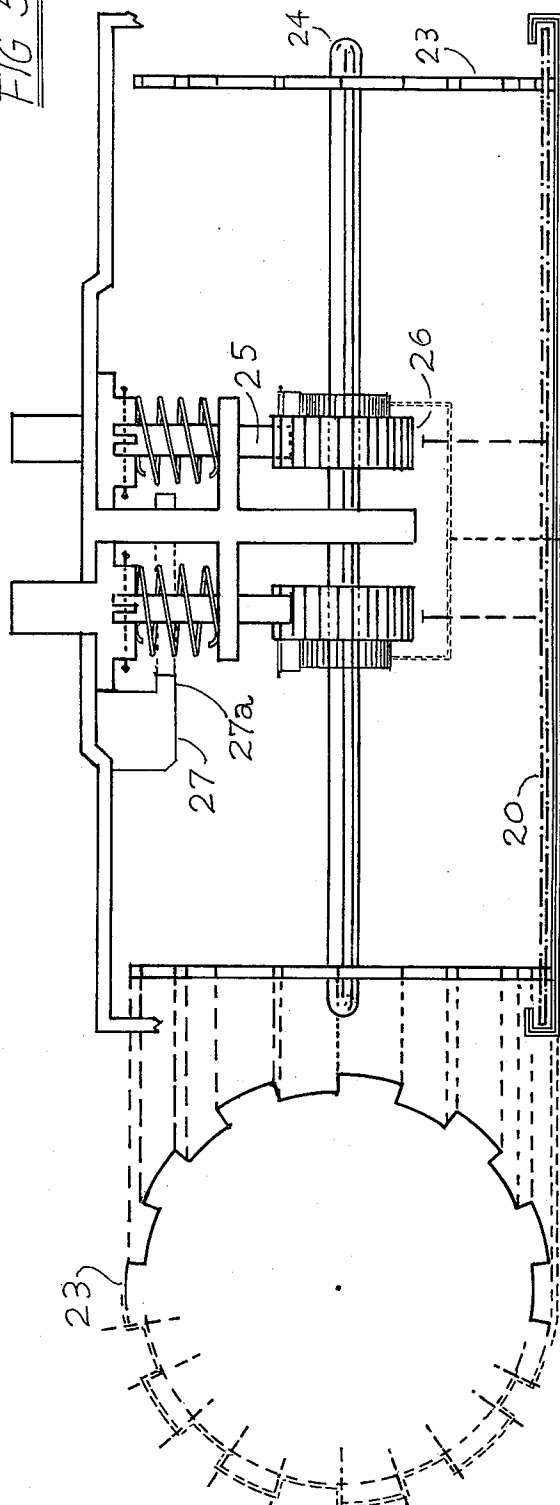


FIG 5B

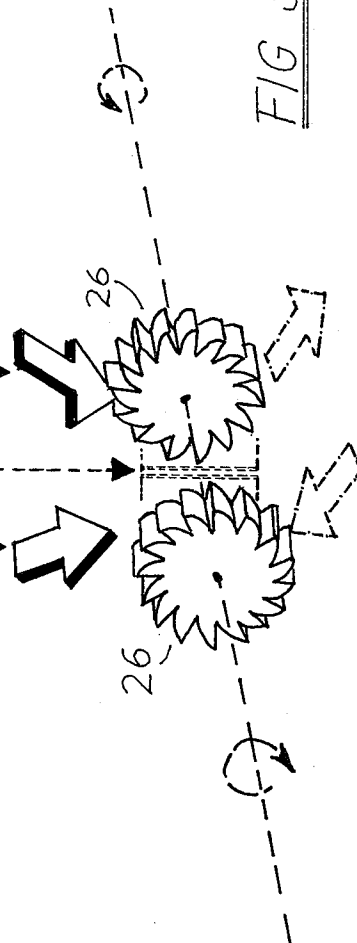
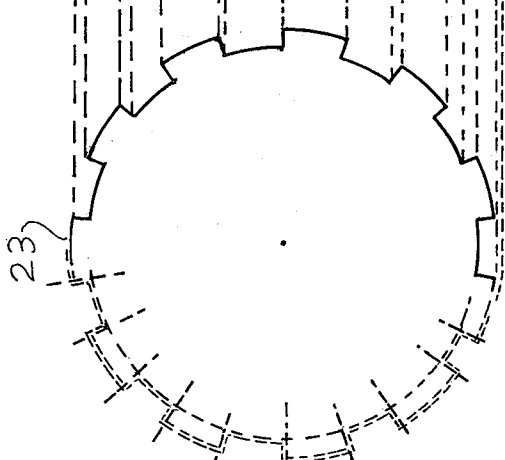


