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(71) Applicant: **Pan, John C.**
Taya Hsiang, Taichung Hsien (TW)

(72) Inventor: **Pan, John C.**
Taya Hsiang, Taichung Hsien (TW)

(74) Representative:
Ferguson, Alexander
Octrooibureau Vriesendorp & Gaade,
P.O. Box 266
2501 AW Den Haag (NL)

(54) A dart target with a cursor displacement step counting display.

(57) A dart target with a cursor displacement step-counting display device includes a target (10) divided into several sectors each represents a corresponding score designated by a number for movement steps of a cursor, a key region (15) adapted to the target (10) for setting players and playing modes, a plurality of lights for illustrating game modes and players, a main controller (30) for outputting signals related to the cursor movement step and to record the cursor position, and a cursor displacement step-counting display comprising a plurality of lights for cooperating with the main controller (30) in order to move a cursor during the plurality of lights and to record the cursor position as a start point for a subsequent movement.

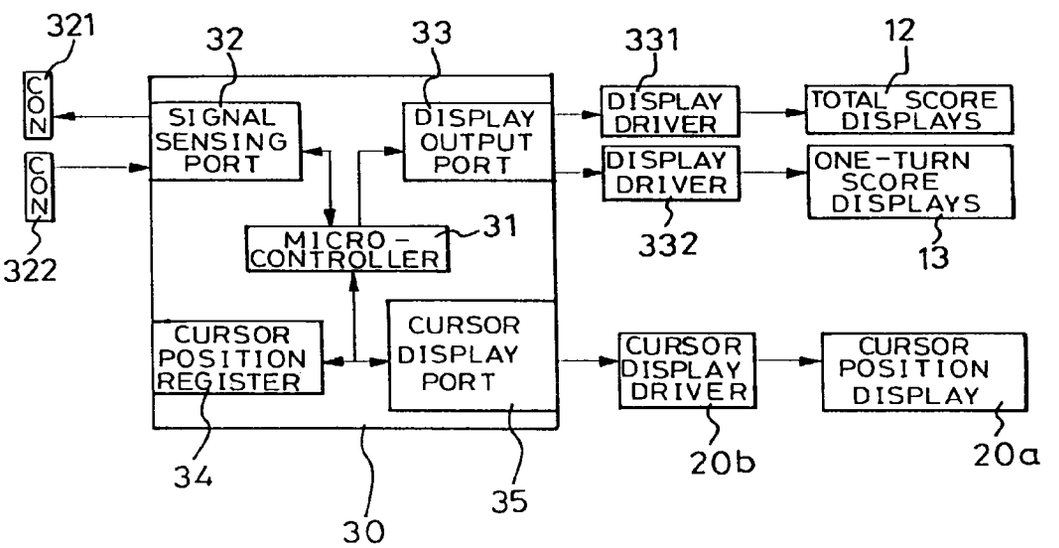

FIG. 1B

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Description

[0001] The present invention relates to a dart target, and more particularly to a dart target with a cursor displacement step-counting display for the game of "cricket" or any competition game.

[0002] A conventional display device used with a dart target for the game of "cricket" typically has a structure as shown in FIG. 1A. The dart target has a target 10 divided into several sectors and a control panel (not numbered) disposed below the target 10. The control panel includes a key region 15, two total score display areas 12 each of which comprises a three-byte aggregate score for illustrating the total score of a corresponding user, two one-turn score display areas 13 each of which comprises a two-byte aggregate score for illustrating the score of this turn, two pilot lamps 14 for identifying players, and two qualification display groups 20. Each qualification display group 20 comprises twenty one light-emitting diodes in an array of 7 by 3 (7x3) pattern. In this "cricket" game, only the scores of 20, 19, 18, 17, 16, 15, and "BULL" are counted, others are not counted. Moreover, every player has to hit the same score three times before the score is counted effective, therefore the two qualification display groups 20 illustrate the qualification of each score (including scores 20, 19, 18, 17, 16, 15, and "BULL") of the two players. However, the same score becomes ineffective if every one of the players has hit the corresponding region of the score at least three times. Therefore, whoever has hit the same score three times will get an effective score after he has hit the same region again. Meanwhile, the other player will try to hit the same region three times to make this specific region ineffective, thereby preventing his competitor from getting more scores. The light emitting diodes in each row of the qualification display groups 20 are lit up either from left to right (see the arrows of Fig. 2) or from right to left according to a designing choice.

[0003] The displaying manner of the conventional display device of a dart target is conservative lack sufficient variation to be an interesting game. Therefore, a new cursor displacement step counting display device used with a dart target for the game of "cricket" or any competition game is earnestly needed to replace the conventional display device.

[0004] A primary object of the present invention is to provide a dart target with a cursor displacement step-counting display device for dynamically showing a resultant score on the display device by moving a cursor along a plurality of light elements thus increasing the effect of a dart game.

[0005] Another object of the present invention is to provide a dart target with a cursor displacement step-counting display device, which can utilize the original display of the dart game to be a new display device cooperating with some extra hardware for achieving a cursor displacement step counting effect.

[0006] In accordance with one aspect of the present invention, there is provided a dart target with a cursor displacement step-counting display device which includes a target divided into several sectors each of which represents a corresponding score designated by a number for movement steps of a cursor, a key region disposed below the target allowing manual operation thereon to set players and playing modes, a main controller comprising a microcontroller, a cursor position register, and a cursor display port for cooperating to output signals related to a cursor movement step and to record the cursor position, and a cursor displacement step-counting display comprising a plurality of lights for cooperating with the microcontroller, the cursor position register, and the cursor display port in order to move a cursor during the plurality of lights, and to record the cursor position as a start point for next movement.

