Sept. 20, 1971 D. MORRIS 3,606,331

COMPUTER-CONTROLLED APPARATUS FOR PLAYING GAME OF NIM

Filed Feb. 13, 1969 3 Sheets-Sheet 1

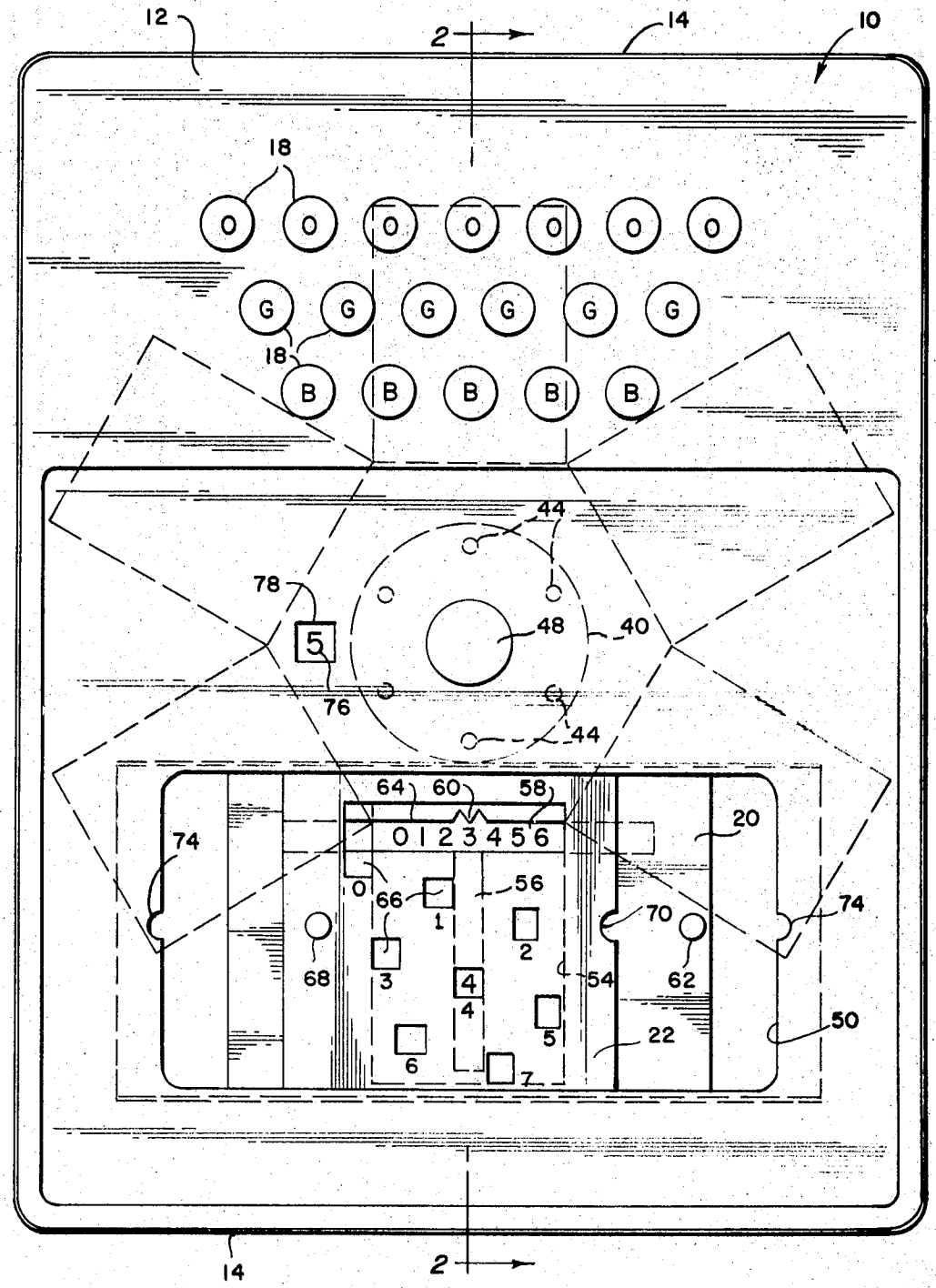



FIG. 1

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COMPUTER-CONTROLLED APPARATUS FOR PLAYING GAME OF NIM

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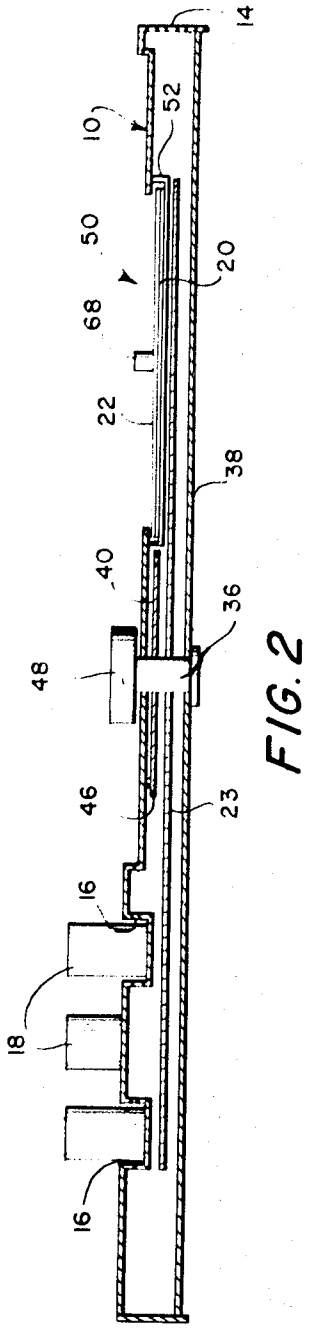