FIG 5C



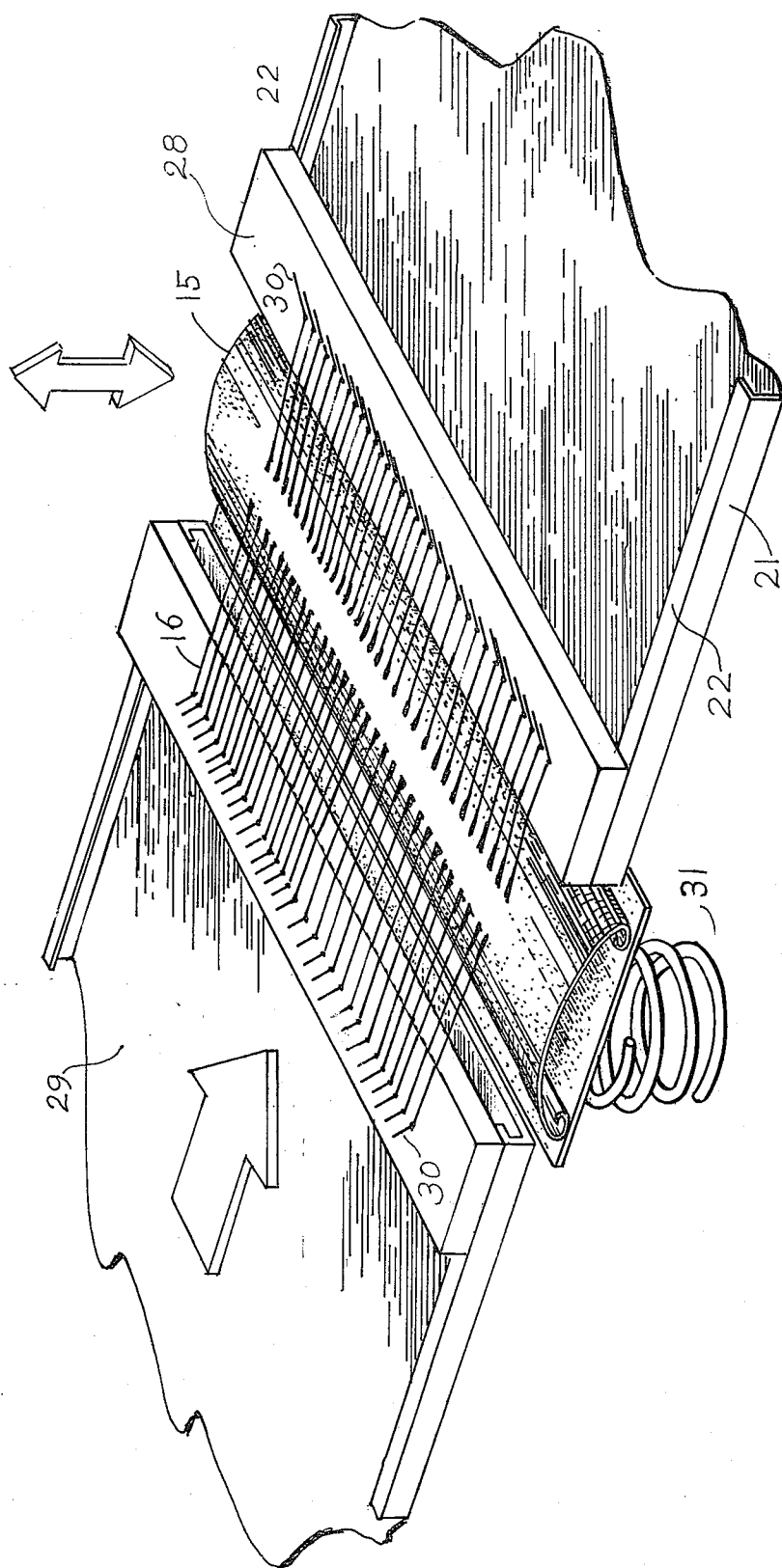


FIG 6

## EDUCATIONAL GAME PLAYING DEVICE

### BACKGROUND AND SUMMARY OF THE INVENTION

Many games have been developed wherein special boards are utilized in connection with the placing and moving of pieces or pawns for a particular purpose, such as, for example, in the case of the game of chess. Some of the games are particularly difficult to learn and require special solutions to problems which entail difficult learning methods. The present available learning methods are frequently slow and tedious and, thus, are quite tiring to the average person who therefore frequently abandons his pursuit of the game. Furthermore, many of the existing learning methods are very expensive, thereby seriously limiting their marketability to the general public.

Accordingly, it is an object of the present invention to provide a game playing device which possesses the flexibility to make it adaptable to a variety of different types of games.

Another object of the present invention is to provide an improved game playing machine which has associated therewith an inexpensive and easy-to-learn teaching system.

A further object of the present invention is to provide a game playing device which enables a player to strategically select his particular moves or position and compare said moves with the optimum possible moves which should have been made. The operator or player by comparing his particular decision or move with the optimum solution can thereby learn the game much more readily.

Still another object of the present invention is to provide a game playing device which enables the player to repeat games such as checkers, chess, Go, Chinese checkers, Muhle, and the like which have been pre-played or predetermined; to repeat positions, to develop strategies in famous battles and to enable the player or operator to perform and learn textile design planning.

A still further object of the present invention is to provide a game playing device which is economical to manufacture, and possesses a good, sturdy, aesthetic appearance.

Other objects and further scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention and wherein,

FIG. 1 shows a perspective view of the game playing device of the present invention, wherein various portions of the device are separated from each other for clarity;

FIG. 2 is an end view of the device of FIG. 1;