[0007] Other objects, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

In the drawings:

FIG. 1A is a schematic view showing a conventional dart target for a "cricket" game;

FIG. 1B is a circuit block diagram for a cursor displacement step counting display device in accordance with this invention;

FIG. 1C is a detailed circuit of FIG. 1B;

FIG. 2 illustrates the cursor moving pattern utilizing the original light emitting diodes in a conventional dart target for a "cricket" game;

FIGs. 3A to 3C illustrate a light up game using the cursor displacement step counting display device of the present invention;

FIG. 3D illustrates the operation flowchart of the light up game shown in FIG. 3A;

FIG. 4 illustrates a game of passing a mine area using the cursor displacement step counting display device of the present invention;

FIG. 5A illustrates a game of "hot potato" using the cursor displacement step counting display device in accordance with the invention;

FIG. 5B is a flowchart for illustrating the operation of the game of "hot potato";

FIG. 6 illustrates a game of "little genie" using the cursor displacement step counting display device in accordance with the invention;

FIGs. 7A and 7B respectively illustrate a game of "soccer"/"basketball" using the cursor displacement step counting display device in accordance with the present invention; and

FIG. 8 illustrates a chasing game using the cursor displacement step counting display device in accordance with the present invention.

[0008] Referring to FIG. 1A, two qualification display groups 20 used with a conventional dart target in a

"cricket" game are used as the display of the present invention. FIGs. 1B and 1C are respectively a circuit block diagram and a detailed circuit for the cursor displacement step-counting display device in accordance with this invention. The circuit comprises a main controller 30 which comprises a micro-controller 31, a signal sensing port 32, a display output port 33, a cursor position register 34, and a cursor display port 35. The signal sensing port 32 includes pins respectively connected to corresponding dart target regions via connectors 321 and 322 for receiving signals from different dart target regions upon being hit by darts. The display output port 33 includes pins connected to the total score displays 12, the one-turn score displays 13, and the pilot lamps 14 via display drivers 331 and 332 for providing display information on the corresponding displays 12, 13, and 14. The cursor position register 34 is used to record the present position of the cursor when the dart target is set in a cursor displacement step-counting mode. The cursor display port 35 is electrically connected to a cursor position display 20a via a cursor display driver 20b for providing a cursor position shown on the cursor position display 20a. More specifically, the cursor position display 20a may be a matrix of lights such as the qualification display groups 20 used in the conventional dart target for the "cricket" game of Fig. 1A.

[0009] Accordingly, the microcontroller 31 cooperates with the cursor position register 34, the cursor display port 35, the cursor display driver 20b, and the cursor position display 20a to provide a dart target including a cursor displacement step counting display for dynamically simulating a cursor movement according to the score hit by the user and recording the present position as the start point of movement of next shot. There are many ways of using the cursor displacement step-counting display device, therefore a few examples are illustrated hereunder.

[0010] Referring to Fig. 3A, one qualification display group 20 of Fig. 1A is used as the cursor displacement display 20a of the present invention. In this example, the cursor displacement display 20a includes twenty-one lamps (light emitting diodes, LED), where a path from a start point to an end point is indicated by phantom lines with arrows. In this game, the start point is lit up from the beginning of the game, and the cursor is indicated by a lit-up LED which is moved according to the present one-turn score. The new position of the cursor is recorded and will be treated as a new start point for the next shot. The player has to achieve the exact score to reach the end point. For example, if the player hits a score exceeding the required steps to reach the end point, the cursor will pass the end point and move back in an opposite direction to the path. If the player has reached the end point, the end point will be lit up (see Fig. 3B), and a new end point right before the original end point is defined. Next time, this player starts from the original start point and the destination of the cursor is on the new end point. The procedure is repeated until the very last new end point set at the position right after the original start point is lit up, as shown in Fig. 3C.

[0011] Fig. 3D illustrates the operation flowchart of the game shown in FIG. 3A. Supposing every player can throw three times for each turn. Originally, the microcontroller 31 checks whether the player has finished throwing in this turn (step 61). If positive, the throwing chance turns to another player (step 611), otherwise the available throwing chances of the present player are decreased by one (step 62). At step 63, the step counted for cursor displacement is set to equal the throwing score and a direction flag is set to "0" indicating that the cursor movement is in a forward direction identical to that of the path. At step 64, the step counted is decreased by one. At step 65, the direction flag is checked if it equals "1". If positive, the movement direction is reversed and the present position of the cursor is decreased by one (step 66), otherwise, the present position of the cursor is increased by one (step 67). At step 68, the step counted is checked if it equals zero. If the determination is positive, the procedure returns to step 61, otherwise it proceeds to step 69 to check if the present position of the cursor is the original start point. If the determination at step 69 is positive, the direction flag is set to "0" (step 691) and the procedure returns to step 64, otherwise the procedure directly returns to step 64 without changing the flag. At step 671, the step counted is checked if it equals zero. If the determination is positive, the procedure is forwarded to step 672 in which the present cursor position is checked whether it is the end point. If the determination is positive, the procedure is forwarded to step 673 where the score of this turn is accumulated into the total score; the present position of the cursor is changed to the original start point; and the position of the end point is moved backward by one step. After step 673, the procedure returns to step 61. If the determination at step 672 is negative, the procedure returns to step 61. If the determination at step 671 is negative, the procedure is forwarded to step 681, where the present position of the cursor is checked if it is the end point. If the determination is positive, the direction flag is set to "0" in step 682, otherwise the procedure returns to step 64.

[0012] Referring to Fig. 4, another example of the cursor displacement step counting display device is a game of passing a "mine area", where several of the LEDs in the cursor position display 20a flash to illustrate "mines." The player has to control his/her scores to "jump over" the "mines." The locations of the "mines" may be changed by random assignment from operation of the microcontroller 31. The step counting manner in the "mine" game is the same as the previous one, therefore the description is omitted herein.

[0013] Another game using the same structure is a "hot potato" game. Referring to Fig. 5A, two cursor position displays 20a are shown, each of which is used for a corresponding player. The path for cursor movement is the same as the mine game. At least one potato is set in

either side of the two cursor position displays 20a. If the player can make the cursor move to exactly the potato position, the potato is transferred to the other cursor position display 20a (i.e., the potato is moved to the competitor's passing area). If the player hits a score exceeding the position of the "hot potato", the cursor will move back from the potato position for a few steps exceeding the "hot potato" position.

[0014] Fig. 5B illustrates the operation flowchart of the "hot potato" game which is similar to the flowchart of Fig. 3D with a few exceptions. Step 681 of Fig. 3D is now changed to step 681' where a decision is made whether the present cursor position is either one of the end point or the "hot potato" position. The negative decision of step 672 of Fig. 3D is changed to step 674 in Fig. 5B. At step 674, the present cursor position is checked whether it equals the "hot potato" position. If the decision is positive, the procedure is forwarded to step 675 where the potato is transferred to the other competitor, otherwise the procedure returns to step 61.

