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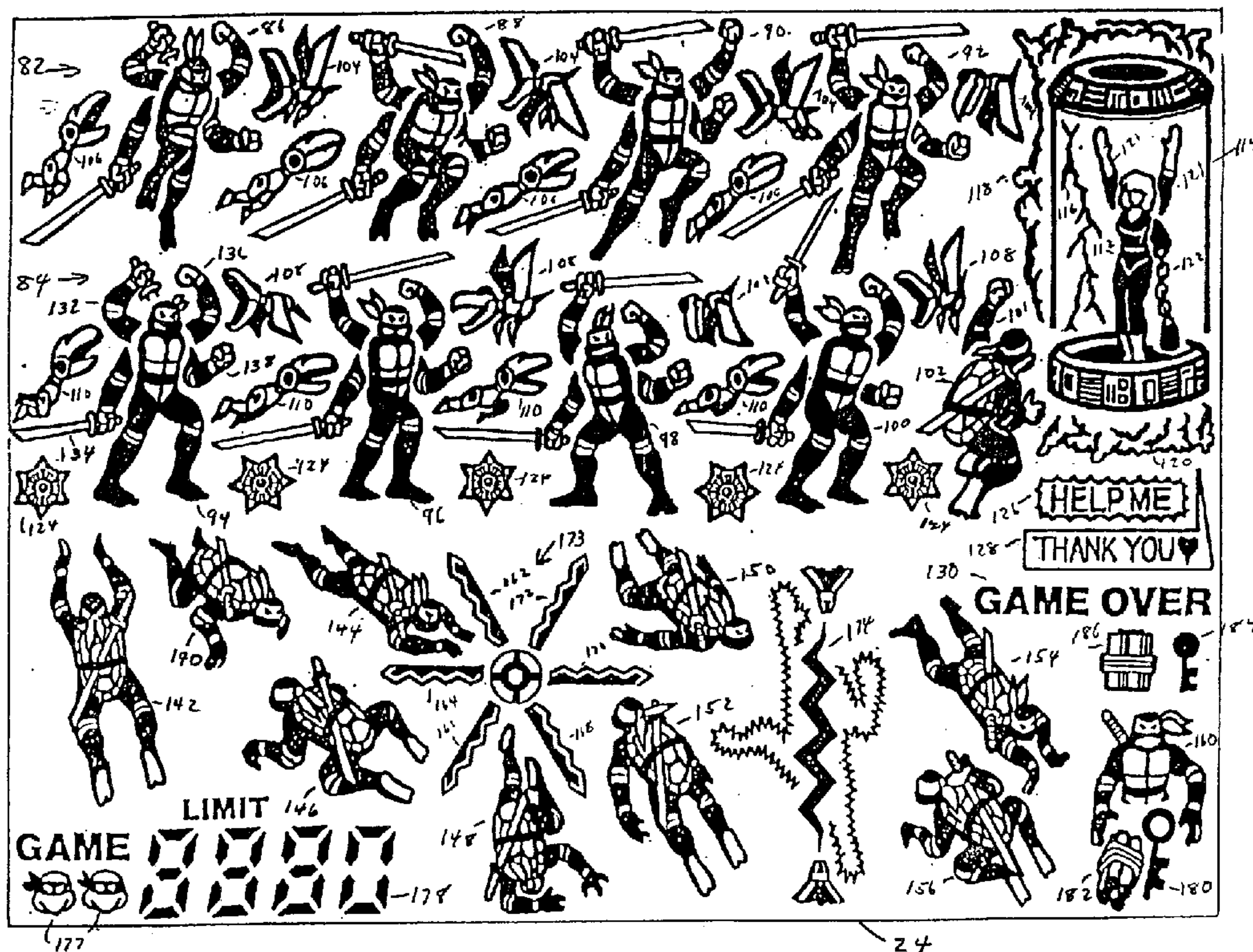
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(54) **JEU VIDEO PORTATIF SIMULANT UNE OPERATION DE SAUVETAGE**

(54) **HAND HELD VIDEO GAME WITH SIMULATED RESCUE**



(57) A novel hand held electronic LCD video game with 19 player-controlled ninja turtle figures individually displayable under player manipulation to simulate rescue of a kidnap victim, The player controls the displayed position of the turtle figures to defend against attack by game controlled mouser figures and throwing star figures. A game processor controls display of player and game controlled image segments to simulate movement of mouser creatures and throwing stars attacking the player controlled turtle figures. The player controlled turtle is manipulated to perform simulated underwater swimming to obtain dynamite multiple times and a key one to free the victim. The layer must also manipulate the turtle figure to approach and free the victim while simulating punching and use of a sword to defend against attack. One of three levels of difficulty may be selected by the player.

Abstract

1 A novel hand held electronic LCD video game with
2 19 player-controlled ninja turtle figures individually
3 displayable under player manipulation to simulate rescue of
4 a kidnap victim. The player controls the displayed
5 position of the turtle figures to defend against attack by
6 game controlled mouser figures and throwing star figures.
7 A game processor controls display of player and game
8 controlled image segments to simulate movement of mouser
9 creatures and throwing stars attacking the player
10 controlled turtle figures. The player controlled turtle is
11 manipulated to perform simulated underwater swimming to
12 obtain dynamite multiple times and a key one to free the
13 victim. The layer must also manipulate the turtle figure
14 to approach and free the victim while simulating punching
15 and use of a sword to defend against attack. One of three
16 levels of difficulty may be selected by the player.

HAND HELD VIDEO GAME WITH SIMULATED RESCUE

1 The present invention relates generally to the
2 field of electronic games and more particularly to a novel
3 hand held electronic video game.

4 The advent of video display devices such as
5 liquid crystal displays (LCD) employed in electronic games
6 has led to the development of hand held electronic video
7 games which can be held in the player's hands while
8 allowing the player to manipulate the controls and observe
9 a video display. Such electronic games are known in which
10 a player causes the movement of a game object such as a
11 dart, horseshoe, or ping pong ball. The movement of the
12 game object can be influenced by the player. Some prior
13 art games permit changing of the movement of the game
14 object in a manner unknown to or not easily predictable by
15 a player with reference to predetermined positional
16 relationships between player controlled and game
17 controlled symbols. Also, games are known in which a game
18 object may be manipulated by a player to try to avoid
19 randomly generated obstacles.

20 It is accordingly an object of the present
21 invention to provide a novel video game suitable for hand
22 held play using an LCD video display.

23 It is another object of the invention to provide
24 a figure displaying electronic hand held game apparatus
25 with which a novel game of rescue can be played.

26 It is another object of the invention to provide
27 an electronic hand held game with a plurality of
28 individually displayable player controlled turtle figures
29 manipulatable by the player to simulate rescue of a
30 prisoner by retrieving dynamite and a key from underwater

1 and simultaneously defending against simulated attack by
2 game controlled attack figures.

3 Accordingly, in accordance with one embodiment of
4 the invention, there is provided a hand-held image
5 displaying electronic game apparatus including a plurality
6 of manually operable control pushbutton switches for
7 permitting control of the play of the game by a player, a
8 sound transducer for generating sound, a control circuit
9 coupled to the control switches and the sound transducer
10 including a processor, a read-only memory, and a random
11 access memory, for generating game control signals and
12 sound signals. Also included is a display having
13 selectively activatable image segments corresponding to a
14 plurality of player-controlled figures, to a plurality of
15 game-controlled figures, and to alpha-numeric game
16 information for selective display thereof. The display is
17 responsive to the control circuit for display of game
18 images responsive to the game control signals such that
19 only one player-controlled figure is visually displayed at
20 one time at only one of a plurality of pre-determined
21 positions and the position at which the player-controlled
22 figure is displayed is moveable to an adjacent position
23 responsive to activation of a first set of the control
24 switches. Some of the plurality of positions correspond
25 to underwater positions with associated game controlled
26 intermittently activated snare device image segments, and
27 some of said plurality of positions correspond to above-
28 water positions with associated game controlled attacking
29 image segments. The processor generates signals to display
30 destruction of the player controlled image while in an
31 underwater position in response to movement through one of
32 the snare devices during an activated period, and while in
33 an above-water position in response to simulated collision
34 with an attacking image segment. A control switch enables
35 the player to destroy an attacking image segment prior to
36 simulated collision.

37
38 Brief Description of the Drawings

1 The invention, together with further objects and
2 advantages thereof, may be understood by reference to the
3 following detailed description taken in conjunction with
4 the accompanying drawings wherein like reference numerals
5 designate like elements throughout several figures.

6 FIG. 1 is a front elevational view of a housing
7 for a specific embodiment of a hand held electronic LCD
8 video game constructed in accordance with the invention.

9 FIG. 2A is a block diagram of the electronics of
10 a specific embodiment of a hand held LCD video game in
11 accordance with the invention.

12 FIG. 2B is a detailed block diagram of a specific
13 embodiment of the processor for the hand held LCD video
14 game of FIG. 2A.

15 FIG. 3 is a diagrammatic view illustrating a
16 specific embodiment of a detailed pattern for a display of
17 the embodiment of FIG. 1.

18 FIG. 4A-4E are flow diagrams illustrating the
19 game control sequence and game play methodology of a
20 specific embodiment of a control program for the game
21 processor 42 according to the invention.

22 Detailed Description of the Preferred Embodiment

23 Referring now to the drawings, FIG. 1 is a front
24 view of a hand held game 20 in accordance with the present
25 invention comprising a casing 22 configured for housing
26 various electronic components and a display 24. The
27 casing 22 has a generally trapezoidal configuration, as
28 shown in FIG. 1, defined by a bottom peripheral edge
29 surface 26a formed as a concave arcuate edge surface, a top
30 edge surface 26b formed as a convex arcuate surface and
31 generally longitudinally rectilinear lateral edge
32 surfaces 26c and 26d. The laterally opposite ends or
33 corners of the bottom and top arcuate edge surfaces 26a and
34 26b, respectively, blend with the lateral edge surfaces 26c
35 and 26d through rounded corner edge surfaces, as shown.
36 Casing 22 in the illustrated embodiment is approximately 7
37 inches long, 4 1/2 inches wide at the bottom end, and 3 1/4
38 inches wide at the top end. The casing 22 is preferably

1 formed of a suitable rigid plastic material to contain and
2 protect the game electronic circuitry.

3 The casing 22 has a generally rectangular
4 opening 28 behind which may be mounted the display
5 screen 24 suitably observable in the opening 28. In the
6 illustrated embodiment, the display 24 is a liquid crystal
7 display (LCD) screen, but may alternatively employ another
8 type of display screen suitable for a hand held game such
9 as electroluminescent, electrochromic, etc. The display
10 screen 24, as will be described in greater detail
11 hereinafter, is formed with segments for displaying images
12 for the game, as well as numerical value and other game
13 information displaying portions for displaying game scores
14 and other game-related information.