FIG. 3A is a perspective view of the lighting system for the board utilized in the device of the present invention;

FIG. 3B is an enlarged plan view of a portion of FIG. 3A;

FIG. 4 is a plan view of the data card which contains the plurality of bits of information which is used to tell the operator or player the optimum moves which should be made;

FIGS. 5A, 5B and 5C show the driving or advancing mechanism for conveying the data card through the game playing device;

FIG. 6 is a perspective view of the electrical sensing system utilized to transmit the bits of information on the data card to the playing surface of the device;

FIG. 7 is a schematic view of the electric system utilized in the device of the present invention; and

FIG. 8 is a perspective view in composite form of one embodiment of the game playing device of the present invention.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, wherein identical reference numerals are used throughout various views to indicate identical elements, the game playing device of the present invention, according to FIG. 1, comprises a top assembly 1 which contains a translucent plate 2 on which a design can be printed which, in this particular illustration, is a combination of sixty-four light and dark squares 3 and 4, which can be used for playing checkers or chess. A middle section 5 is disposed underneath and attached to the top plate 2 and contains illuminating cells 6, each of said cells being separated from each other in accordance with the requirements, design and purpose of the game. FIG. 1 shows 64 individually lighted squares, that is, 32 light squares 3 and 32 dark squares 4 which are closed on their lower sides by a plate 7. The lower portion of the device 8 contains the data card entrance slot 9, the data card exit 10, the advancement mechanism (see FIGS. 5A, 5B and 5C) and the electrical sensing system shown in FIGS. 6 and 7. Space is also provided in the lower section of the device to house the elements of the power supply including the batteries and the like. FIG. 1 also shows the control buttons 11 and 12 for providing the forward and backward motion of the data card, respectively. When operating these control buttons, the electrical circuit is actuated and the advancing mechanism is placed into operation. FIG. 2 merely shows FIG. 1 from an end view and in a more compact state.