[0015] Referring to Fig. 6, another game named ""little genie"" using the same structure of the cursor displacement step counting display device is shown. The game of "little genie" is similar to the "hot potato" game with some extra rules. When a first player, for example, the right side display has reached the "hot potato" position by seven steps, the "hot potato" will be transferred to the left side display and located at the end point. The cursor of the second player has to move seven steps thus exceeding the "hot potato" position and return in opposite direction. The LED already lit up at the position of the "hot potato" will be turned off, therefore the second player has to get appropriate score to light up the LED. Whoever lights up all the LEDs will win the game.

[0016] Another game named ""soccer"/"basketball"" using the same structure of the cursor displacement step counting display device is shown. Referring to Fig. 7A, a first "goal" (or basket) may be set at a corner and a second "goal" (or "basket") may be set at an opposite corner. Therefore, a first player will offend from the first "goal" position to the second "goal" position trying to make the cursor stay exactly at the second "goal" to win the game. Fig. 7B illustrates the same game with two displays, similar to Fig. 7A. The arrows in Figs. 7A and 7B illustrate the offending (moving) direction from the first "goal" to the second "goal," while an opposite direction provided for an offense from the second "goal" to the first "goal" is omitted herein.

[0017] FIG. 8 illustrates a chasing game using the cursor displacement step counting display device in accordance with the present invention. In the chasing game, two or more players play a chasing game according to a circular direction, for example, the arrows shown in Fig. 8. Any player will be out of the game if he/she is overtaken by another player. The winner will be the only one left in the game.

[0018] It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size, and arrangement of the parts, for example the light patterns of the cursor position display, within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

Claims

1. A dart target with a cursor displacement step-counting display device comprising:

   a target (10) divided into several sectors each of which represents a corresponding score designated by a number for movement steps of a cursor;
   a key region (15) adapted to the target (10) allowing manual operation thereon to set players and playing modes;
   a main controller (30) comprising a microcontroller (31), a cursor position register (34), and a cursor display port (35) for cooperating to output signals related to a cursor movement step and record the cursor position; and
   a cursor displacement step-counting display comprising a plurality of lights for cooperating with the microcontroller (31), the cursor position register (34), and the cursor display port (35) in order to move a cursor during the plurality of lights and to record the cursor position as a start point for a subsequent movement.

2. A dart target with a cursor displacement step-counting display device as claimed in claim 1, wherein the cursor displacement step-counting display is configured to be a continuous movement path along the plurality of lights thus allowing players to move steps according to a throwing score, and when an end point is reached a corresponding light will be lit up, the game is over when one of the players has lit all the lights.

3. A dart target with a cursor displacement step-counting display device as claimed in claim 1, wherein the cursor displacement step-counting display is assigned with at least one "mine" represented by a flashing light in the plurality of lights via a random process of the microcontroller (31), and a player is out of game if the player mistakenly "steps" on the "mine".

4. A dart target with a cursor displacement step-counting display device as claimed in claim 1, wherein the cursor displacement step-counting display is assigned with at least a "hot potato" in the

plurality of lights via a random process of the microcontroller (31), and a first player has to return in opposite direction if the first player has overtaken the "hot potato", and the "hot potato" will be passed to a second player if the first player has exactly reached the "hot potato" position.

5. A dart target with a cursor displacement step-counting display device as claimed in claim 1, wherein the cursor displacement step-counting display is assigned with at least a "hot potato" in the plurality of lights via a random process of the microcontroller (31), and if a first player has reached the "hot potato" position, the "hot potato" will be passed to a second player and cause the second player to move according to the score as achieved by the first player, and whenever the second player has passed the already lit up light, the light will be turned off automatically.

6. A dart target with a cursor displacement step-counting display device as claimed in claim 1, wherein the cursor displacement step-counting display is assigned with two "goals" in two corners of the plurality of lights thus allowing two players to offend respectively from a corresponding "goal" to an opposite "goal".

7. A dart target with a cursor displacement step-counting display device, wherein the cursor displacement step-counting display is assigned a circular path and two cursors respectively for two players are initially positioned at two positions of the plurality of lights, thus two players are chasing each other in the circular path, and a player is out of the game if caught by the other player.

8. A dart target with a cursor displacement step-counting display device as claimed in claim 7, further comprising a plurality of lights for illustrating game modes and players.