15 In addition, various pushbuttons for control of
16 the game, such as control of the visual display of the game
17 images when playing the game, are provided in the vicinity
18 of the display opening 28 of the casing 22. In the
19 illustrated embodiment, the casing 22 has a pair of
20 circular openings 32a within which may be supported control
21 buttons 34a and 34b, respectively, forming part of the
22 video display control circuitry. Circular buttons 34a and
23 34b may optionally be of equal diameter and symmetrically
24 located about the longitudinal center line of the
25 casing 22, as shown. In the illustrated embodiment, the
26 button 34a activates a four-way switch (i.e., four
27 pushbutton switches) with four activation positions
28 indicated by four arrowheads 36a, 36b, 36c and 36d which
29 may be manually manipulated by the player to control, for
30 example, the up, down, right and left movement (i.e., up
31 if the upper arrow 36a is depressed, down if the lower
32 arrow 36c is depressed, right if right arrow 36b is
33 depressed and left if left arrow 36d is depressed) of a
34 player controlled figure, to be described in detail
35 hereinafter. The button 34b, in the illustrated
36 embodiment, may be manually manipulated by the player to
37 control simulated attack by the player controlled figure by
38 sword or by punching on the display screen 24 as will be

1 described in detail hereinafter. In the illustrated
2 embodiment, the button 34b activates a dual switch (i.e.,
3 two pushbutton switches) with two activation positions
4 indicated by two arrowheads 35a and 35b which may be
5 manipulated by the player to control attack (i.e., by
6 punching if the right arrow 35b is depressed and by sword
7 if the left arrow 35a is depressed.)

8 A plurality of generally equal oblong openings to
9 receive pushbutton controls 38a, 38b, 38c and 38d and a
10 smaller round opening to receive a pushbutton control 38e
11 may also be formed in the casing 22 such that there axis
12 lie along a common line transverse to the longitudinal
13 access of the housing 10, as shown. The pushbuttons 38a,
14 38b, 38c, 38d, and 38e facilitate selective control of
15 switches which control aspects of the electronic circuitry
16 of the video game 20.

17 In the illustrated embodiment, the pushbutton 38a
18 controls an off switch to permit the player to turn the
19 game off and the pushbutton 38d controls an on/start switch
20 which permits the player to turn the game on and to control
21 the start of the game play. The pushbutton 38b controls a
22 sound control switch which allows the player to turn game
23 sounds on and off. In the illustrated embodiment, the
24 pushbutton 38c controls selection of the game level to be
25 played while the pushbutton 38e controls a reset switch for
26 resetting the game after inserting batteries.

27 FIG. 2a is a block diagram illustrating a
28 specific embodiment of the internal electronic circuitry 40
29 of the hand-held game 20. The electronic circuitry 40
30 includes the LCD display screen 24 (e.g., an LH9181K LCD
31 display marketed by Sharp) coupled to a game processor 42
32 (e.g., an SM-510 marketed by Sharp) as shown. The game
33 processor 42 controls the game display 24 by controlling
34 LCD image segments of the game display 24, and also
35 controls game sound outputs, both responsive to the
36 pushbutton switch control inputs. A set of 11 pushbutton
37 switches 44a-j and 45 is coupled to the game processor to
38 provide control inputs. In the illustrated embodiment, the

1 switches 44a-j and 45 correspond to the control
2 pushbuttons 34a, 34b, 38a-38e of FIG. 1. For example,
3 switches 44a through 44d may correspond to pushbutton 34a
4 (i.e., pushbutton arrows 36a through 36d), switches 44e and
5 44f may correspond to arrows 35a and 35b of pushbutton 34b,
6 switches 44g-44i may correspond to pushbuttons 38a-38d, and
7 switch 45 may correspond to reset pushbutton 38e. A
8 crystal sound transducer 46 is coupled, as shown, to the
9 processor 42 to generate game sounds responsive to sound
10 signals generated by the processor 42. A battery 48, which
11 provides electrical power for the circuitry 40, and an
12 oscillator crystal 50 for use in generating clock signals
13 in conjunction with associated capacitors is also coupled,
14 as shown, to the processor 42.

15 Referring now to FIG. 2B, there is shown a
16 detailed block diagram of a specific embodiment of the game
17 processor 42 with pin designations corresponding to those
18 shown in FIG. 2A. The processor 42 comprises an arithmetic
19 logic unit (ALU) 50 and associated registers 52 coupled
20 along with a read only memory (ROM) 54 to a central bus 55.
21 A random access memory (RAM) 56 including a display RAM 58
22 is coupled directly to the ALU 50 and to a gate and buffer
23 circuit 60, as shown. The gate and buffer circuit couples
24 display segment control signals to the segment control
25 outputs a_1 - a_{16} and b_1 - b_{16} , as shown. The control switch
26 inputs S_1 - S_8 and K_1 - K_4 are coupled respectively through
27 interface buffers 62, 64 to the ALU 50 through the bus 55.
28 In addition, a clock signal circuit 66 couples clock
29 signals to the bus 55 through a divider 68.

30 The processor 42 generates image segment control
31 signals and sound signals by processing the control switch
32 inputs responsive to a game program stored in the ROM 54
33 utilizing the RAM 56 for temporary storage. The ROM 54
34 stores the game program and stores the data needed for
35 controlling the image segments of the display 24. The
36 display RAM stores the current image segment control data,
37 which is coupled to the display to control the game images.

1 FIG. 3 is an illustration of a specific
2 embodiment of a display pattern made up of selectively
3 activatable images or image segments for the display 24,
4 each of which when activated become visually displayed.
5 The game displayed by the image display screen 24 of the
6 illustrated embodiment is a game in which an image of a
7 player controlled figure (a ninja turtle image) carrying a
8 sword can attack using the sword or by punching to destroy
9 enemy mousers at an enemy base.

10 The player must manipulate the ninja turtle image
11 through the enemy base to rescue a prisoner (April) who is
12 hand-cuffed and held prisoner in a capsule at the enemy's
13 base. The ninja turtle image must sneak into the base
14 attacking mousers to get through and retrieve a bundle of
15 dynamite and a key to the hard-cuffs which are hidden under
16 water. There are three levels of difficulty which may be
17 chosen by the players, and three turtles are allotted to
18 the player at the beginning of each game. The turtle image
19 uses the left hand for swinging a sword and light hand for
20 punching to fight off enemy mousers which attack from both
21 sides and to obtain score points for destroying mousers.
22 The turtle obtains the bundle of dynamite located under
23 water by diving into the water which starts a countdown
24 timer, and avoiding two snare devices (gyrating blades and
25 shock barrier). After obtaining the dynamite the turtle
26 image returns to the surface, advances to the capsule, and
27 sets off the dynamite. The turtle must then return for
28 more dynamite or for the key to unlock the handcuffs.

29 The display 24 comprises selectively activatable
30 figures (i.e., image segments), including 2 horizontal
31 rows 82, 84 from left to right of player controlled figures
32 at the upper half of the display 24. Of these rows, row 82
33 comprises four player controlled figures (turtle
34 images) 86-92 at the top while row 84 comprises five turtle
35 images 94-102, as shown. Each row 82, 84 also includes two
36 rows of game-controlled image segments of enemy mousers
37 including flying mousers 104 and mousers 106 in upper
38 row 82, and flying mousers 108 and mousers 110 in row 84.

1 At the upper right are image segments of the prisoner
2 (April) 112, the capsule 114, a capsule crack 116,
3 explosion indicating image segments 118, 120, and hand-
4 cuffs 122. At the bottom of row 84 is a row of throwing
5 stars 124. At the right of the display 24 under the
6 capsule 114, image segments 126 displays "HELP ME", image
7 segments 128 displays "THANK YOU" and image segments 130
8 displays "GAME OVER", as shown. The player controlled
9 turtle images each have two sets of arms, as shown at
10 turtle image 94. Two sword carrying arms 132, 134 permit
11 simulation of swing of a sword, and two punching arms 136,
12 138 permit simulated punching by sequential momentary
13 display of the two arms.

14 Along the lower half of the display 24, are
15 arranged a series of ten player-controlled turtle
16 images 140-160 which are "under water" in the play of the
17 game. Also under water is a set of gyrating blade image
18 segments 162-172 and an electric shock barrier image
19 segment 174 which simulates underneath snare devices.
20 Within the underwater section in the lower left of the
21 display 24 is a four digit, 7-segment display 178 and a
22 display of "LIMIT" and "GAME" for displaying game score,
23 underwater limit time and game level. In the lower right
24 corner of display 24 is an image segment of a key 180 and
25 dynamite 182. Above the turtle image segment 160 is an
26 image segment to indicate carrying of the key 184 and an
27 image segment 186 to indicate carrying of the dynamite.

28 During play of the game, only one of the player-
29 controlled turtle images 86-102, 140-160 is visually
30 displayed at any time. The player may move the displayed
31 player-controlled turtle image by activating the left
32 control pushbutton 34a. Thus, by pushing on the up arrow
33 button position 36a, the player image above the previously
34 displayed image is displayed, simulating upward movement,
35 while pushing on the down arrow region 36c causes simulated
36 movement downward on the display 24. Similarly, simulated
37 left or right horizontal movement is activated by pushing
38 the left arrow region 36d or right arrow region 36b of

1 control pushbutton 34a.

2 Activation of the left arrow 35a of the control
3 pushbutton 34b momentarily visually displays in succession
4 (e.g., total time of .3 seconds in the illustrated
5 embodiment) the upper sword arm image 134, the lower sword
6 arm 132 and the upper sword arm of the currently displayed
7 player control turtle image 86-100, thereby simulating a
8 swing of the sword of the player-controlled image.
9 Activation of the right arrow region 35b of pushbutton 34b
10 momentarily visually displays a succession of the lower
11 punching arm 138, then the upper punching arm 136 and then
12 the lower punching arm 138 (e.g., a total time of .3
13 seconds in the illustrated embodiment) again to simulate a
14 punch by the player controlled turtle images 86-100. These
15 two attack movements, sword swing and punch, are the method
16 by which the player-controlled turtle image attacks and
17 destroys attacking mouser images 104-110. Thus, the
18 player-controlled images 86-102, 140-160 may be manipulated
19 by moving them to one of eighteen positions and by
20 controlling turtle images 86-100 to attack, using
21 pushbuttons 34a and 34b respectively.