FIG. 2

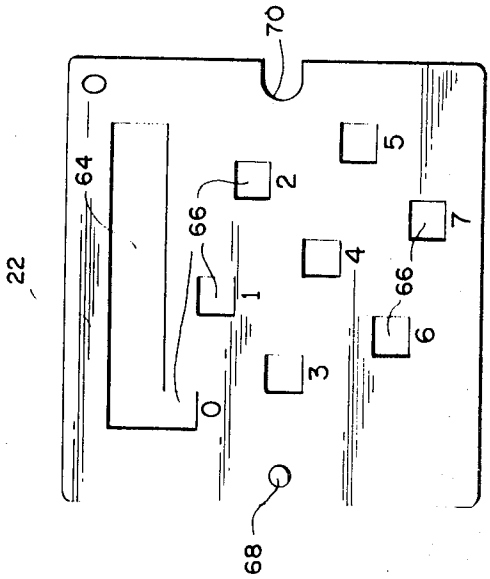



FIG. 4

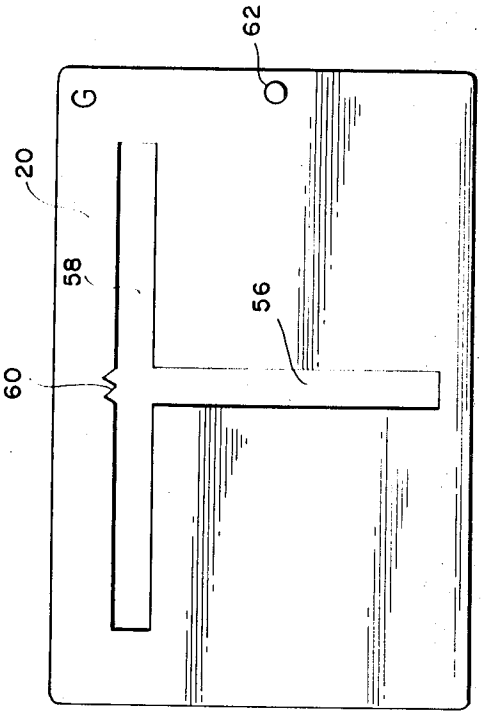



FIG. 3

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COMPUTER-CONTROLLED APPARATUS FOR PLAYING GAME OF NIM

Filed Feb. 13, 1969 3 Sheets-Sheet 3

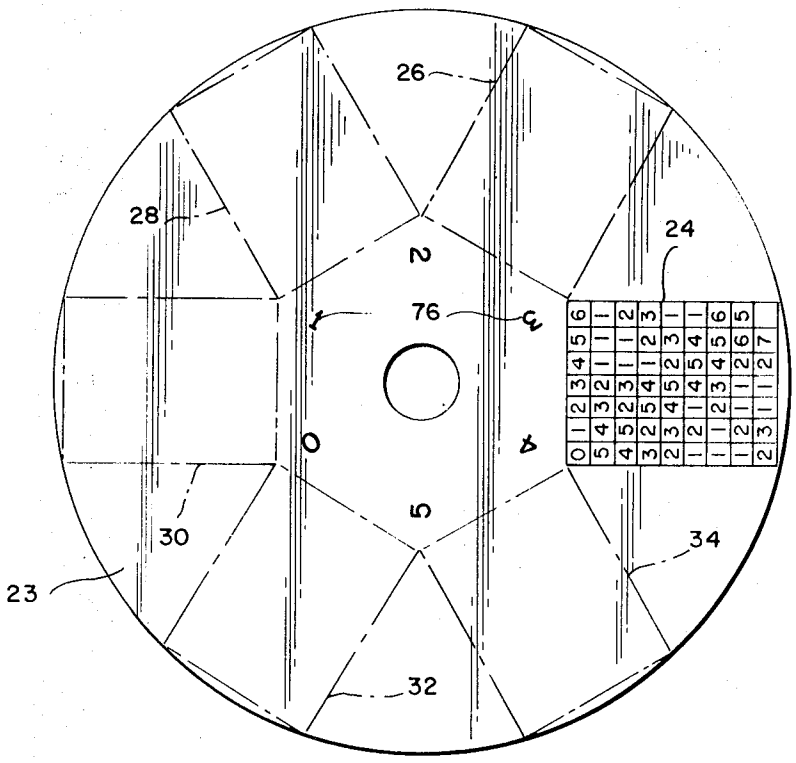



FIG. 5

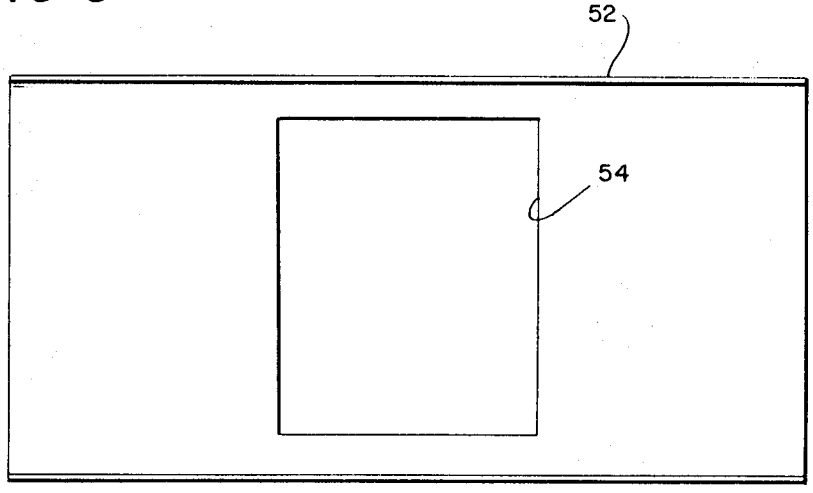



FIG. 6

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3,606,331

# COMPUTER-CONTROLLED APPARATUS FOR PLAYING GAME OF NIM

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Int. Cl. A63f 3/00
U.S. Cl. 273—130R 13 Claims

## ABSTRACT OF THE DISCLOSURE

Apparatus for playing the game of NIM in which three rows of playing pieces are received by a base panel which also supports a computer comprising a rotatable disc and a pair of sliders mounted beneath the base panel The upper surface of the disc has a plurality of sets of indicia, each of which may be aligned with a window in the base panel, and the sliders are superimposed upon the disc beneath the window and have apertures which may be aligned to display a move determined by the computer. Color coding of the playing pieces, the disc, the sliders, and the indicia greatly facilitate the playing of the game.