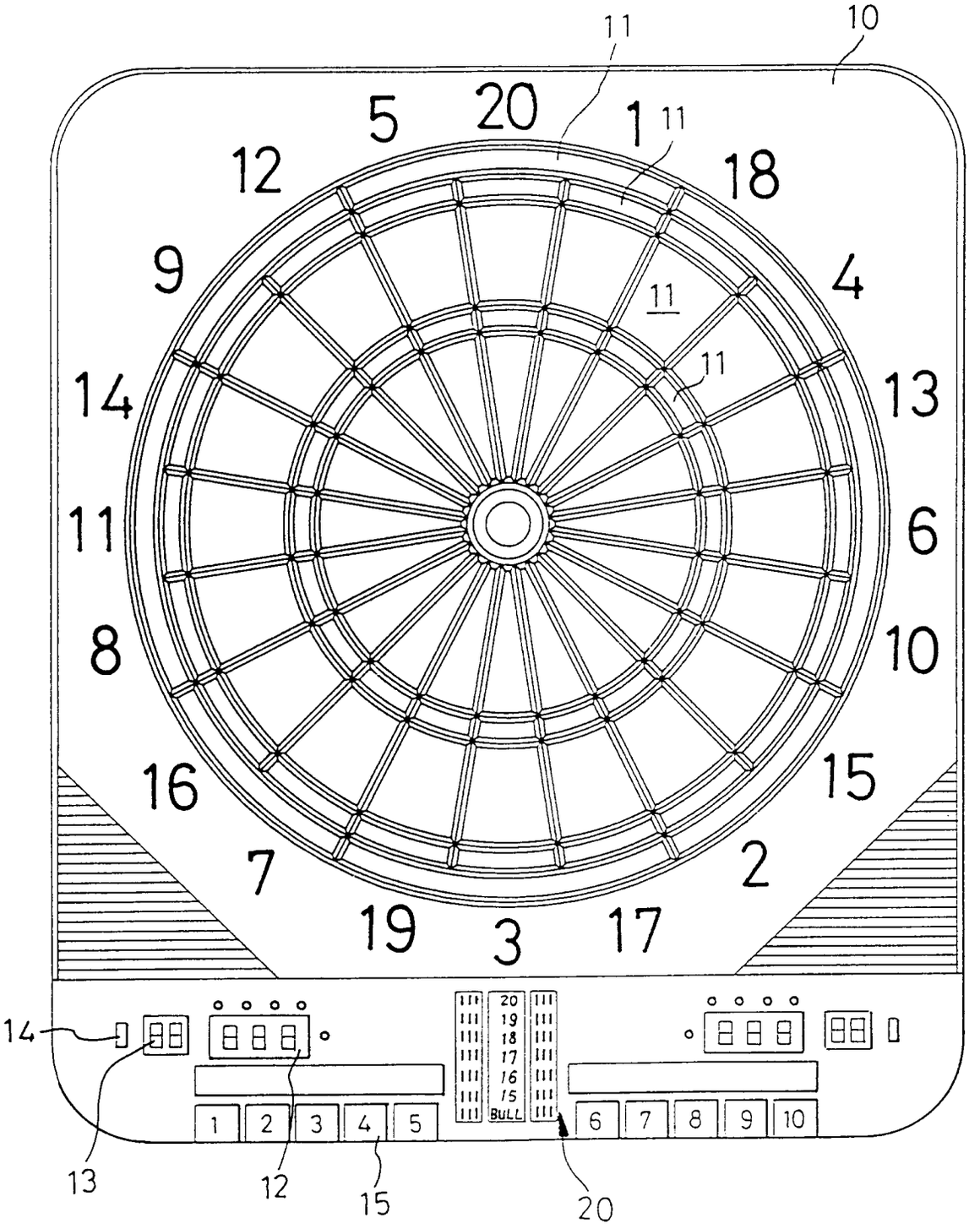
10
11
11
11
11
11
5
20
1
18
12
9
4
14
13
11
6
8
10
16
15
7
2
19
3
17
14
13
12
15
20
20
19
18
17
16
15
BULL
1
2
3
4
5
6
7
8
9
10

FIG. 1A

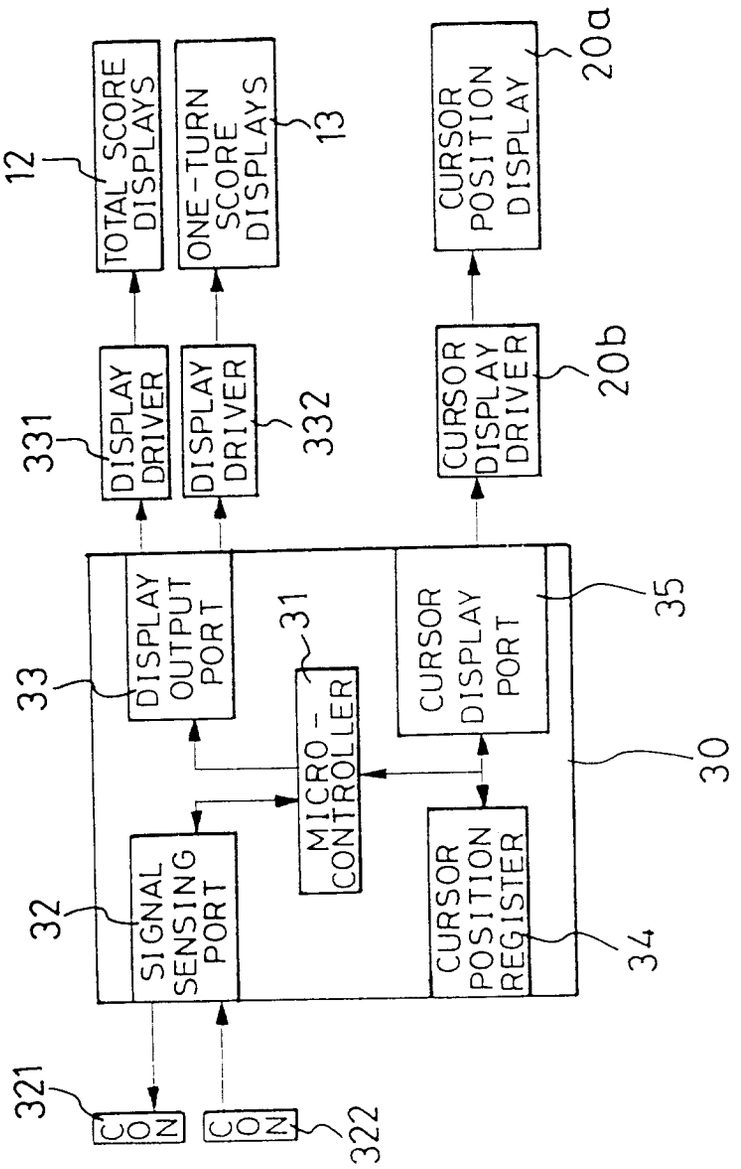
12
TOTAL SCORE DISPLAYS
13
ONE-TURN SCORE DISPLAYS
20a
CURSOR POSITION DISPLAY
331
DISPLAY DRIVER
332
DISPLAY DRIVER
20b
CURSOR DISPLAY DRIVER
33
DISPLAY OUTPUT PORT
31
MICRO-CONTROLLER
CURSOR DISPLAY PORT
35
30
32
SIGNAL SENSING PORT
CURSOR POSITION REGISTER
34
321
CON
CON
322