FIGS. 3A and 3B illustrate the various illuminating cells 6, each containing an electrical lead 13. An illuminating cell 6 is disposed beneath each one of the squares printed on the top plate 2, each one of said cells being separated from the surrounding cells by walls provided by the lattice structure 5. Each illuminating cell is connected on one side directly to the power supply and on the other side to a sensing finger 16 (see FIG. 6). The illuminating element 6, which can be, for example, a light bulb, a calcium cyanide crystal, or the like, receives electrical current from a power supply source as shown in FIG. 7 by the closing of the circuit which causes the electrical current to pass from the connector plate 15, through the holes in the data cards to the sensing fingers 16 and, in turn, through the electrical leads 13 to the appropriate illuminating cells 6.

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The data card shown in FIG. 4 is a standard card approximately 9 inches long by 3 1/4 inches wide. The card is provided with a number of spaces 17 for punching holes for storing specific information. In this particular illustration, the card is adapted for a board containing sixty-four squares, and accordingly, the card is provided with two columns with thirty-two bits of information for each position of the readout mechanism. The data card 20 is also provided with a number of evenly spaced-apart slots 18 and 19 disposed on opposite sides of said card, said slots being adapted to engage with the advancing mechanism of the game playing device. In place of data cards, tapes, which can be merely considered as the data cards to register the programs for the positions and movements of the various pieces utilized in the particular game being played. The operator or the player himself can prepare his own cards by punching appropriate places on the cards or can purchase prepunched cards from the manufacturer. Each card is adapted to contain a minimum of 1,960 bits of information.

The data card 20 preferentially contains 12 or more sets of columns with 64 bits of information provided in each column. The data card is inserted in the slot 9 of the device, is guided through two rails 21 provided with lips 22 (see FIG. 6) and is advanced by the mechanism shown in FIG. 5. The data card passes beneath the sensing fingers 16 and the connector 15 and emerges through the slot 10.

The advancing mechanism of FIGS. 5A, 5B and 5C comprises gear-type drive wheels 23 which are mounted on an axis 24 which is moved by the action of a push rod 25 on the ratchet wheels 26, also attached to the axis 24. The ratchet wheels 26 are activated by depressing either one of the control buttons 11 and 12, depending upon whether forward or reverse movement of the data card is desired. Since the action of the control buttons 11 and 12 is spring loaded, said buttons will always return to their original resting position when they are released. When one of the control buttons 11 or 12 is actuated, this action in turn actuates a micro-switch 27 and an activating rod 25. When the micro-switch contact point 27a is engaged, the electrical system is activated. The activating rod 25 simultaneously engages the appropriate ratchet wheel for either advancing or reversing the data card as discussed above. The information from the data card is read by the sensing fingers 16 as shown in FIG. 6 and is relayed to the illuminating cells 6 through the electrical circuit illustrated in FIG. 7.

Data card or tape reading means are provided as illustrated in FIG. 6 by the sensing fingers 16 which are held together by an armature 28. The sensing fingers are made of a spring-type material which provides the necessary spring action to press them against the card 20 which passes beneath said sensing fingers and the top of the connector plate 15. The data card or tape is conveyed on the top of the holding plate 29 and is guided by the two rails 21 which are provided with guiding lips 22. Each sensing finger 16 is connected directly by its individual connecting cable 30 in FIG. 6, indicated as cable 13 in FIGS. 3A and 3B, to its corresponding luminescent cell 6. One sensing finger corresponds to each one of the illuminating elements. The contact plate 15 is mounted on a spring 31 so that said plate is constantly being pushed against the opposing action of the sensing fingers 16. This provides good

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contact between the sensing fingers and the contact plate. The advancing mechanism illustrated in FIG. 5 causes the data card to move one position, either in the forward or backward direction, from one set of information bits to another set of information bits by the manipulation of the control buttons 11 and 12.