## BACKGROUND OF THE INVENTION

This invention relates to educational game apparatus and is more particularly concerned with computer-controlled apparatus for playing the game of NIM.

Game apparatus employing simple computers in the playing of games such as NIM or TIC-TAC-TOE have been known for some time. Such apparatus is shown, for example, in Patent No. 2,802,668 to Greif and Patent No. 3,048,403 to Du Bosque. The present invention is directed to improved game apparatus of this general type.

## BRIEF DESCRIPTION OF THE INVENTION

It is a principal object of the present invention to provide improved educational game apparatus which permits the learning of strategy techniques, logic methods, and mathematical systems.

More specifically, it is an object of the present invention to provide an improved NIM-type game in which groups of colored playing pieces removably received upon a base panel are readily coordinated with correspondingly colored elements of a computer, so that the move to be made on behalf of the computer is easily ascertained.

Briefly stated, a preferred embodiment of the present invention comprises a base panel which supports three groups of playing pieces and computer components including a rotatable disc having sets of indicia displayed upon a surface thereof and a pair of sliders superimposed upon the disc beneath a window in the base panel for determining the moves directed by the computer.

## BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be further described in conjunction with the accompanying drawings, which illustrate a preferred and exemplary embodiment, and wherein:

FIG. 1 is a plan view of the game apparatus of the invention;

FIG 2 is a vertical sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a plan view of a first slider employed in the invention;

FIG. 4 is a plan view of a second slider;

FIG. 5 is a plan view of an indicia disc employed in the invention; and

FIG. 6 is a plan view of a support for the sliders of FIGS. 3 and 4.



## DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings, and initially to FIGS. 1 and 2, reference numeral **10** designates a base panel, which may be formed of molded plastic, for example, having a generally rectangular upper surface **12**, constituting a game board, and depending side walls **14** which support the base panel upon a table, for example. The base panel is provided with a plurality of depressions or wells **16** (FIG. 2) for removably receiving corresponding playing pieces **18**. In the form shown the playing pieces are pegs arranged in three groups or rows, each group having an identifying characteristic, preferably an identifying color. Thus, the playing pieces of a first group shown in FIG. 1, designated by the letter O, may be orange, the playing pieces of a second group, designated by the letter G, may be green, and the playing pieces of a third group, designated by the letter B, may be blue. In the course of the game the playing pieces will be removed from the base panel in a series of moves alternately directed by a player and a computer which forms a part of the invention. Of course the player will move on behalf of the computer as instructed by the computer.

The computer comprises a pair of sliders **20** and **22**, in the form of the rectangular panels shown in FIGS. 3 and 4, respectively, and a memory disc **23** shown in FIG. 5. The upper surface of the disc is provided with sets of indicia **24–34**. The sets of indicia are centered upon different radii of the disc, and the indicia of each set are arranged in substantially orthogonal columns and rows which define a rectangle. The disc **23** is supported for rotation beneath the base panel **10** in any suitable manner. In the form shown the disc is fixed to a shaft **36** which extends through a corresponding opening in the base panel and through an aligned opening in a bottom plate **38**. Shaft **36** has a smaller disc **40** secured thereto and provided with a plurality of openings **44** (see FIG. 1) for receiving one or more detents **46** protruding from the bottom of the base panel as shown in FIG. 2. Disc **40** may have sufficient inherent resiliency to permit the detent **46** to snap into and out of the openings **44**. This permits the disc **23** to be positively positioned, by turning a knob **48** fixed to shaft **36** above the base panel, so that any one of the sets of indicia **24–34** may be positively located at a reference position beneath a window **50** in the base panel.

Sliders **20** and **22** are superimposed over the disc beneath the window **50**, slider **20** resting upon a rectangular U-shaped tray **52** suspended from the base panel beneath the window **50** and slider **22** resting upon slider **20**. Tray **52** (FIG. 6) is located above the disc **23** and has a rectangular aperture **54** through which one set of indicia of the disc may be exposed when the set is aligned with window **50** of the base panel. The longitudinal margins of windows **50** overlap the corresponding margins of the sliders, which fit within tray **52**.