FIG. 1B

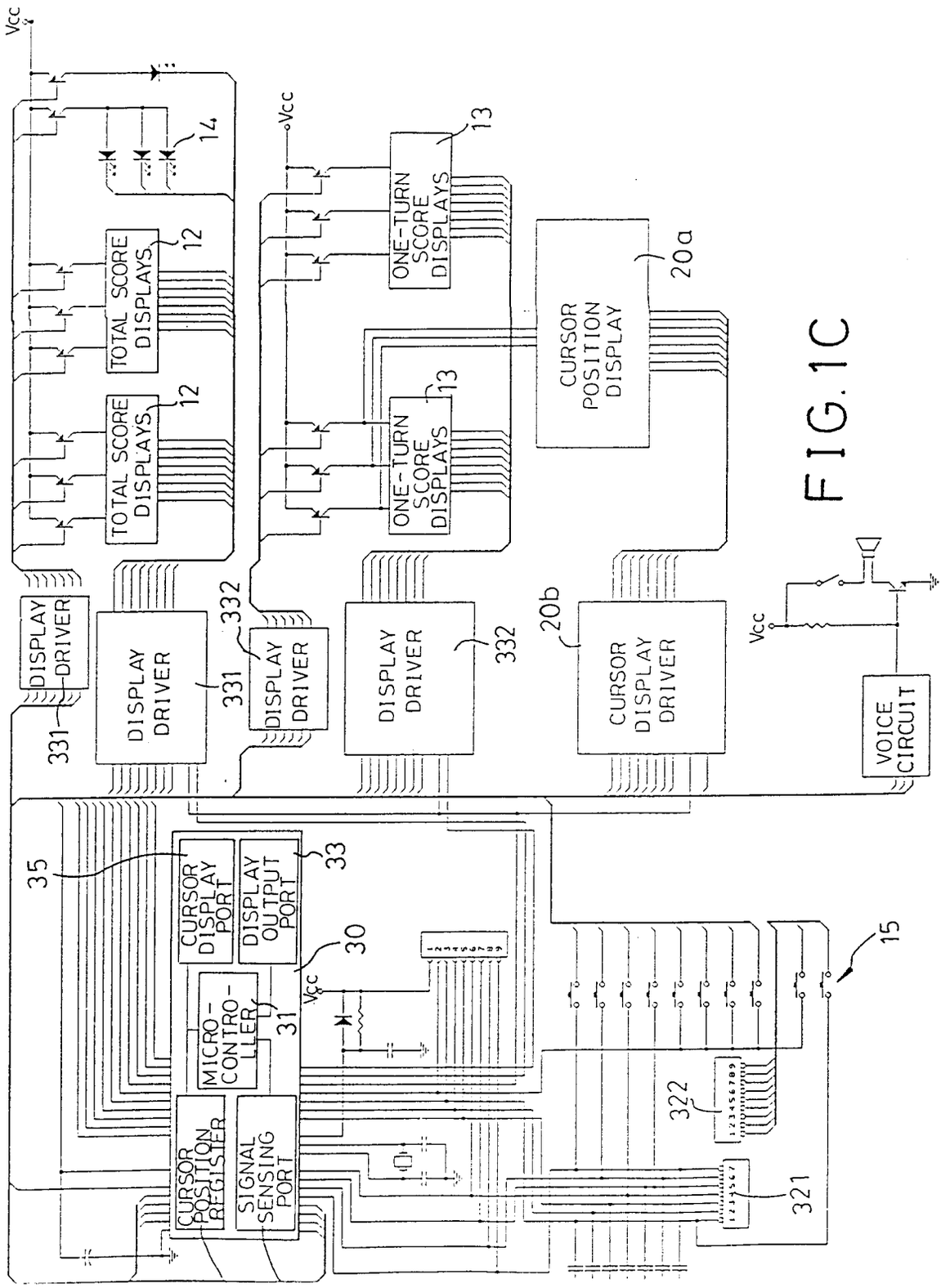
Vcc
14
TOTAL SCORE DISPLAYS
12
ONE-TURN SCORE DISPLAYS
13
CURSOR POSITION DISPLAY
20a
20b
DISPLAY DRIVER
331
332
CURSOR DISPLAY DRIVER
VOICE CIRCUIT
35
CURSOR DISPLAY PORT
DISPLAY OUTPUT PORT
33
30
MICRO-CONTRO-LLER
31
CURSOR POSITION REGISTER
SIGNAL SENSING PORT
322
321
15