22 Simulated movement of the enemy mousers 104-110,
23 throwing stars 124, gyrating blades 162 - 172 and shock
24 barrier 174 is provided under control of the game
25 electronic processor 42 by visual display of image segments
26 in a sequence. Thus, the flying mousers 104, 108 are
27 caused to appear to advance from the right to the left of
28 the display 24 at a uniform speed by sequentially
29 displaying images generally from the right to the left of
30 the display 24 and can be destroyed by the turtle punching.
31 In the illustrated embodiment, one place movement of a
32 mouser takes .8 seconds for level one play, .6 seconds for
33 the level two and .4 second for level three play. Enemy
34 mousers 106 and 110 appear to move left to right in the
35 same manner with corresponding time delays of .9 seconds,
36 .7 seconds and .5 seconds for respective levels one, two
37 and three in the illustrated embodiment and can be
38 destroyed by the turtle sword. Similarly, throwing

1 stars 124 are sequentially displayed along a line to
2 simulate movement from left to right with a time delay per
3 place movement, in the illustrated embodiment, of .7
4 seconds, .5 seconds and .3 seconds, respectively for
5 levels one, two and three.

6 The game is initiated, as shown by blocks 200,
7 202 and 204 of FIG. 4A, by pushing the on/start pushbutton
8 (i.e., key) 38d which activates the display 24 to display
9 "GAME 1" on the alpha-numeric seven segment display 178 and
10 will generate a game sound, as shown at blocks 206 and 208.
11 The game level is selected by pushing the game level select
12 pushbutton 38c which will result in display of "GAME 2" if
13 pushed once, "GAME 3", if pushed twice and back to "GAME 1
14 if pushed again, as indicated at blocks 208, 210 and 211.
15 Game play is begun, as shown at blocks 212 and 213, by
16 pushing the on/start key 38d a second time. This results
17 in branching to the routine of FIG. 4B as illustrated at
18 branch point 213. If the game play is not initiated at
19 block 212 by activating the on key, program control
20 continues to the decision block 214. As illustrated by
21 blocks 214 and 216, the sound may be deactivated so that
22 the game is silent by depressing the sound on/off key 38b
23 or can be reactivated by depressing the sound on/off
24 key 38b again. As illustrated at blocks 218 and 220, the
25 game may be turned off at any time by depressing the power
26 off key 38a where upon the game sequence returns to
27 block 200 to permit restart of the game.

28 A second depression of the on/start key 38d, as
29 illustrated at block 212, will result in branching to
30 FIG. 4B, as shown at mode 213. As illustrated at block 230
31 of FIG. 4B, the second depression of the on/start key
32 activates the display of two turtles 177 (indicating
33 allocated turtle lives remaining in game) and a "00 00"
34 score for one second on the digital display 178, as shown
35 at block 230. This is followed by display of the
36 prisoner 112, the capsule 114, the underwater snares 173
37 and 174 and the dynamite 182 for several seconds along with
38 a sound beep, as illustrated at block 232. This is

1 followed by display of a turtle image 86 at the top left of
2 the display 24 which then slides down to display turtle
3 image 94 after a second, as illustrated at block 234. Each
4 game begins with an allocation of three operator-controlled
5 turtle players. If all three players are destroyed, the
6 game is over. The enemy mousers 104-110, and stars 124
7 then begin to attack the operator-controlled turtle
8 image 94 from both sides and the game play begins (i.e.,
9 simulated movement by sequentially displaying images) as
10 indicated by block 240.

11 As illustrated, game play proceeds from branch
12 point 244 to blocks 248 and 250 of FIG. 4C, where the
13 player may manipulate the controls 34a to avoid attack of
14 the aliens by pushing the up key region 36a of key 34a to
15 jump to avoid an attacking star 124, as indicated by
16 blocks 248 and 250. The star 124 cannot be destroyed, but
17 can only be avoided by jumping out of the way. Thus, at
18 any position, the player-controlled turtle image can avoid
19 the star by activation of the up arrow 36a and then is
20 returned to ground level from the top position by
21 activation of the down arrow 36c. In addition, by
22 activating the right arrow key 36b or left arrow key 36d,
23 the turtle can be manipulated right or left. The player
24 symbol may also be manipulated to punch or swing a sword to
25 destroy an attacking mouser by activating the sword
26 key 35a, or the punching key 35b as indicated by
27 blocks 252, 253. If a displayed mouser image is
28 immediately adjacent the punching or sword swinging arm at
29 the time the key 35a, 35b is activated the mouser is
30 destroyed and the players score is incremented by ten, as
31 indicated by blocks 254, 256. The score is continually
32 displayed during the game play except when the turtle image
33 is under water.

34 If the player fails to hit an approaching enemy
35 mouser or star, and fails to move out of the way, the
36 player controlled turtle image may be hit (i.e., run into)
37 by the enemy mouser or star. If that event occurs, the
38 player controlled symbol is shown as destroyed by removing

1 the player controlled turtle temporarily from the screen
2 and removing one of the remaining turtle symbols 177, as
3 illustrated by blocks 260, 262 and 264. The number of
4 remaining player controlled symbols in the game is then
5 determined, as shown at block 268, and if players remain,
6 the player sequence continues, as shown. If no players
7 remain, the game score is displayed, the "GAME OVER"
8 message is displayed with a sound sequence and the display
9 is turned off after a few seconds, as illustrated by
10 blocks 268, 270 and 272. If there are players remaining at
11 block 268, the player symbol is displayed and the game
12 sequence returns to block 248 for continuation of play, as
13 shown.

14 If the result at block 262 is that the game-
15 controlled image is not hit, then, a check is performed to
16 determine if the down arrow key was pressed when the player
17 controlled turtle image was at the left, ground level
18 location (i.e., the turtle image 94 displayed). If not,
19 the game sequence proceeds to block 248, as shown. If the
20 down arrow key was activated, then the turtle image "dives"
21 under the water, simulated by display of the underwater
22 turtle image segment 140. In addition, the score
23 display 178 set with an under water count. The player
24 controlled turtle image must obtain the dynamite or key and
25 leave the water before the counter counts down to zero.
26 Thus, the time allotted to get through the under water
27 section is limited by the count. Game flow then continues
28 to block 284 of FIG. 4D as indicated at node 282.

29 The player controlled turtle image is thus
30 manipulated underwater to approach and retrieve the
31 dynamite 182 at the right, lower corner of the display 24
32 using the direction pushbutton 34a. The turtle image may
33 then move toward the dynamite 182 by moving from the turtle
34 image 140 to the turtle image 144 through the gyrating
35 blade snare to the turtle image 150 and through the shock
36 barrier 74 to turtle images 154 and 160 respectively, as
37 illustrated by block 286-292. When the player controlled
38 turtle image reaches the dynamite (i.e., display of

1 image 160) the dynamite image 182 will be briefly displayed
2 as illustrated at block 294. The player then manipulates
3 the direction keys 34a to direct the turtle image back to
4 the turtle image 156 through the shock barrier 174 to
5 turtle image 152 through the gyrating blade 174 to the
6 turtle image 146 and 142 respectively. The player
7 controlled turtle image then is returned to the surface by
8 activating the up control of the direction key 34a before
9 the counter decrements to zero as illustrated by block 300,
10 301, and 303.

11 If the player controlled turtle image is hit by
12 either snare device 173, 174, or fails to return to the
13 surface before the counter reaches zero, the game play
14 sequence branches to block 304 and one turtle life is lost,
15 as shown. A determination is then made to determine if any
16 turtle lives remain for the player, and if not, the game
17 ends with display of the "GAME OVER" image 130, as
18 illustrated by blocks 306, 308. If turtle lives remain,
19 the game sequence returns to block 232 of FIG. 4B as
20 indicated by the node 302 and the game sequence is repeated
21 with the player having to start over to retrieve the
22 dynamite or key. If the player successfully returns to the
23 surface before the counter returns to zero, the counter
24 disappears and the score is displayed and the turtle
25 image 94 is displayed as indicated at block 303 and 305.
26 The game sequence then continues to FIG. 4E as indicated by
27 node 307.

28 While underwater, the gyrating blade snare
29 device 173 continually simulates rotating motion by
30 sequential display of two segments 162-172 at a time. If
31 the segments 164 and 170 are displayed (i.e., horizontal
32 blade position), the turtle image may pass through unharmed
33 by moving from turtle image 144 to image 150 or from
34 image 152 to image 146. However, if the blades 166 and 172
35 or blades 162 and 168 are displayed, the turtle life will
36 be lost if the player tries to move the player controlled
37 turtle image through the gyrating blades at that time.
38 (i.e., if the turtle is in the position 144, 146, 150 or

1 152 when any non-horizontal blades are displayed). This
2 will cause the fallen turtle image 148 to be temporally
3 displayed, a buzzer sound to be generated and a decrease
4 by one of the turtle lives remaining in the game. The
5 underwater shock barrier 174 periodically generates a
6 current illustrated by periodic display of the shock image
7 segment 174. If the play controlled turtle image attempts
8 to pass from turtle image 150 to 154 or from turtle
9 image 156 to 152 while the shock image segment is
10 displayed, the turtle life will be lost resulting in on-off
11 flashing of the turtle image, a buzzer sound and a decrease
12 of one turtle life remaining in the game. In the
13 illustrated embodiment gyrating blades moves from one
14 position to the next in .7 second for level one play, .5
15 second for level two play and .3 second for level three
16 play. The shock barrier has a display interval of .7
17 second for level one, .5 second for level two and .3 second
18 for level three in the illustrated embodiment.

19 After the player controlled turtle image has
20 returned to the surface so that the turtle image 94 is
21 displayed, the player then moves the player controlled
22 turtle image toward the capsule 114 on the right by
23 manipulating the direction keys 34a, as illustrated by
24 block 320 of FIG. 4E. The player controlled turtle image
25 is moved to the right by pushing the right arrow 36b of the
26 direction key 34a. To jump to the upper level, the up
27 arrow 36a is pushed after which the image will return to
28 the lower level automatically after .5 seconds or can be
29 immediately returned by activating the down arrow 36c.
30 Moving a turtle image from one position to another in the
31 illustrated embodiment takes .1 second. During the entire
32 time player controlled images are being moved toward the
33 capsule 114, the mousers 104, 106, 108, 110 and throwing
34 stars 124 attack and must be destroyed or avoided or the
35 turtle life will be lost if a simulated collision occurs,
36 as shown by block 322, 324 and 304. When the player
37 controlled turtle image, after having obtained the
38 dynamite, approaches the capsule by moving to turtle image

1 segment 102, the dynamite is set off. The turtle
2 automatically returns to turtle image position 100, and the
3 score is increased by fifty. The explosion image
4 segment 118 is displayed to show the explosion, the
5 dynamite image 186 disappears and the crack 116 in the
6 capsule appears, as illustrated by blocks 326, 328. The
7 turtle image position closest to the capsule cannot be
8 entered unless the dynamite or key has been obtained.