Slider **20** has an elongated aperture **56** which may be aligned with any column of the set of indicia beneath the window **50** to expose the indicia of that column. Aperture **56** is also preferably extended transversely in opposite directions at one end thereof, as shown at **58**, so that the entire top row of indicia of any set may be exposed through the aperture **58** regardless of the lateral position of the slider **20** upon the tray **52**. A pointer projection **60** is provided at the top of aperture **56** for designating one of the indicia of the said top row. Slider **20** has an upstanding knob **62** at one end thereof which projects through the window **50** to permit the slider to be moved manually by the player.

Slider **22** (FIG. 4) has an elongated aperture **64** through which the indicia of the said top row are exposed and a plurality of individual apertures **66**, one of

which merges with aperture **64**. Each of the individual apertures is provided with an identifying reference number, from **0** to **7** in the form shown. Slider **22** is also provided with an upstanding knob **68**, which may be located at the end of the slider opposite to the end of slider **20** upon which knob **62** is located. A notch **70** in slider **22** is provided for receiving the knob **62** and ensuring sufficient travel of underlying slider **20**. Notches **74** may similarly be provided at the ends of window **50** in the base panel, as shown in FIG. 1, for receiving knobs **62** and **68** at the limits of the slider travel.

Slider **20** is employed in association with the row of green pegs and preferably is colored green, as indicated by letter G at the upper right-hand corner of the slider. Similarly, slider **22** is used in association with the row of orange pegs and is colored orange, as designated by the letter O at the upper right-hand corner of the slider in FIG. 4. Disc **23** is used in asociation with the row of blue pegs and is provided with a series of preferably blue reference numerals **76** upon the upper surface thereof spaced circumferentially and positioned and oriented for proper viewing through an aperture **78** in the base panel (FIG. 1).

When one of the reference numerals **76** is exposed through aperture **78** an associated set of indicia on disc **23** will be positioned beneath the window **50** of the base plate for exposure through the window **54** of the tray **52** which overlies the disc. In FIG. 5 the set **24** of indicia is associated with reference numeral **5** of the disc and will be positioned for exposure when reference numeral **5** appears in aperture **78** as shown. The correspondence of the other reference numerals **76** with their sets of indicia is apparent from the disc in FIG. 5. The knob **48** is preferably also colored blue to indicate the association of the disc with the blue pegs.

Although only one set of indicia is fully shown in FIG. 5, the other sets being indicated by phantom lines in order to simplify the drawing, it will be understood that the disc actually displays a full set of indicia at each of the indicated positions. In the form shown there are six sets of indicia. The corresponding reference numbers **0** through **5** represent, respectively, the number of blue game pieces remaining in play at the moment that a computation is to be made. Thus, if five blue pieces remain on the base panel, the disc will be turned until reference numeral **5** appears in aperture **78**. If four blue pieces remain, one having been removed, the disc will be turned until reference numeral **4** appears in the aperture **78**, etc. It should be noted that the reference numbers associated with apertures **66** of the orange slider **22** similarly correspond to the number of orange pieces remaining in play when a computation is to be made. The following tables give the full sets of indicia which appear on disc **23**:

| Set 24 | Set 26 | Set 28 |
|---|---|---|
| 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| 5 4 3 2 1 1 1 | 4 3 2 1 1 1 2 | 3 2 1 1 1 2 3 |
| 4 5 2 3 1 1 2 | 3 4 1 2 1 2 1 | 2 3 1 1 2 3 4 |
| 3 2 5 4 1 2 3 | 2 1 4 3 2 1 1 | 1 1 3 2 3 4 5 |
| 2 3 4 5 2 3 1 | 1 2 3 4 3 2 1 | 1 1 2 3 4 5 6 |
| 1 2 1 4 5 4 1 | 1 1 2 3 4 5 6 | 1 2 3 4 3 2 1 |
| 1 1 2 3 4 5 6 | 1 1 1 2 5 4 1 | 2 3 4 5 2 3 1 |
| 1 2 1 1 1 6 5 | 2 1 1 1 6 5 4 | 3 4 5 6 1 1 3 |
| 2 3 1 1 2 7 | 3 2 1 1 7 6 3 | 4 5 6 7 1 1 2 |