FIG.1C

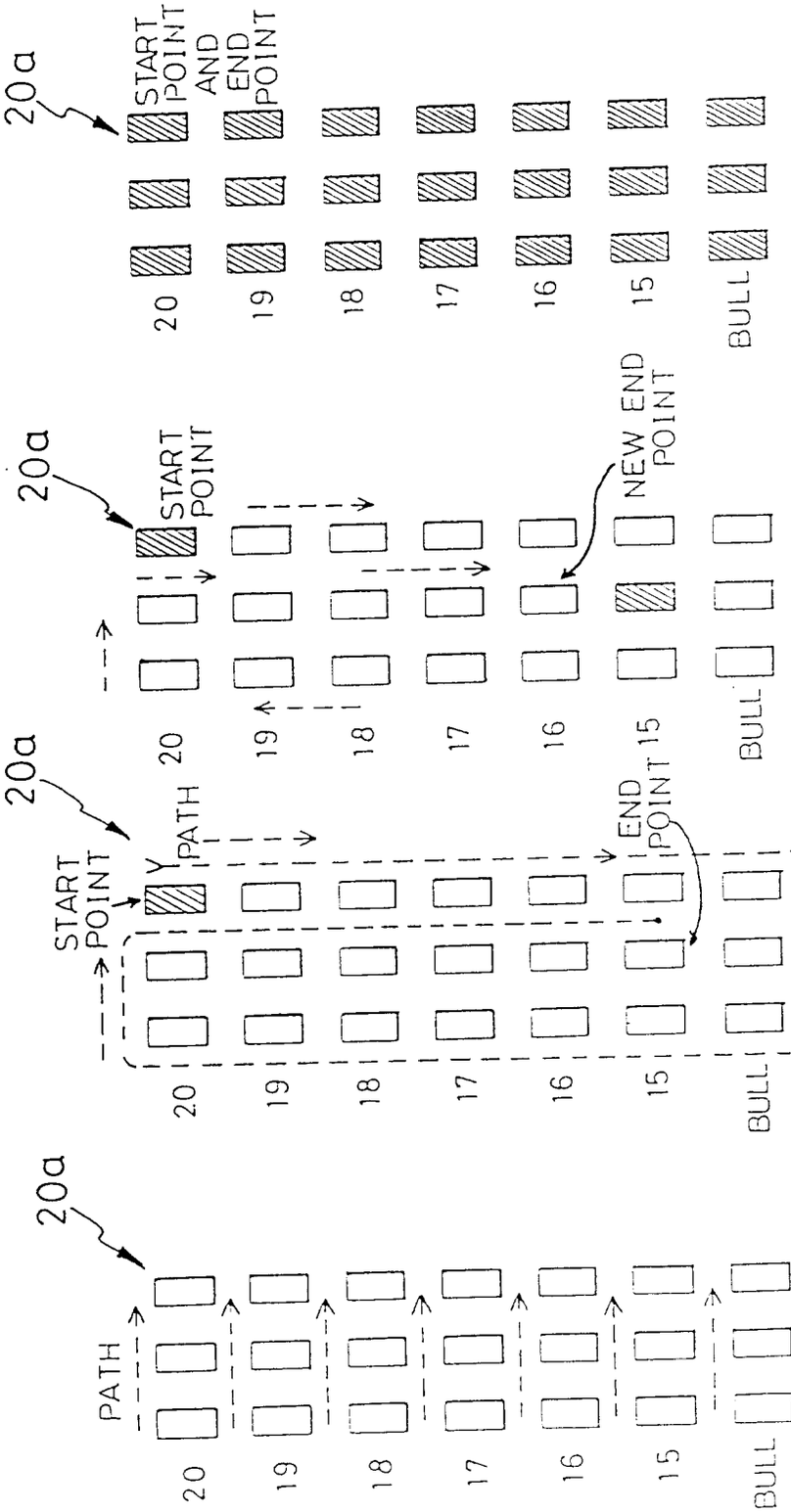

FIG. 2 FIG. 3A FIG. 3B FIG. 3C

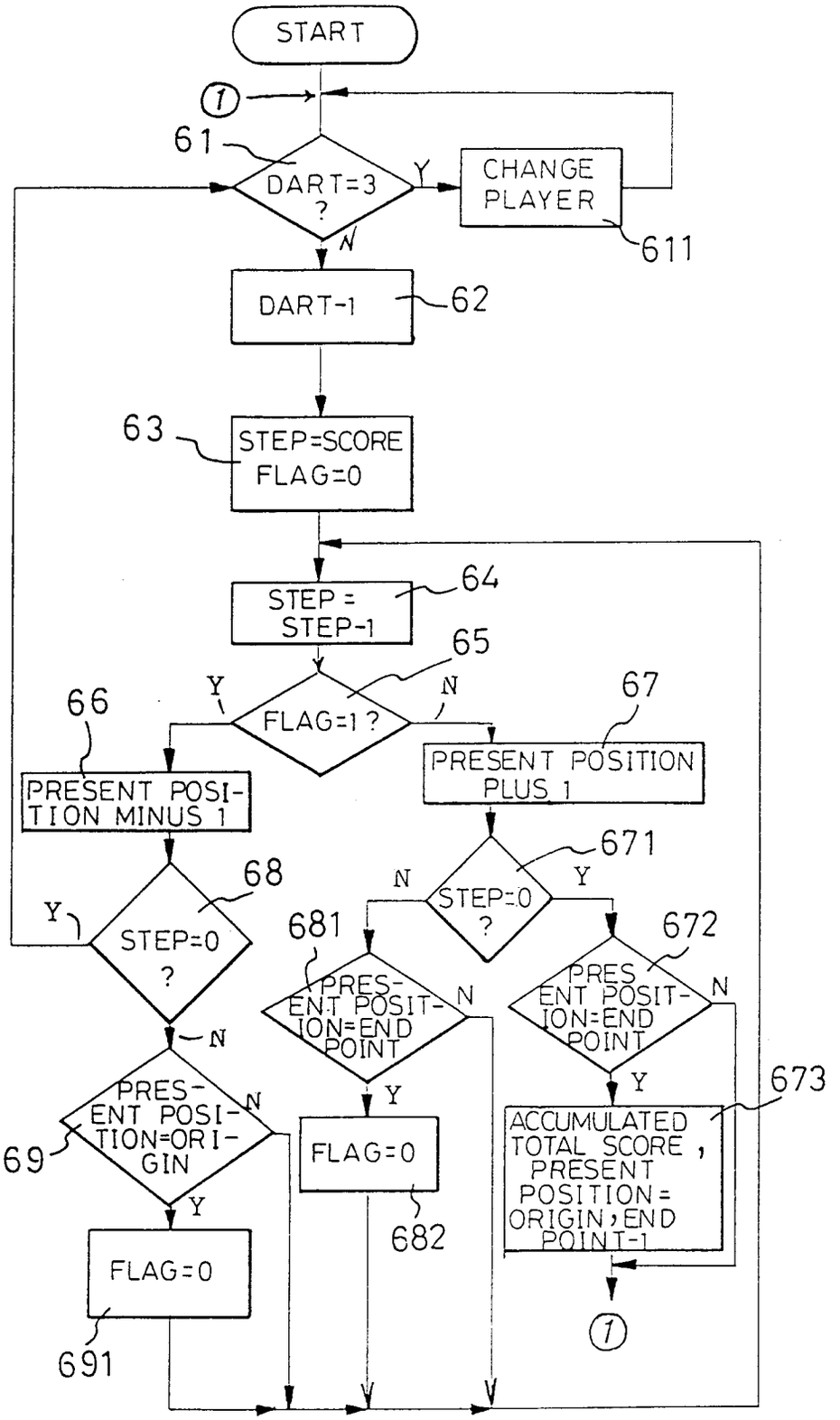
START
1
61
DART=3 ?
Y
N
CHANGE PLAYER
611
DART-1
62
63
STEP=SCORE
FLAG=0
64
STEP = STEP-1
65
FLAG=1 ?
Y
N
66
67
PRESENT POSI-TION MINUS 1
PRESENT POSITION PLUS 1
671
68
STEP=0 ?
STEP=0 ?
681
672
PRES-ENT POSIT-ION=END POINT
PRES-ENT POSIT-ION=END POINT
673
ACCUMULATED TOTAL SCORE, PRESENT POSITION= ORIGIN; END POINT-1
PRES-ENT POSI-TION=ORI-GIN
69
FLAG=0
682
FLAG=0
691
1