9 After the explosion, if the capsule is not yet
10 destroyed, the player controlled image must return to the
11 left and then dive underwater and retrieve more dynamite in
12 the same manner as previously described, as illustrated by
13 blocks 330, 332 and 244. For a level one game, capsule is
14 destroyed by two explosion of dynamite, three explosions
15 for level two and four explosions for level three. Once
16 the capsule has been destroyed, the capsule 114 will
17 disappear, the score will be increased by one hundred, and
18 player controlled turtle image then returns to the left and
19 dives underwater again to obtain the handcuff key 180 which
20 appears in the lower right corner of the display 24, as
21 illustrated by blocks 334, 336 and 244. When the key is
22 obtained, the player controlled image is returned to the
23 capsule and upon entering the turtle image position 102,
24 the key 180 disappears, the land cuffs 122 disappear, the
25 prisoner April raises her hands 121, the "THANK YOU"
26 message 128 is displayed, and the score is increased by two
27 hundred. In addition, the turtle image 102 displays a
28 raised hand 101, the score flashes, "GAME OVER" is
29 displayed, and after sixty seconds, the display will turn
30 off, as indicated by blocks 338, 340.

31 A specific program listing for use with the
32 illustrated embodiment in which the SM-510 processor is
33 used is shown in Appendix A. The program shown is a
34 hexadecimal object code listing having a hexadecimal
35 program address on the left followed by a hexadecimal
36 representation of the object code. The program includes
37 both image segment control and sound generation code.

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8 Specific embodiments of the novel electronic
9 hand-held video game according to the invention have been
10 described for purposes of illustrating the manner in which
11 the invention may be made and used. It should be
12 understood that implementation of other variations and
13 modifications of the invention in its various aspects will
14 be apparent to those skilled in the art, and that the
15 invention is not limited by the specific embodiments
16 described. It is therefore contemplated to cover by the
17 present invention any and all underlying modifications,
18 variations or equivalents that fall within the true scope
19 of the basic underlying principles disclosed and claimed
20 herein.