| Set 30 | Set 32 | Set 34 |
|---|---|---|
| 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| 2 1 1 1 2 3 4 | 1 1 1 2 3 4 5 | 1 2 3 4 5 6 |
| 1 2 1 1 1 2 3 | 1 1 2 3 4 5 6 | 1 1 1 2 3 4 5 |
| 1 1 2 3 4 5 6 | 1 2 1 1 1 2 3 | 2 1 1 1 2 3 4 |
| 1 1 3 2 3 4 5 | 2 3 1 1 2 3 4 | 3 2 1 1 1 2 3 |
| 2 1 4 3 2 1 1 | 3 4 1 2 1 2 1 | 4 3 2 1 1 1 2 |
| 3 2 5 4 1 2 1 | 4 5 2 3 1 1 2 | 5 4 3 2 1 1 1 |
| 4 3 6 5 3 2 2 | 5 6 3 4 1 2 1 | 6 5 4 3 2 1 1 |
| 5 4 7 6 1 3 3 | 6 7 4 5 2 3 2 | 7 6 5 4 3 2 1 |

In the preferred form of the invention the numerals which make up the sets of indicia are printed in the appropriate colors: Green, blue, and orange, or have backgrounds in such colors. Although the colors are not shown in the drawing they will be apparent from the following tables in which the numbers of each set of indicia are replaced by the appropriate letters G, B, and O, which designate that the corresponding numbers given in the tables above are printed in green, blue or orange ink:

| Set 24 | Set 26 | Set 28 |
|---|---|---|
| G G G G G G G | G G G G G G G | G G G G G G G |
| B B B B B G G | B B B B B G G | B B B B G G G |
| B B B B G O G | B B B B O G G | B B B O G G G |
| B B B B O O G | B B B B O O B | B B B O G G G |
| B B B B O O O | B B B B O O O | O G G O G G G |
| B B G B B O O | O G G G O G G | O O O O B B B |
| B O G G G O G | O B G G O B B | O O O O B B B |
| O O G G G O B | O O O G O O B | O O O O B G B |
| O O O O B O | O O O O O O B | O O O O O O O |

| Set 30 | Set 32 | Set 34 |
|---|---|---|
| G G G G G G G | G G G G G G G | G G G G G G G |
| B B B G G G G | B B G G G G G | G G G G G G G |
| B B O G G G G | B B G G G G G | O O G G G G G |
| O G O G G G G | O O B G G G G | O O O G G G G |
| O O O B G G G | O O O B G G G | O O O O G G G |
| O O O O B B G | O O O O B G G | O O O O O G G |
| O O O O B B O | O O O O G B G | O O O O O O G |
| O O O O O O O | O O O O O O B | O O O O O O O |
| O O O O O O O | O O O O O O O | O O O O O O O |

In the playing of the game, all of the game pieces are placed in their corresponding positions as shown in FIG. 1. The player then makes a move, which comprises removing any number of pegs which he wishes from any one row, but only from one row. He may remove an entire row if he wishes. To determine the computer's move, the knob **48** is turned until a blue numeral appears in aperture **78** corresponding to the number of blue pegs remaining on the board. For example, if there are five blue pegs remaining, the knob **48** is turned until the number **5** appears at aperture **78**. Then the green slider **20** is moved to the left or right in FIG. 1 until the projection **60** points to the number of green pegs remaining on the board. This will align aperture **56** of the green slider with a column of indicia of the set which corresponds to the reference number appearing in aperture **78**. Finally, the orange slider **22** is moved to the left or right until an aperture **66** thereof whose identifying number corresponds to the number of orange pegs remaining on the board is aligned with the underlying aperture **56** of slider **20** to permit the reading of a particular indicium from the set of indicia of the disc (the apertures **66** being aligned with different rows of indicia of the set). The number and color which then appear in the appropriate aperture **66** designate the number and color of pegs to be removed from the board on behalf of the computer. The player then makes another move in the same manner and thereafter sets the disc and sliders to determine the next move of the computer. In accordance with the rules of the game the object may be to force an opponent to remove the last peg from the board. Thus, if the player makes a move which leaves one peg on the board after the player has moved, the computer loses the game, and vice versa. Other games may also be played with the apparatus of the invention by following other rules. Different memory discs may be provided, having different sets of indicia, so as to vary the moves determined by the computer.