FIG. 7 illustrates that the power supply can be provided by live voltage used in combination with a step-down transformer 32 or batteries 33. The selection of the source of the power supply is made by switch 34. Switch 27 is the on-off switch which opens and closes the circuit. One side of the transformer output and the negative polarity of the batteries are connected directly to one side of the illuminating cells through the connecting cable 30. Each one of the sensing fingers 16 is connected in the circuit as illustrated in FIG. 6 and establishes contact with the contact plate 15 through openings punched in the data card and no insulation is provided by the introduction of the card or tape into the device. The sensing system or card reading system illustrated in FIG. 6 is designed to simultaneously read from two or more adjoining columns at each readout. It can read as many bits of information as necessary and in the case of the game of Go, for example, this will be up to 328 bits of information, but of course, the amount may vary largely depending upon the game or application for which the board is designed. As stated above, the sensing fingers establish electrical contact with the connector plate 15 through the punched-out holes in the tape or card, thus closing the circuit. The appropriate luminescent elements are then illuminated indicating the positions where the game pieces are to be moved.

The normal method of operation of the device of the present invention is as follows: The data card 20 is prepunched with certain holes 17 being punched-out. The game playing machine or device is connected to the power supply, that is, either to batteries 33 or to the line transformer 32 through the use of the selection switch 34. The device is then turned-on by means of the switch 27. When the optional transformer is used, the selection switch 34 must be turned to "line," which automatically disconnects the batteries 33. The data card 20 is inserted into slot 9 and pushed manually until its first slots 18 and 19 engage with the drive wheels 23 of the advancing mechanism. With the first move of the control button 11, the card or tape is placed beneath the sensing fingers 16 and thus is ready for the first readout. The control button or lever 11 is connected through the connecting rod 25 to the ratchet system 26 and the drive or star wheels 23. Alternatively, a triangular plate could be used instead of the ratchet and wheel system described above. The drive wheels 23 engage in the slots 18 and 19 of the data card or tape for moving said card or tape either in the forward or backward direction as desired. The drive mechanism described above advances the card or tape which is guided by rails 21 beneath the sensing fingers 16 and between said sensing fingers and the plate 15. Each successive position of the data card is obtained by one full movement of the control button or lever 11 or 12.

If the game playing device of the present invention is applied to chess, the player places 32 game pieces in their starting assembly on the translucent upper plate 2. The player then makes his first decision as to where the first piece is to be moved. To compare this decision against a master game imprinted on the data card or tape, the player actuates the control lever or button

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which moves the data card one position, and at the same time closes the electric circuit and lights the appropriate specific cells 6 beneath the translucent board 2. The actuation of the control button or lever 11 or 12 triggers the readout of the card or tape. The sensing fingers 16 establish contact through the holes in the card or tape with the contact plate 15 and current flows, as the circuit is closed, lighting the cells 6. The light will be noticeable through the top plate 2, indicating to the player which pieces should be moved to what position. The player can thereafter correct and/or adjust his previous movement in accordance with the instructions received from the data card. Thus, the player can compare his strategy with the strategy of the masters as recorded on the data card, or any other previously prepared plan of action which is registered on the data card or tape. After making his initial move, the player then can decide a possible move for his opponent and then can press the control button to determine whether or not the correct move was made. The player will then again take his own position and reply to the move previously made by the opponent. Thus, the third pressing of the control button will indicate the second movement of the player. The releasing of the control button will return it to its resting position which also cuts-off the flow of current by the action of the switch 27 and prepares the advancing mechanism for its next forward move. Either button 11 or 12 can be used for moving the data card in either the forward or reverse direction, the only important factor being that said buttons provide opposite functions. The advancing mechanism is actuated by the button 11 or 12 through the connecting rod 25 on the ratchet 26 which in turn moves the axis 24 and drives the wheels 23 which engage in the holes 18 and 19 at the sides of the data card or tape 20. At any time when releasing the control button 11 or 12, the card or tape can be pulled out backward or forward through slots 9 or 10 and adjusted to any position as desired. When pressing the control button 11, for example, the light circuit will be closed through switch 27. It will remain closed as long as the button is depressed and will be cut-off when the button is released. As a variation in this procedure, a timer can be interposed in the circuit, thereby delaying the power cut-off by a predetermined time. A firmer pressure on the button will engage the advancing mechanism and push the card or tape to its next readout position. By continuously actuating the button the player can complete a set of positions for a game or a teaching sequence. It is readily apparent that the present invention can be applied to many different types of games by merely changing the translucent plate and the number of sensing elements.