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APPENDIX A

```

1 *-----*
2 *          BH005  TMNT
3 *
4 *          prog
5 *          ROM addr 0000H thru 0FFFH
6 *          By KUNAMI
7 *-----*
8 * addr  0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
9 *-----*
9 <0000> 7D 00 00 54 6F 00 66 5F 6B 54 00 97 5F 5F 97 7B
10 <0010> 97 5F 79 54 97 00 6F 6B 6F 97 AA 69 57 6F 5A 61
11 <0020> 00 6F 97 6B 56 5F 7B 80 5F 6F 00 0E 97 56 6F 91
12 <0030> 5F 54 6F 5F 67 72 5F 73 0B 75 56 1F 54 72 B0 00
13 <0040> 7D 00 00 6E 14 00 6F 1B 5C 5F 6E 5C 5F 54 10 B3
14 <0050> 5C 5F 10 54 04 AA 5F 04 0B 6E 5C 30 54 5F 6A 5F
15 <0060> 40 5F 1B 5F 0B 0B 7C 6E 5B 6F 6A A7 10 1B 6F 64
16 <0070> 7B 5C 10 5F 6E 5F 5F 57 FD 62 6F B3 7F 07 C0 00
17 <0080> 7D 6E 8A 6A 1C 32 0E 1C 5F 20 60 12 61 07 20 7F
18 <0090> 6A 6E 11 60 60 30 20 B3 10 6E B3 20 04 64 65 76
19 <00A0> B4 67 9B 6C 0B 20 CB 16 B3 31 32 06 5F 11 0D 80
20 <00B0> 7D 20 54 0C 6E 0F 09 7F A5 B3 5F 35 7D 5F A9 00
21 <00C0> 5F 00 00 5F 61 00 9F 0B 00 9B 00 5F 00 1B 5F 32
22 <00D0> 54 9F 54 00 00 00 9B 0B 61 00 61 5B 6E 9F 60 60
23 <00E0> 0B 0B 93 54 00 0B 00 9E 9B 00 00 54 66 6E 5F 31
24 <00F0> 54 9B 00 60 61 9B 9F 60 9B 30 35 32 61 30 00 00
25 <0100> 56 00 2F 10 0F 7B 2B 2F 0F 64 CE 20 0F 04 12 2D
26 <0110> 6A 6B 5F 53 6A 7E 9F 12 04 5F 5F 27 A5 2F 10 2D
27 <0120> AE 2F 0E 10 69 1B 2B 6A 9F 8B 67 2A 2E 6A 27 10
28 <0130> 57 5F 70 9F 2B 10 10 5F 9D 27 A5 04 2B 29 12 00
29 <0140> 20 00 00 0C 5F 00 62 14 19 0B 70 07 2E 5F 28 5F
30 <0150> 64 0F 7E 7B 1B 74 63 20 6A 6B 9D AA 20 6C B8 EC
31 <0160> 53 5F 6B 2C 2C 5F 5F 0E 2C 22 0C 10 C0 5F 13 5F
32 <0170> BE 10 10 20 10 69 6A 0F 74 11 5F 28 11 53 7E 00
33 <0180> 76 F0 79 04 5F 0C 67 54 5F 04 76 80 6B 5F 6B 5F
34 <0190> 69 0C 76 80 7B 5F 0D H4 5F B2 80 B8 67 5F 0B 68
35 <01A0> 67 5F 6B 9B 7B 5F 07 6B 0D 5F 04 6B 76 6B 54 2B
36 <01B0> 5F 04 54 0D 7D 07 54 80 69 5F FD 5F 55 69 B9 00
37 <01C0> 20 6F 74 EF 76 F1 69 6A 53 66 74 6A 7B AB EF 53
38 <01D0> FD 2A 5F 29 82 EF EF 7A 40 EF 53 91 20 69 22 9A
39 <01E0> 10 7A 9E 67 93 67 80 B5 24 53 69 C0 23 69 10 69
40 <01F0> 5F 7B 69 5F 53 21 53 70 07 31 AC 5F 0C 0F 71 00
41 <0200> 69 00 79 24 B9 B9 77 0E 54 0F 0F 0B 0E 5F 19 0F
42 <0210> 0B 7B 0E 0E 04 7A 04 6B 79 0B 04 24 6F 0F 0E 04
43 <0220> EF 14 5F B9 B2 6C 19 19 5F 64 5F 54 54 1B 5F 19
44 <0230> 5F 5F 04 0F 67 H1 A2 0B 66 74 0E 6C 54 0B AE 00
45 <0240> 5F 5E 77 7B 56 8B FD 19 77 67 0C 74 56 7C 07 6C
46 <0250> 5F 06 5F 06 19 1B 0D 61 66 69 64 0D 04 06 0D 9D
47 <0260> 64 39 B2 07 40 6F 82 0D 7B 07 23 04 0C 6C 5F 5F
48 <0270> 5B 5F 5F 5F 57 5F 19 66 B3 5F 92 0C 0B 19 69 00
49 <0280> 6B 00 00 7B 3F 00 14 10 7D 5F 00 8B 00 20 20 BC
50 <0290> 5F B2 10 00 00 00 53 00 76 B0 90 04 CB H6 53 69
51 <02A0> F0 B3 54 6A 27 20 00 6B 20 00 00 19 1D 19 5F 70
52 <02B0> 6B 67 7B 00 19 53 5F 5F 00 77 53 0F 6B 2B 0F 00
53 <02C0> 5F 2E 7A 10 06 B1 9D 57 56 77 B2 B2 69 53 7B 6B
54 <02D0> 1B 67 10 94 5F 56 53 67 31 5F 20 10 AB 5F 0C 31
55 <02E0> 5F 6C 5F A2 99 20 56 74 3F B1 6B 5F 1B 2E 76 30
56 <02F0> 54 5F B1 6B 30 5E 31 10 9D BA 10 5F 6C 61 1B 00
57 <0300> 0C 6E 06 79 14 0B 06 06 64 20 04 0B 07 0F B1 9D
58 <0310> 6A 06 7B 20 06 64 6E 19 6E 0B 7D 0B 7C 56 69 40
59 <0320> 69 5A 0B 0F 20 5F 64 6B 40 14 07 06 5B 0F 0E 69