FIG. 3D

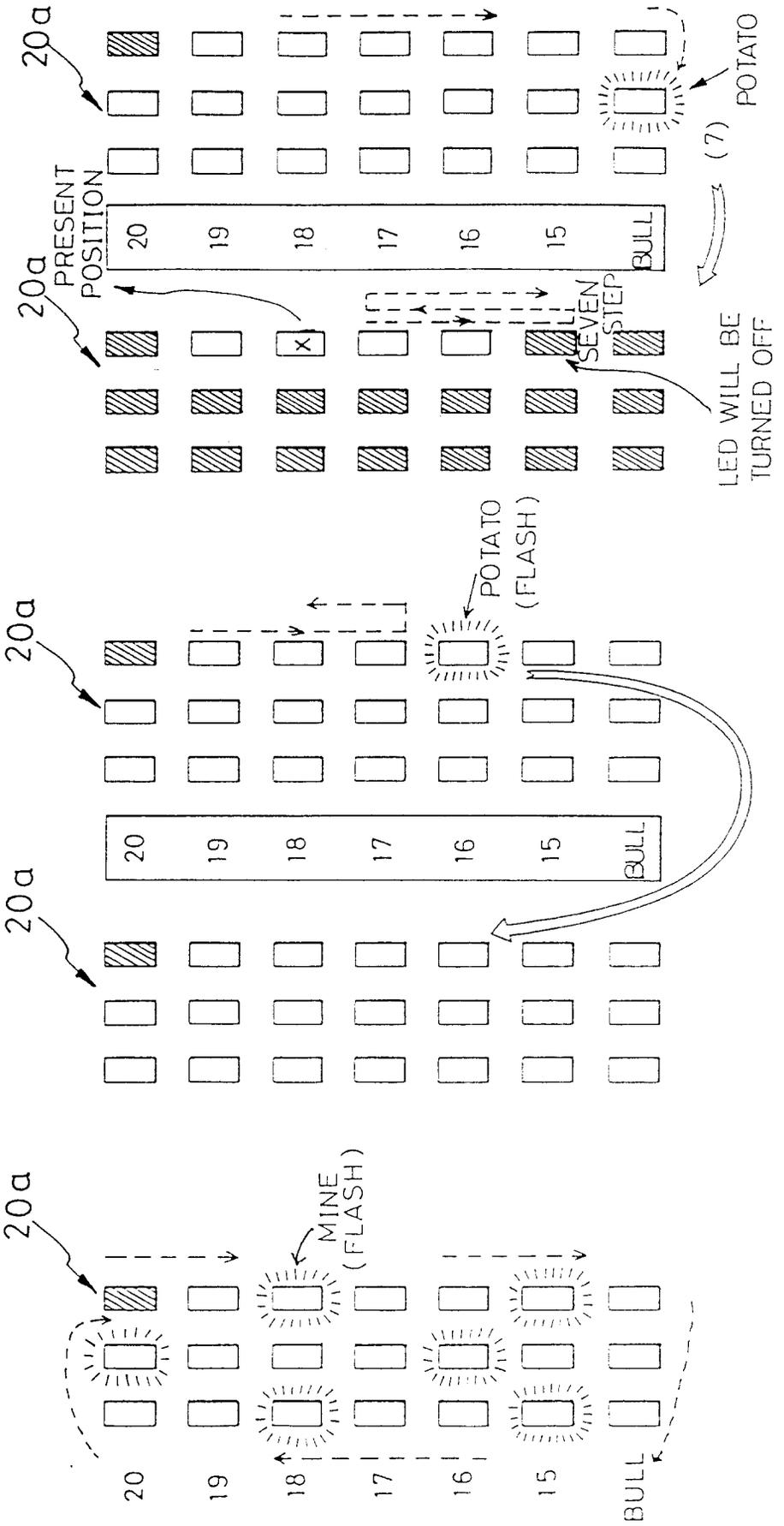

FIG. 4

FIG. 5A

FIG. 6

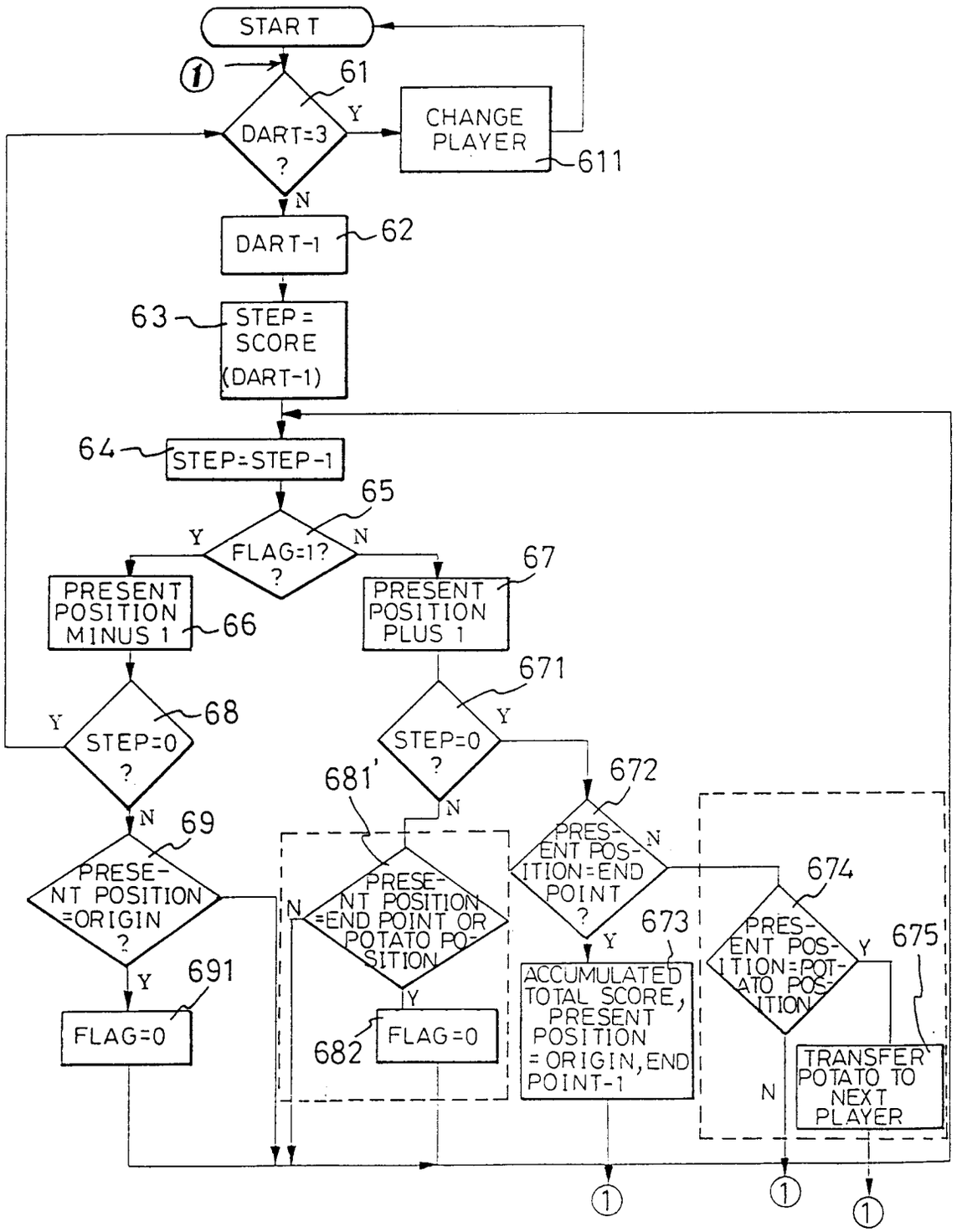
START
1
61
DART=3 ?
Y
CHANGE PLAYER
611
N
DART-1
62
63
STEP = SCORE (DART-1)
64
STEP=STEP-1
65
FLAG=1? ?
Y
N
PRESENT POSITION MINUS 1
66
PRESENT POSITION PLUS 1
67
68
STEP=0 ?
671
STEP=0 ?
672
681'
69
PRESENT POSITION =ORIGIN ?
PRESENT POSITION =END POINT OR POTATO POSITION
PRESENT POSITION=END POINT ?
673
674
675
691
FLAG=0
682
FLAG=0
ACCUMULATED TOTAL SCORE, PRESENT POSITION =ORIGIN, END POINT-1
PRESENT POSITION=POTATO POSITION
TRANSFER POTATO TO NEXT PLAYER