The apparatus of the invention is especially useful in teaching strategy techniques, logic methods, and mathematical systems. Because of the ready correlation of the game pieces with the computer components and the indicia, by virtue of the color coding, the game is easily played, even by a novice. The apparatus of the invention is simple to operate, is economical to manufacture, and is easily adaptable to different game strategies.

While a preferred embodiment of the invention has been shown and described, it will be apparent to those skilled in the art that changes may be made in this embodiment without departing from the principles and spirit of the invention, the scope of which is defined in the appended claims.

The invention claimed is:

1. Game apparatus comprising a panel having associated therewith a plurality of separate, visually distinguishable groups of game pieces, means having a surface movable relative to said panel and having a plurality of sets of indicia thereon, the sets corresponding, respectively, to the number of pieces of one of said groups remaining in play and there being one more set than the number of pieces in that group, the indicia of each set being arranged in substantially orthogonal columns and rows, said panel having a reference position at which each of said sets of indicia may be located in accordance with the number of pieces of said one group remaining in play, slider means located at said position and movable relative to said surface along the rows of indicia at said reference position for selecting a column of indicia at the reference position in accordance with the number of pieces of a second group remaining in play, there being one more column in each set than the number of pieces in said second group, and indicator means for selecting an indicium from the selected column in accordance with the number of pieces of a third group remaining in play, said indicator means having a number of indicium-selecting elements which is one more than the number of pieces in said third group.

2. The apparatus of claim 1, wherein said surface is upon a disc rotatable relative to said panel and wherein the sets of indicia are centered upon different radii of the disc.

3. The apparatus of claim 2, wherein the sets of indicia define rectangles.

4. The apparatus of claim 2, wherein the disc rotates beneath said panel and said panel is provided with a window at the reference position for exposing a set of indicia thereat.

5. The apparatus of claim 4, wherein the slider means overlies the disc beneath the window and has an elongated aperture positioned to expose a column of indicia from the set positioned at the window and is movable along the rows of indicia at the window.



6. The apparatus of claim 5, wherein the indicator means comprises further slider means which overlies the first-mentioned slider means beneath the window and is movable along the rows of indicia at the window, the further slider means having a plurality of apertures overlying individual indicia of corresponding rows of indicia and each of which may be aligned with the aperture of the first-mentioned slider means

7. The apparatus of claim 6, each of the apertures of the further slider means having associated therewith an indicium designating the number of pieces of said third group remaining in play, said further slider means having an elongated aperture overlying another row of indicia at the window.

8. The apparatus of claim 7, each of said sets of indicia having associated therewith a reference number designating the number of pieces of the first group remaining in play, said panel having an aperture for exposing the reference number associated with the set of indicia at the window.

9. The apparatus of claim 8, wherein the playing pieces of each group have a distinguishing visual characteristic and each of the slider means has a visual characteristic corresponding to that of an associated group of playing pieces.

10. The apparatus of claim 9, wherein the indicia of said sets have different visual characteristics corresponding to the visual characteristics of said groups.

11. The apparatus of claim 10, wherein the reference numbers of said disc have a visual characteristic corresponding to that of the associated group of playing pieces.

12. The apparatus of claim 11, said panel having a plurality of receivers for said playing pieces arranged in groups.

13. The apparatus of claim 12, said disc having a knob projecting above said panel for turning the disc and having means for holding the disc in position with one of the sets of indicia located at the window.

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| | | | |
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| 3,048,403 | 8/1962 | Du Bosque | 273—130 |

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