The game playing device of the present invention differs substantially from the prior art devices, such as, for example, the chess machine disclosed in U.S. Pat. No. 3,395,463 to Worden et al. Although this patent is concerned with a similar type of device wherein information is communicated to players by means of a data card, the present invention differs in operation from the U.S. patent both functionally and applicably. First of all, the device of the patent indicates with one lighting and movement of the data card, the present position of the piece to be moved and with a second lighting and movement of the data card, the position to which said piece is to be moved. In other words, two card indications and two movements of the advance button are required to indicate one chess movement. This is to be compared with the device of the present invention

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which will be limited, for comparison reasons, to the game of chess wherein with only one pressing of the advance and light button, a light indication is made on the board showing what piece is to be moved and to what position it is to be moved, thereby giving both the present and next future positions, simultaneously. The device of the Worden et al patent does not contain the electrical circuitry which would permit this type of indication. Furthermore, utilizing the device of the present invention, the squares of the board can be selectively lighted one by one or simultaneously, as many as desired, such as, for example, two for a common move in chess, three for "En Passant," four for castling, up to nine for check-mate and sixty-four in case of "Pat," "undecided" and end of game. In this connection, it should be noted that the Worden et al patent requires auxiliary lights as an independent and necessary indicator group to show the progress of the game. As a practical matter, the Worden et al patent can only be directed to the game of chess whereas the device of the present invention, because of its simplified construction can be easily adapted to many games by making a couple of minor modifications. For example, the game Go, requiring 324 squares instead of 64 squares, can be readily adapted to the device of the present invention.

A further distinction between the present invention and the chess machine of the Worden et al patent is in the manner in which the data card is fed into the device. As noted in the Worden et al patent, the data card reader 25 is disposed on the top and adjacent one end of the housing whereas the data card of the present invention is actually inserted into the housing. Also, the advancing mechanism utilized in the Worden et al. patent does not register each position clearly and, thus, each sequential movement must be adjusted visually using the visual hairline 41. Then, after the card has been advanced one position through said visual adjustment, a button or switch must then be pressed to actuate the lighting system. In contradistinction thereto, according to the device of the present invention, when the button 11 or 12 is pushed, not only is the data card automatically moved one position, without any visual check being required, but also, the depression of said button automatically lights the appropriate positions on the board.

As noted in column 3, lines 29-36, of the Worden et al. patent, their data card, which is adapted to contain 960 bits of information per card is divided into ten working areas, thereby providing an indication for only ten moves or positions on the board per card. The reason for this is that the electrical contacts require a large amount of space. In the device of the present invention, the data card provides for over 30 indications or moves due to a much more simplified indicator system as shown in FIG. 6. Thus, in the case of chess, in most normal games, only one data card would be necessary to complete a game. Also, in using the game playing device of the present invention, embossed cards can be used in place of perforated cards.

The Worden et al device is also designed for 110 volt A.C. operation with a transformer and a rectifier, plus electronic circuits and protective devices to avoid electrical interferences. As noted in column 4, lines 5-8, undesirable current flow can occur and, accordingly, to avoid such a problem and to protect the circuit, a number of diodes must be utilized. In spite of this precaution, when the contacts are closed in the extreme portions of the circuit, said contacts close several circuits

rather than lighting the squares individually. The game playing device of the present invention, in comparison with the Worden et al patent, is designed for a very low voltage, that is, a battery providing 1.6 to 6 volts, and also low amperage. Thus, the device of the present invention has eliminated all electronic devices and costly materials leaving merely a versatile game playing device which can be operated by simple mechanism manipulations and simple electrical elements.