60 <0330> 40 5F 14 30 5F 5F 6E 40 69 5F 7D 69 40 C0 69 00
61 <0340> 5F 00 00 54 93 00 3F B6 93 3D 00 21 74 5F 56 6E
62 <0350> 93 37 6A 5F 7C 00 69 2D 04 3D EF 3B 53 96 1D 29
63 <0360> 07 AH 6A 5F 6A 93 6F 5F 5F 3F 40 13 93 93 AC 11
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65 <0380> 20 00 01 2B 30 77 BF 11 5F 3C 00 5B 6B B3 5F 69

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68	<03BU>	6A	1U	53	5F	24	22	U7	5B	5F	UF	53	HF	68	7B	FD	00
69	<03CU>	5F	AB	6F	AB	54	54	A1	54	5F	6U	7A	92	AB	56	67	56
70	<03DU>	68	6E	5F	78	95	5F	54	6F	5F	A6	66	97	7A	5F	78	6A
71	<03EU>	68	5F	8H	9H	76	6E	5F	BY	56	54	AH	6E	69	AB	55	57
72	<03FU>	57	AB	54	AB	9U	5F	55	BD	BE	5F	AB	AB	AB	5F	5F	00
73	<0400>	58	00	0U	11	11	0U	2U	11	8C	5F	0U	5B	1U	15	20	11
74	<041U>	15	32	65	0U	0U	0U	08	15	20	6F	20	U1	11	15	20	EE
75	<0420>	88	2U	18	2U	2U	6E	6E	2U	2U	0U	0U	2U	10	5F	20	5F
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78	<045U>	8A	6E	66	21	57	24	92	5F	0F	H1	54	1F	6D	0C	62	6D
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82	<049U>	64	5F	7E	6E	08	9A	86	9B	6U	5F	6U	6U	9A	6E	AF	65
83	<04AU>	01	3U	08	6U	05	5F	04	5F	9A	5F	54	6U	32	32	61	01
84	<04BU>	5F	31	07	08	6U	31	3U	5F	08	54	3U	08	5B	5B	AU	0U
85	<04CU>	5F	6E	06	6A	64	1Y	0F	07	6C	5F	07	6U	1Y	0E	06	69
86	<04DU>	72	05	6E	05	7E	06	5F	06	5F	07	H3	1C	5F	05	0U	1D
87	<04EU>	2U	67	04	6C	04	04	04	3U	B3	5F	05	07	72	B6	6D	69
88	<04FU>	69	9U	06	6E	5F	6A	2U	3U	3U	6E	62	6E	6E	5F	5F	0U
89	<050U>	77	0U	0U	31	1U	0U	18	1C	8A	3U	7B	12	18	12	3U	5F
90	<051U>	1U	53	31	94	1U	59	5F	1U	3U	11	3U	31	65	31	U1	07
91	<052U>	2F	3U	1Y	18	1Y	18	31	01	5F	23	76	18	13	1U	5F	69
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94	<055U>	28	5F	06	5F	07	68	8U	8U	78	68	05	68	68	07	07	68
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96	<057U>	5F	5F	85	55	5F	67	91	8U	76	8U	68	5F	57	76	8F	0U
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101	<05CU>	07	0U	0U	0C	5F	0U	6C	5F	5U	5F	0U	5F	74	5F	05	6B
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105	<060U>	5F	0U	0U	5F	6A	0U	67	8U	6B	8C	0U	5F	5F	76	6H	19
106	<061U>	54	97	54	7Y	0U	0U	9C	6B	0C	4U	8U	6A	74	97	UC	97
107	<062U>	66	6H	3U	5F	8U	79	7B	0D	8H	5C	0U	0E	0U	0C	6F	6H
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115	<06AU>	7E	5F	8C	7E	8U	63	64	64	56	5F	0U	6F	07	6H	0C	6H
116	<06BU>	56	57	7C	55	87	5F	0E	03	HF	H5	06	68	06	7E	19	0U
117	<06CU>	68	4U	7A	1Y	05	91	AD	8H	0E	93	0F	5F	76	56	F3	6A
118	<06DU>	53	6B	55	5F	56	06	0F	73	63	07	04	6F	6F	6B	0E	5F
119	<06EU>	E4	7Y	0F	0E	5F	6E	67	4U	1Y	7D	91	54	04	1Y	5F	5D
120	<06FU>	5F	5F	63	6B	54	AB	74	6B	5D	49	H2	B8	68	6B	E9	0U
121	<070U>	54	4U	75	5F	56	8F	06	6H	33	74	04	75	06	68	92	74
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123	<072U>	8F	6A	AA	28	82	A4	5F	6F	8F	0E	5F	36	66	68	B4	11
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133 <U7CU> 5F UU UU 14 14 FU 2E 14 2E 2E 7E 2U 5F 14 2A 14
134 <U7DU> 14 14 3U 27 5F UC 14 14 2A 14 27 14 14 14 2E 4F
135 <U7EU> UH 25 2F 2D 14 15 UU 2H 26 1U 08 2C 14 2E 2U 6A
136 <U7FU> UC 14 2D 14 14 14 2F 1B 6B 26 2C 5F 00 40 5F 00
137 <U8UU> 5F 8H 4U 5F 2F 5F AH 1U 5F 5F 6E 0H 94 54 A3 2F
138 <U8IU> AE 99 1B 71 5F 1U 5U 87 66 54 A3 85 62 0C 5F 8U
139 <U82U> 4U 61 55 5F 72 64 5F 55 5F 95 7U 1U 1B 5F 54 5F