FIG. 5B

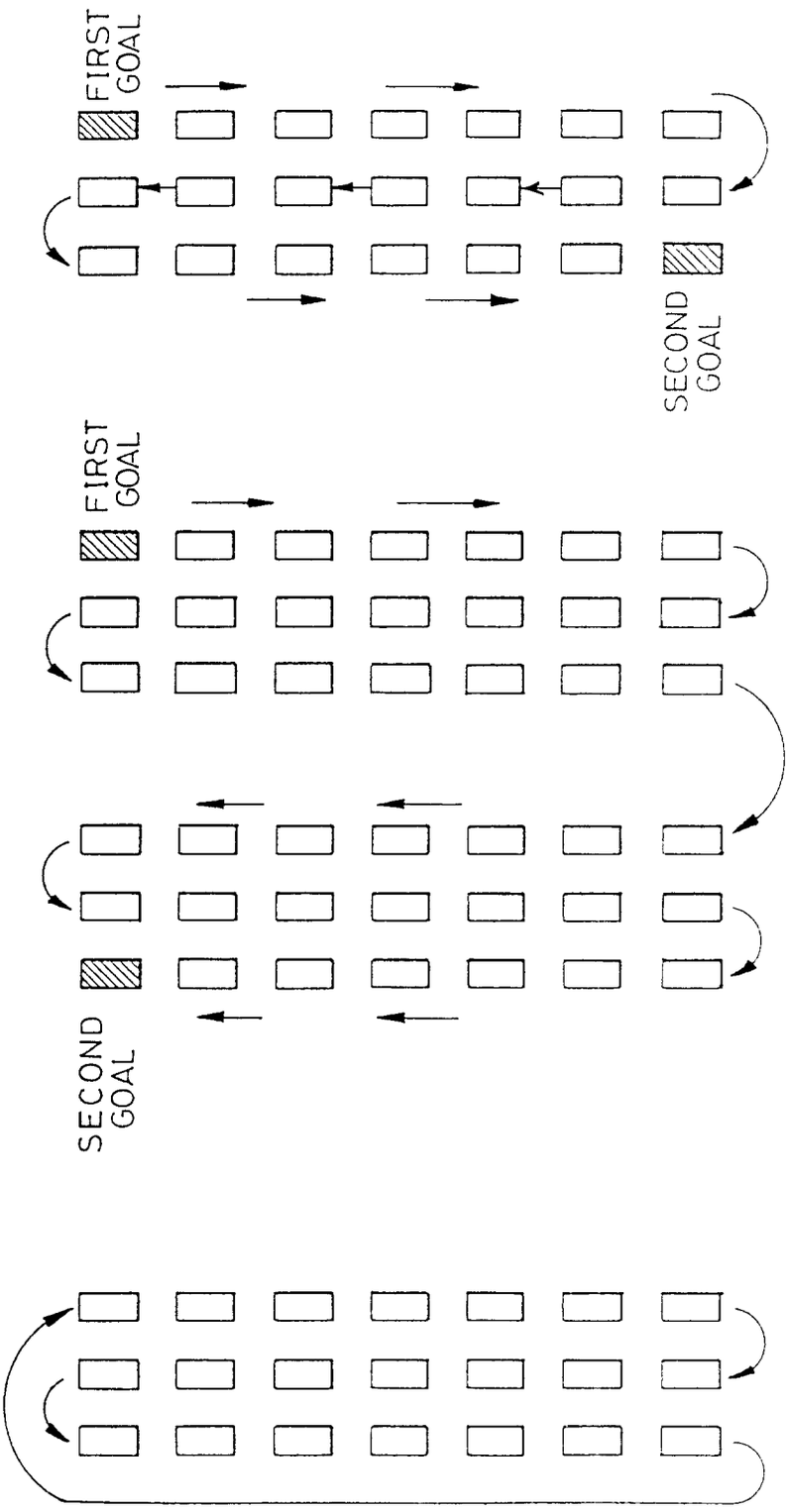

FIG. 7A

FIG. 7B

FIG. 8