In reading the Worden et al patent, it will be noted that it is primarily directed to the use of photoelectric cells in transferring the information from the data card to the chess board. Thus, 22 photoelectric cells 53 are positioned beneath the 22 information bits in the data card and twenty-two lights 55 are positioned above the twenty-two information bits in the data card at each readout. If the card has been punched in one of its bits, light will shine through the bit to energize the photoelectric cell therebeneath which, in turn, makes the appropriate indication on the chess board. The use of a photoelectric system of the Worden et al. patent is conceptually different from the system utilized in the game playing device of the present invention as best shown in FIG. 6 wherein the information punched into a data card is conveyed to the chess board by sensing means 16 which merely complete an electrical circuit in those areas of the data card which have been punched out. The Worden et al. patent also shows in FIG. 5 that its photoelectric system can be replaced by mechanical switches. As noted in FIG. 6, 22 terminals 115 are positioned over twenty-two information bits on the card and 22 spring loaded contact pins 117 are positioned below the 22 information bits. When any of the bits are punched out, pin 117 makes contact with the terminal 115 to energize a particular light. Also, as shown in FIG. 7, 22 spring contacts 119 could be positioned at one side of the data card and the switches could be closed upon the spring contact pin extending through a punched hole in the card and engaging a terminal 121. It is believed that the present application represents a significant patentable improvement over the Worden et al patent and any other known devices known to be presently available in the prior art.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications are intended to be included within the scope of the following claims.

We claim:

1. A game playing device comprising a housing having a top game playing surface, said game playing surface defining a plurality of game positions, an illuminating element disposed below each of said game positions, connector plate means disposed in said housing, a plurality of sensing means disposed above said connector plate means, means for progressively introducing a sheet containing punched information bit locations into said housing between said connector plate means and said plurality of sensing means, each of said

sensing means being adapted to contact said connector plate means through said bit locations, and electrical circuit means providing electrical connection between said connector plate means and said illuminating means, so that when the sensing means contact said connector plate means through the bit locations in the information sheet one or more illuminating elements is actuated.

2. The device of claim 1, wherein the connector plate means extends across the housing substantially perpendicular to the path of the information sheet and provides a common electrical contact for all of the sensing means and a spring means is associated with said connector plate means for insuring contact between said connector plate means and the sensing means.

3. The device of claim 1, wherein the number of sensing means corresponds to the number of illuminating elements.

4. The device of claim 1, wherein the information sheets are provided with engaging slots and the advancing means is adapted to engage said slots for conveying said information sheet.

5. The device of claim 4, wherein the advancing means comprises gear-type elements and gear-type wheels mounted on a common axle, push rods which are adapted to engage the gear-type wheels and control buttons which extend from the top surface of the housing and are attached to said push rods, whereby the pushing of said control buttons actuates the push rods which engage the gear-type wheels which in turn causes the gear-type elements to move the information sheet by engagement with the slots disposed therein.

6. The device of claim 5, wherein the push rods are spring loaded so that they return to their original position after the control buttons attached thereto are released.

7. The device of claim 6, wherein a microswitch is provided in the electrical circuit and positioned in close association with the control buttons so that when the control buttons for advancing or reversing the information sheet are depressed, closing of the electrical circuit and illumination of the appropriate areas as dictated by the contact between the connector plate means and the sensing means are achieved.

8. The device of claim 4, wherein the engaging slots are laterally disposed on both sides of the information sheet.

9. The device of claim 8, wherein the information sheet is a data card or a data tape.

10. The device of claim 9, wherein the information sheet is a data card containing at least twelve sets of columns with sixty-four bits of information produced in each column.

11. The device of claim 1, wherein the top surface is translucent and lattice means are provided for separating the illuminating elements from each other.

12. The device of claim 11, wherein the illuminating means is a calcium cyanide crystal or a light bulb.

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