140 <U83U> BH 3D 95 8D 6U 0C U9 5U 66 5F 1U 0B 1B 1B 09 0U
141 <U84U> 5F BH 7U 0B 1E 2E 1B E4 5F 5F 5F 21 22 3E 6B 13
142 <U85U> B4 E9 E4 E4 2E E9 HB 9A 6B 8B 5F 0E 2A 2U 2U 2U
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144 <U87U> 13 0E 6B 31 0B 0U 5F 29 29 1U 8U 53 53 A7 A7 0U
145 <U88U> 5F B3 7U 52 B2 4U 0U 5F 0C 56 7E 6E 0E 01 6E 67
146 <U89U> 8D 3F 74 3F 6E HU A5 H5 H6 74 66 66 0U H7 6A 5F
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148 <U8BU> 2U 56 5F 66 6A 65 5F 11 14 01 56 6E HU 0B 6E 0U
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163 <U9AU> 7A 66 6A 79 7B 2C 7A 74 19 0U 0U 6A 6A 7B 54 BH
164 <U9BU> 54 54 4B 6F 0U B2 0U 6E BE 5F AC 7F 6E 0U 64 0U
165 <U9CU> 56 8U 7E 63 05 BE 5F 19 0U B2 0E 4B 04 4B 06 9A
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167 <U9EU> AF 0E 5F 56 BE 19 0U 5F 5F 19 B2 74 BE 0F 7E 19
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182 <UADU> 3U 1U 7U 07 56 06 15 5F 54 01 5D 6C 6U A5 8D 34
183 <UAEU> BH 31 2B 5F 6F 75 94 2U 1U A3 85 0B A5 23 34 8D
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188 <UH3U> 04 6B 2U 2U 9B 9B F6 5C 64 53 H1 1B 0F 3D 04 0U
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190 <UH5U> 97 55 7A 97 6U 85 97 6E 97 6B 54 55 54 54 11 6B
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192 <UH7U> 69 AC 5F 5F 5F 67 69 5F 4U 76 7B 6C 69 2U 4U 0U
193 <UH8U> 64 6E 1U 25 21 2U 9U 2U 56 A2 0F 54 34 54 1F 77
194 <UH9U> 5F 6E 2U 5F 2U 5F 0B 57 21 6U H3 1U 5F 5F 0F 5F
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 204 <UC3U> 65 54 2F 8D 0E 05 19 5B 01 0D 6C 8B 6A 65 67 00
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265 *

266 *

music

267 *

RUM addr 0000H thru 00FFH

268 *

269 * addr 0 1 2 3 4 5 6 7 8 9 A B C D E F

270 *

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286 <00F0> 01 29 2D 01 00 09 00 09 00 1D 01 FF FF FF FF FF

WHAT IS CLAIMED IS:

1 1. A hand-held electronic game comprising:
2 a plurality of manually operable control
3 pushbutton switches for permitting control of the play of
4 the game by a player;
5 sound transducer means for generating sound
6 responsive to sound signals;
7 control circuit means coupled to the control
8 switches and the sound transducer means, and including a
9 processor, a read-only memory, and a random access memory,
10 for generating game control signals and sound signals;
11 display means having selectively activatable
12 image segments corresponding to a plurality of player-
13 controlled figures, to a plurality of game-controlled
14 figures, and to alpha-numeric game information for
15 selective display thereof, said display means responsive to
16 said control circuit means control signals for display of
17 game images responsive to the game control signals such
18 that only one player-controlled figure is visually
19 displayed at one time at only one of a plurality of pre-
20 determined positions and the position at which the player-
21 controlled figure is displayed is moveable to an adjacent
22 position responsive to activation of a first set of the
23 control switches, some of said plurality of positions
24 corresponding to underwater positions with associated game
25 controlled intermittently activated snare device image
26 segments and some of said plurality of positions
27 corresponding to above-water positions with associated game
28 controlled attacking image segments, said processor
29 comprising means for generating signals to display
30 destruction of the player controlled image while in an
31 underwater position in response to movement through one of
32 the snare devices during an activated period and while in
33 an above-water position in response to simulated collision
34 with an attacking image segment, and means responsive to a
35 control switch for enabling the player to destroy an
36 attacking image segment prior to simulated collision.

1 2. The game of Claim 1 wherein the plurality of
2 player-controlled figures comprise a plurality of turtle
3 figures and the plurality of game-controlled figures
4 comprise attacking mouser and throwing star image segments
5 which may be displayed sequentially to simulate attacking
6 motion.

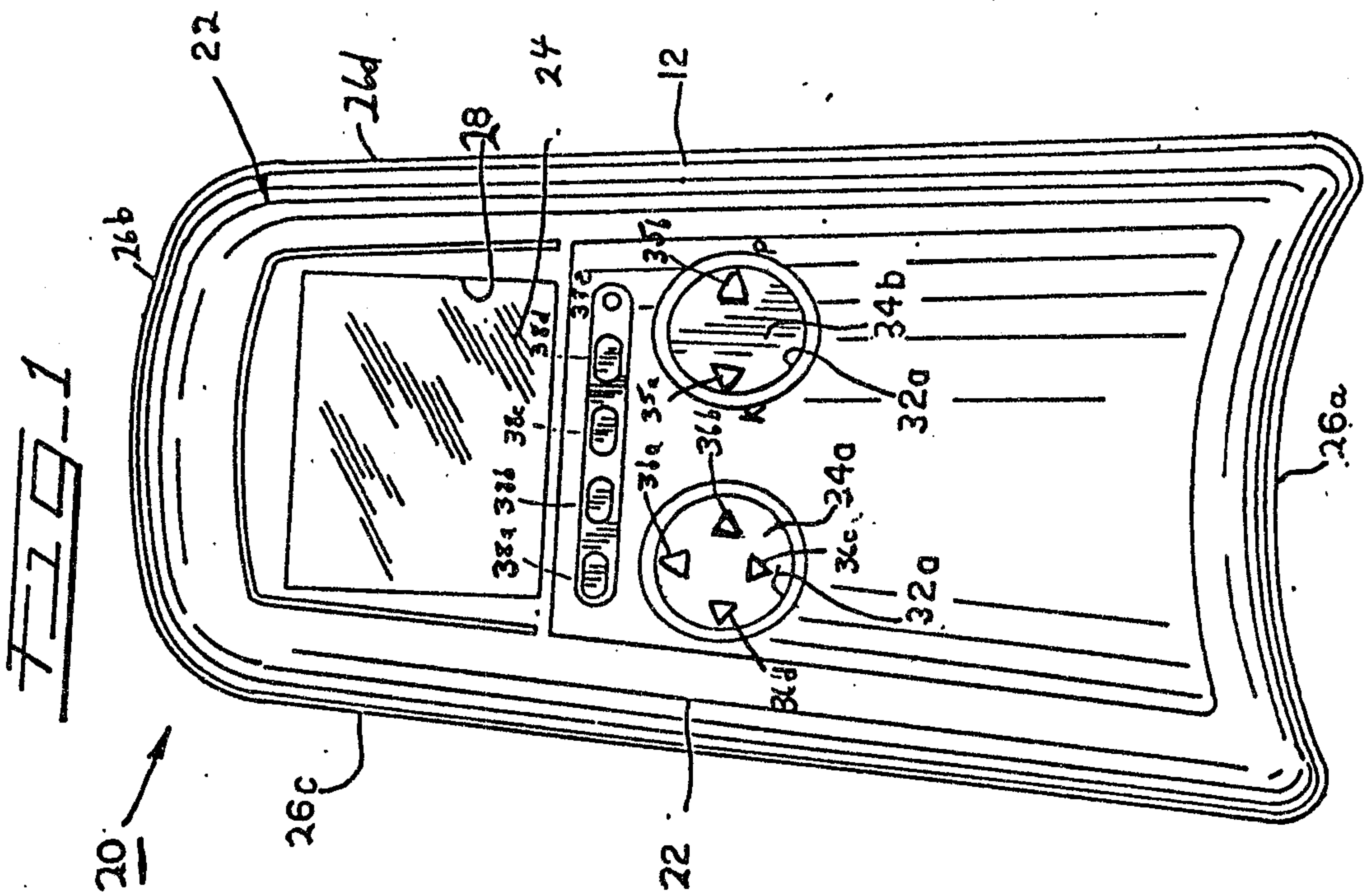
1 3. The game of Claim 2 wherein the processor
2 comprises means for controlling display of a punching arm
3 image segment and a sword image segment associated with a
4 displayed player controlled turtle figure, and for
5 simulating destruction of mouser image segments responsive
6 to activation by the player of a punching and sword
7 activating control switch pair.

1 4. The game of Claim 3 wherein the processor
2 comprises means for controlling the display of dynamite
3 image segments to simulate availability of dynamite, and
4 retrieval of dynamite by a player-controlled figure.

1 5. The game of Claim 4 wherein the processor
2 comprises means for accumulating a score responsive to
3 simulated destruction of mouser image segments and for
4 controlling display of the score.

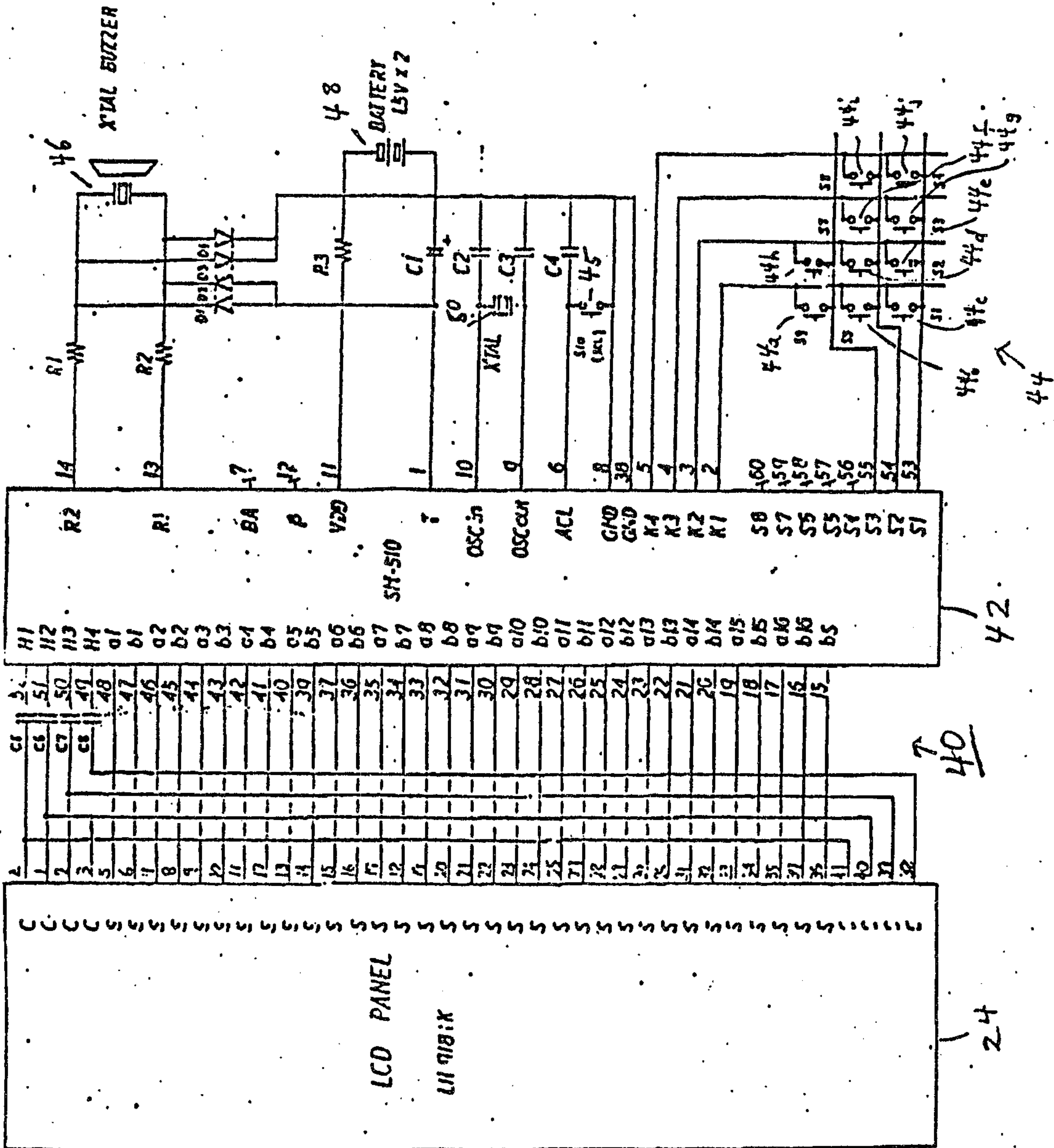
1 6. The game of Claim 5 wherein the game-
2 controlled figures comprise a digital counter and the
3 processor comprises means for setting a predetermined
4 number in response to the player-controlled turtle figure
5 entering an underwater position, for decrementing the
6 counter periodically until the player-controlled turtle
7 figure exits the underwater position and for simulating
8 destruction of a player-controlled turtle figure.

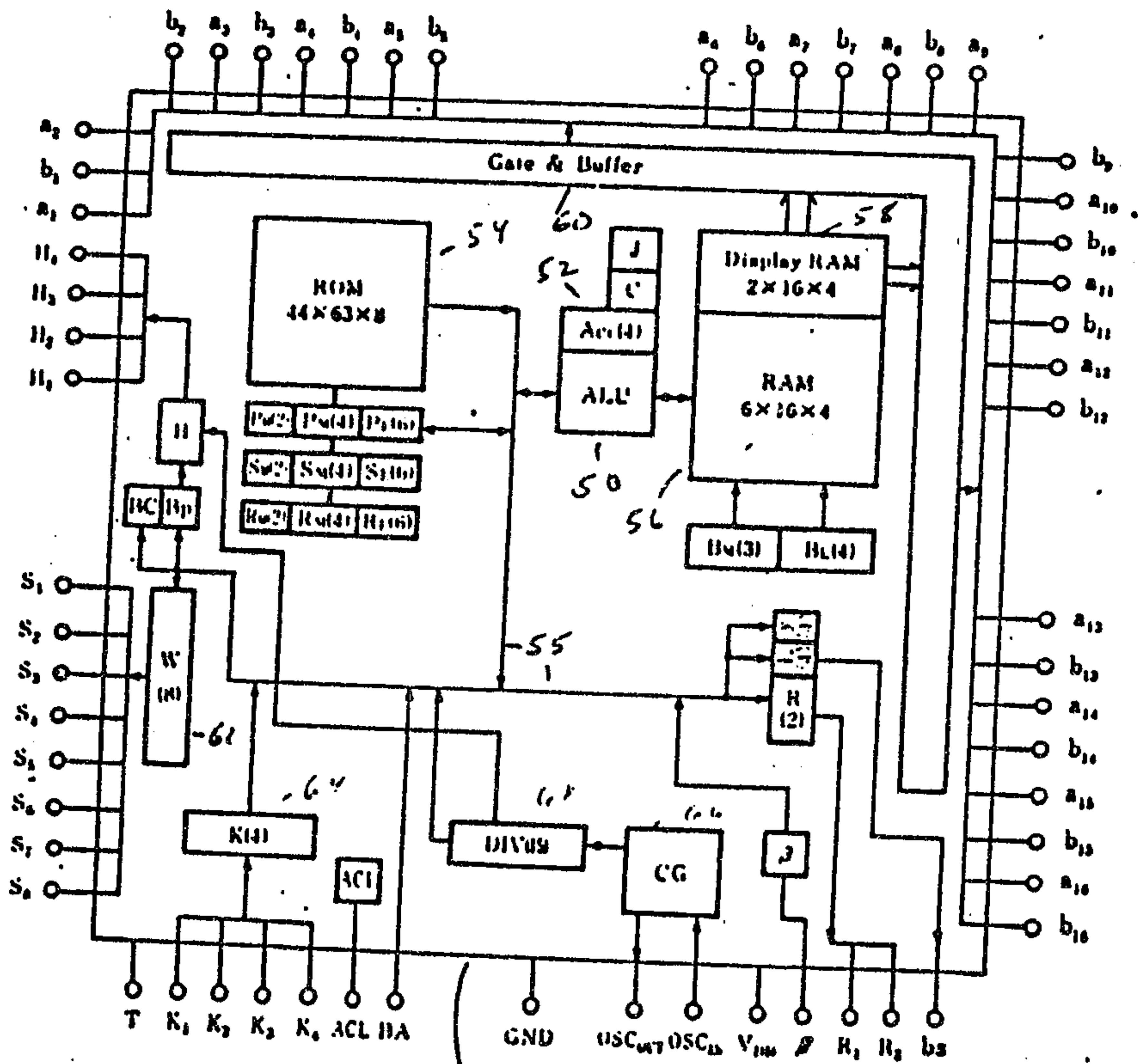
1 7. The game of Claim 6 wherein the game-
2 controlled figures further comprise a prisoner image
3 segment enclosed by a capsule image segment and wherein the
4 processor comprises means for controlling the display of
5 the capsule image segment and prisoner image segment to
6 simulate freeing a prisoner.



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FIG. 2A





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FIG 2B

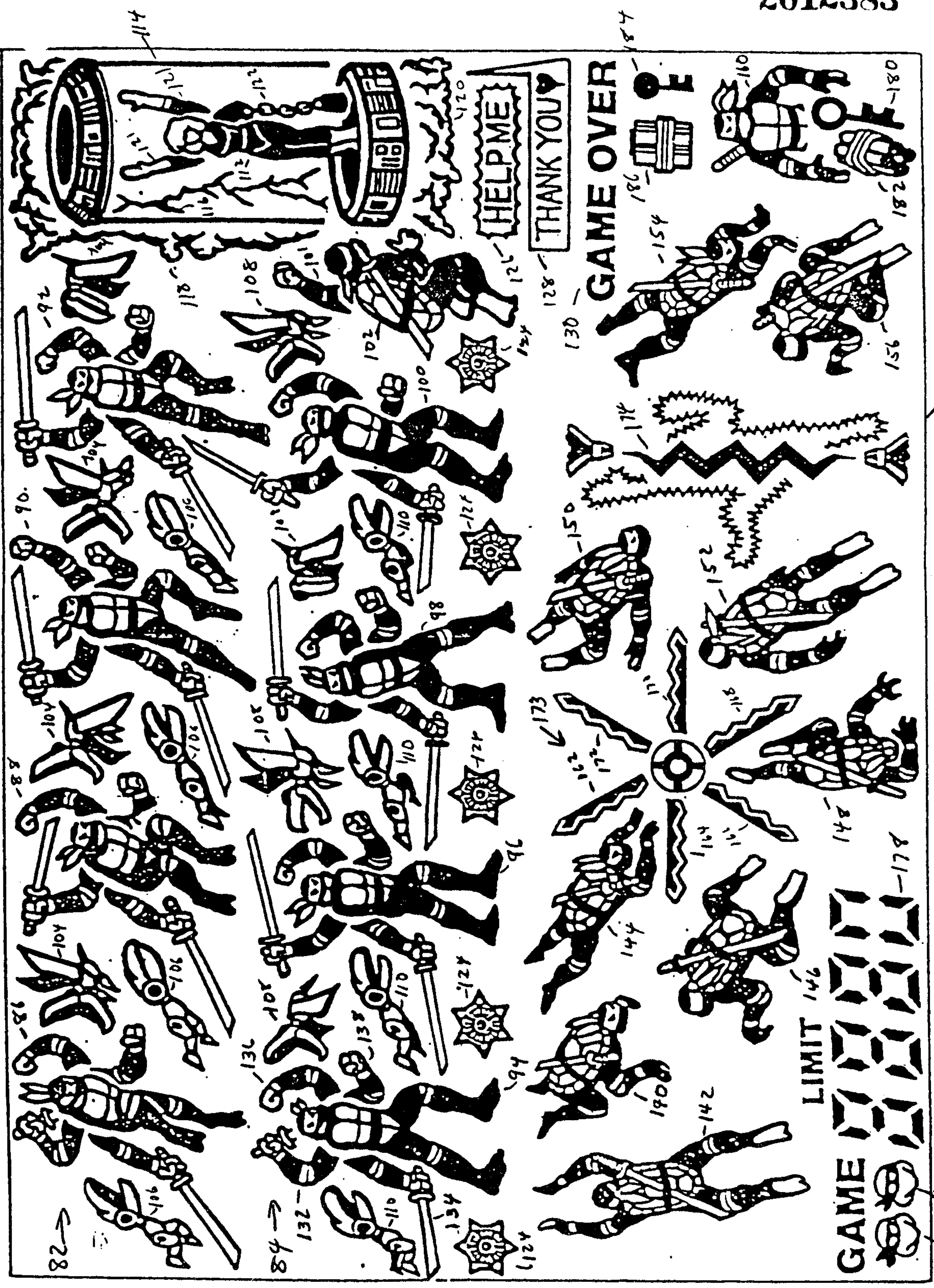


FIG. 3

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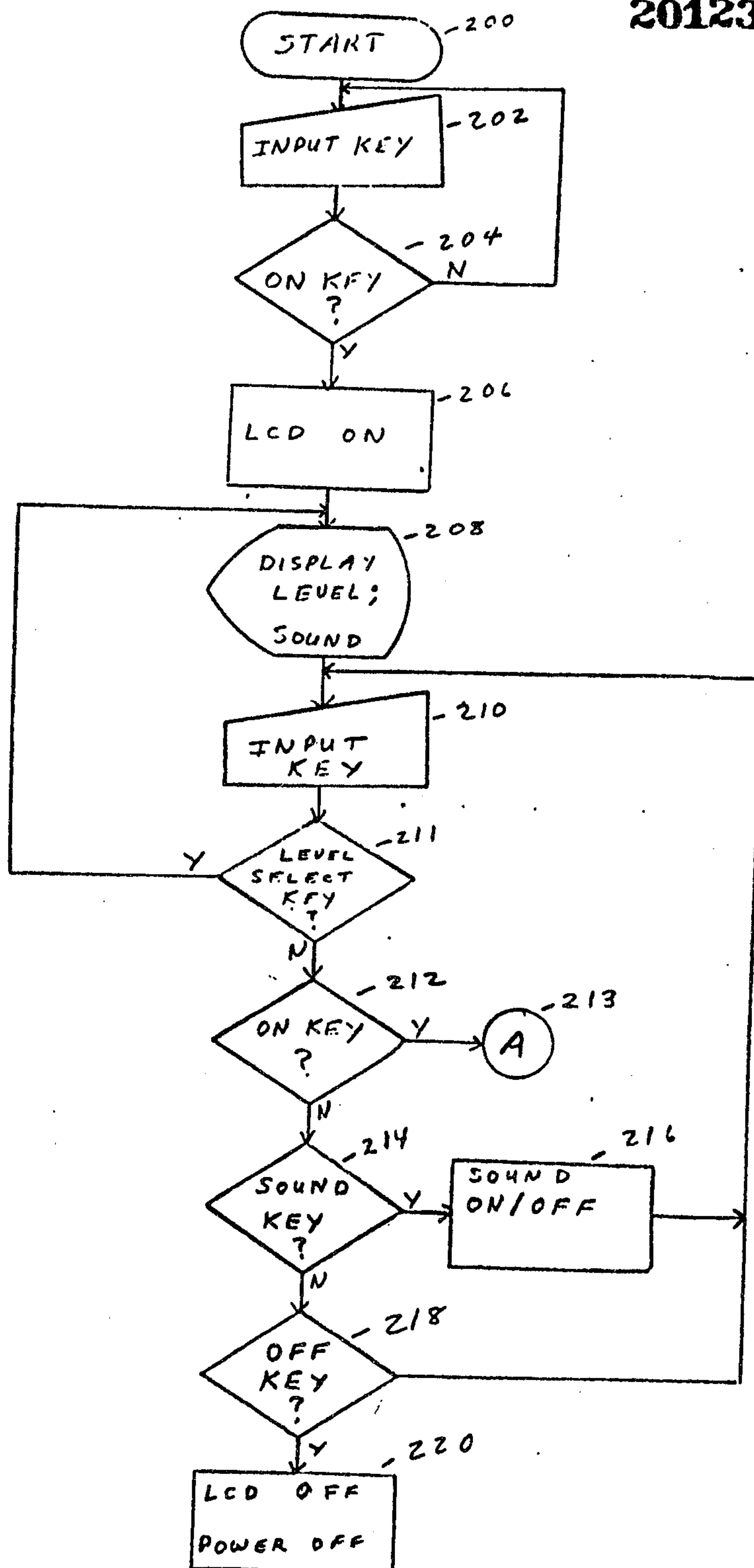


FIG 4A

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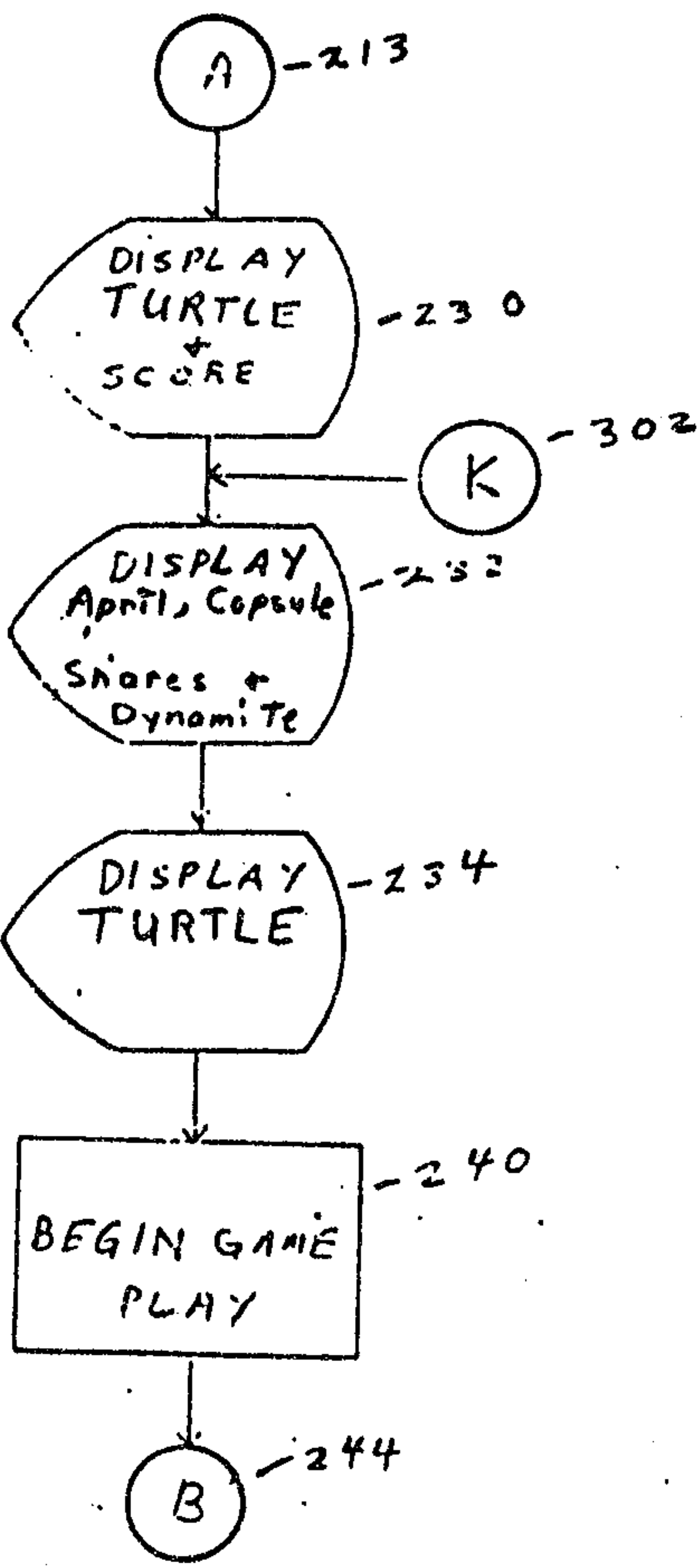


FIG 4 B

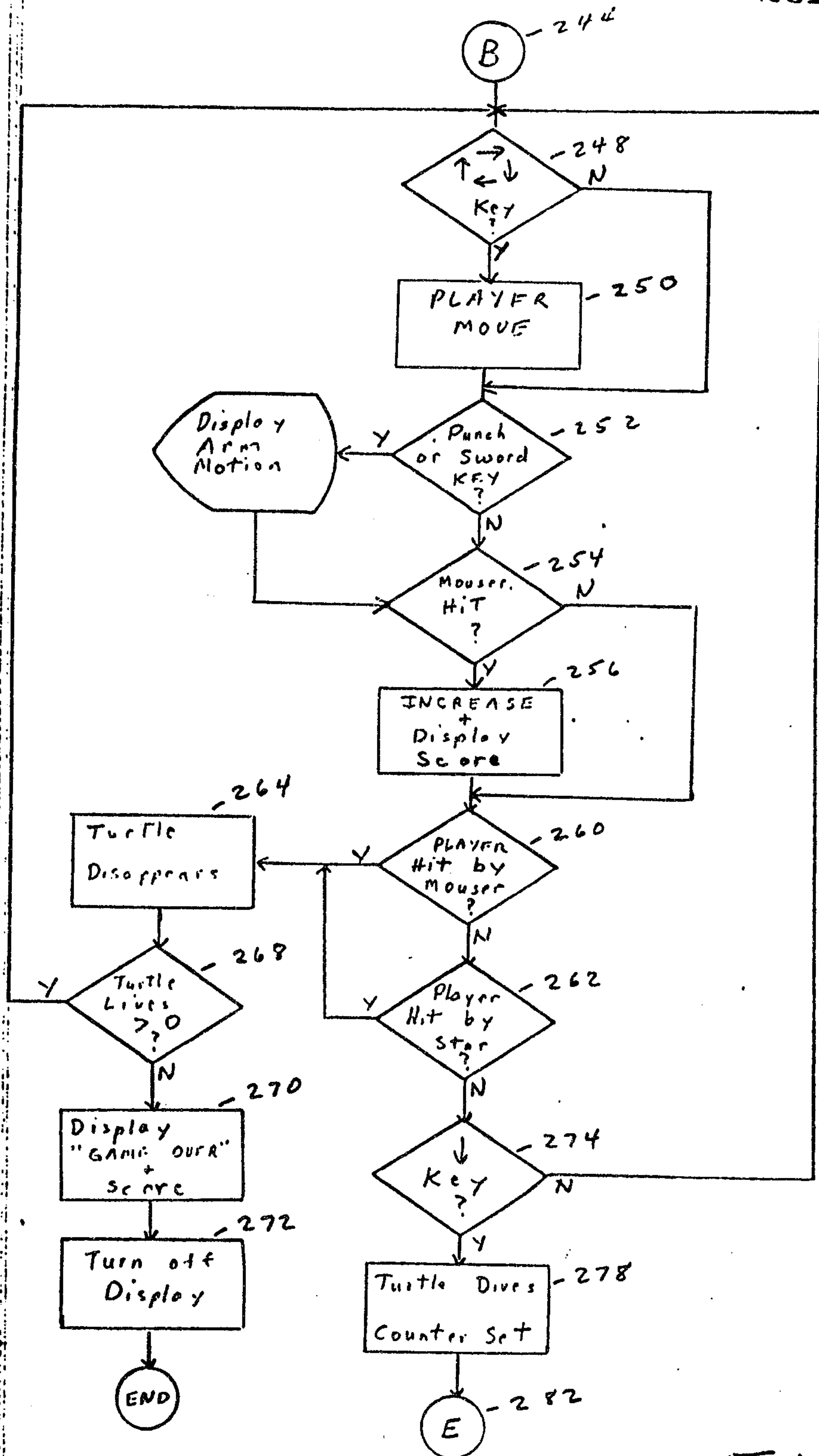


FIG. 4C

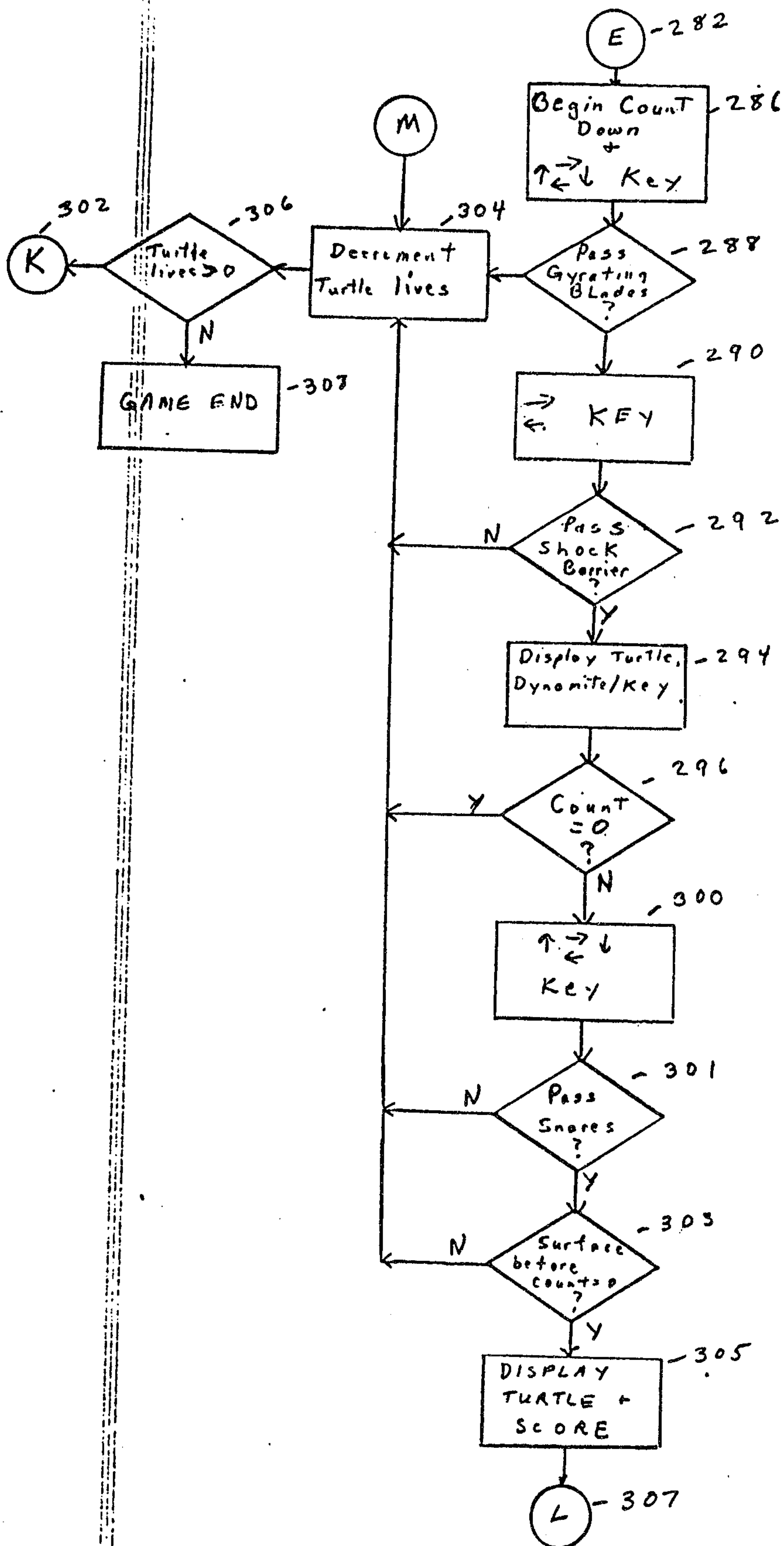


FIG. 4D

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Agent for Applicant

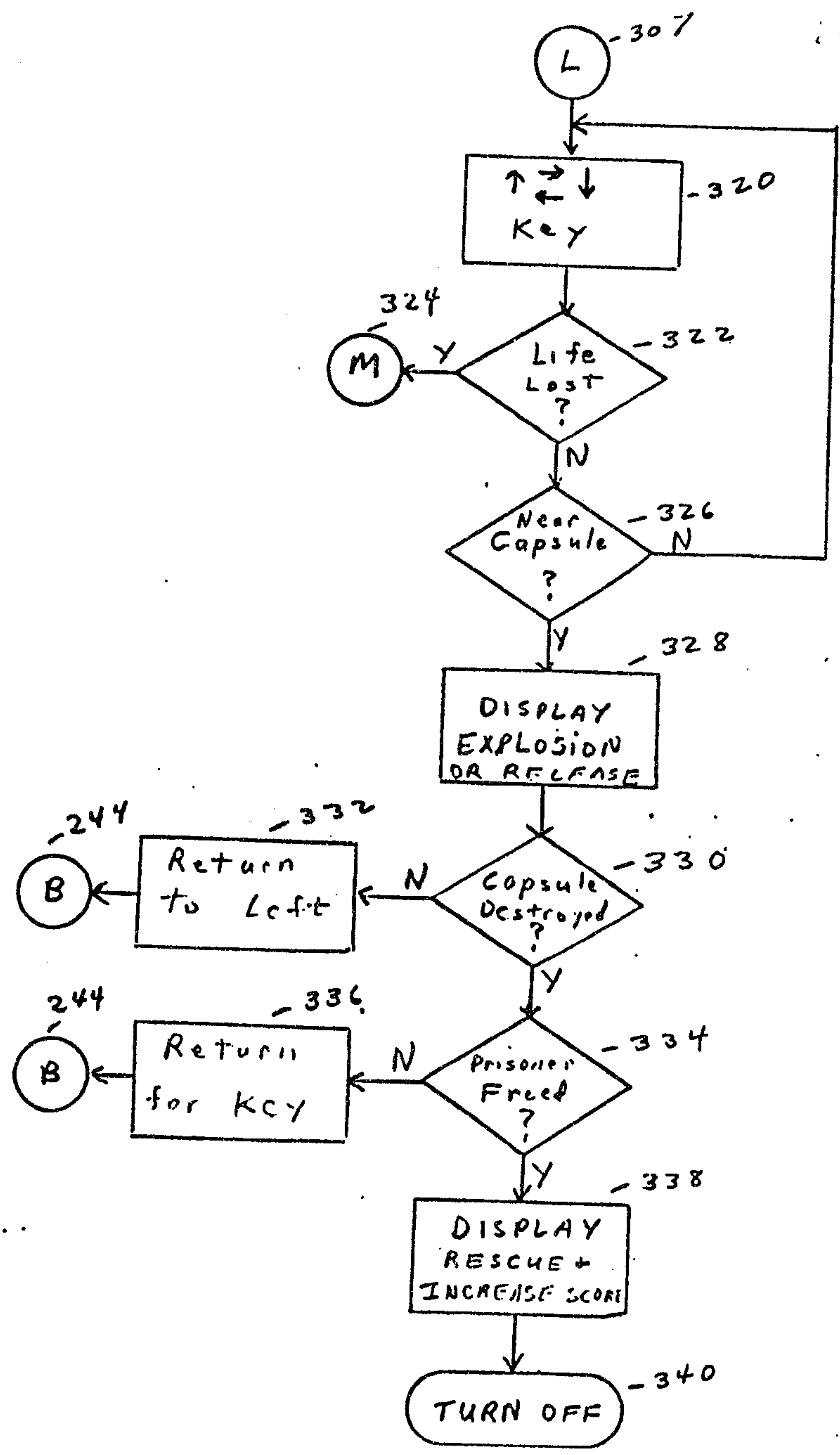


FIG. 4E

