

[54] TARGET GAME

3,764,142 10/1973 Stubbmann..... 273/DIG. 26

[75] Inventors: **Gunars Licitis, Lombard; Marvin I. Glass, Chicago, both of Ill.**

Primary Examiner—Anton O. Oechsle
Assistant Examiner—Marvin Siskind
Attorney, Agent, or Firm—Coffee & Sweeney

[73] Assignee: **Marvin Glass & Associates,**
Chicago, Ill.

[22] Filed: Feb. 26, 1973

[21] Appl. No.: 335,764

[57] **ABSTRACT**

[52] U.S. Cl. 273/101.2, 273/DIG. 26, 273/102.1 B,
273/102.1 C

[51] Int. Cl. F41j 9/00

[58] **Field of Search**..... 273/102.2 R, 101.1, 101.2,
273/148 R, 105.2, 105.6, DIG. 26, 102.1 R,
102.1 C, 86 R

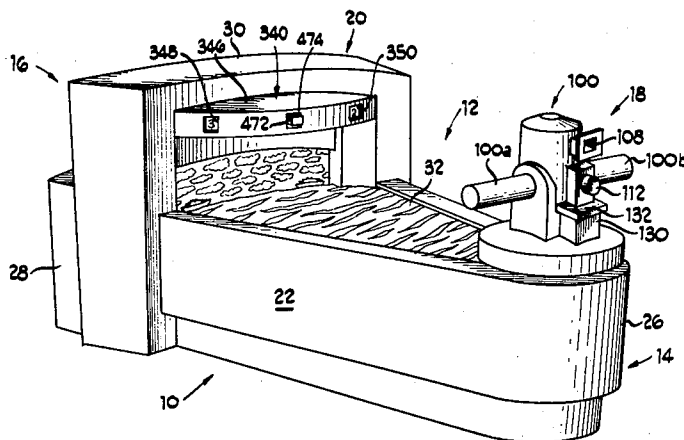
[56] **References Cited**

UNITED STATES PATENTS

1,743,201	1/1930	Fey	273/101.2
2,300,132	10/1942	New	273/101.2
2,743,928	5/1956	Durant	273/101.2
3,531,120	9/1970	Ross	273/101.2
3,635,477	1/1972	Ochi	273/101.2
3,712,615	1/1973	Staats	273/86 R

A target game characterized by the provision of a housing with targets mounted for lateral movement across one end of the housing and a sighting and firing mechanism at the other end of the housing. The sighting and firing mechanism is associated with a pivotal arm having a movable finger which is engageable with the movable targets to strike the targets and terminate the normal path of movement of the targets. The movable finger is also associated with a light transmitting beam for simulating the advancement of a simulated projectile toward the target. In addition, the radiating arm further carries a signal indicating light at the end thereof for actuation responsive to engagement of the movable finger with the movable target and sound producing means which changes its signal dependent upon the functioning of the simulated projectile.

49 Claims, 17 Drawing Figures



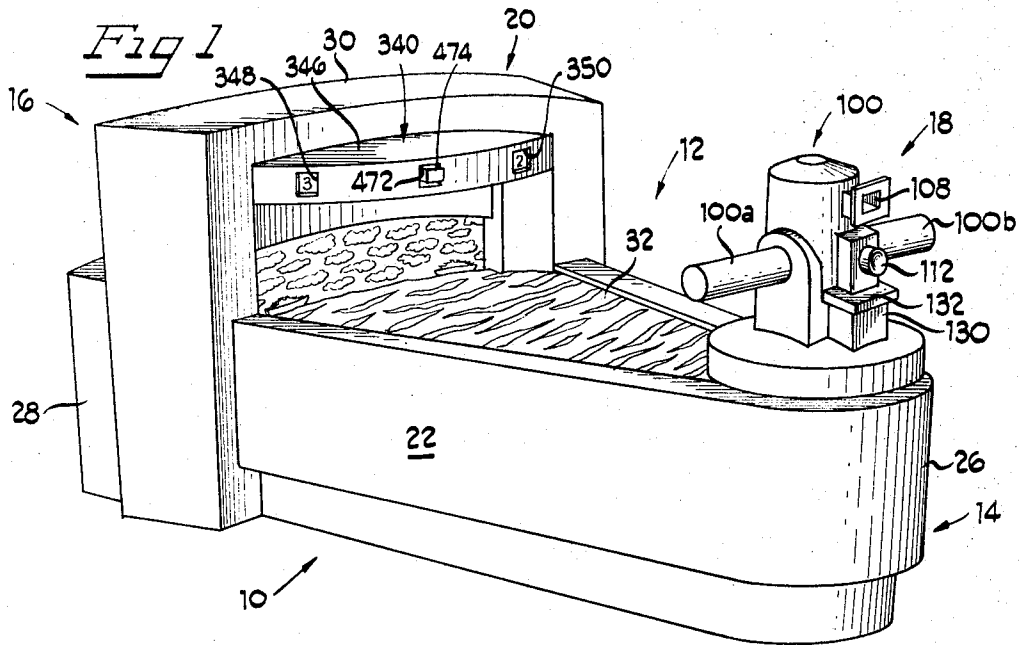
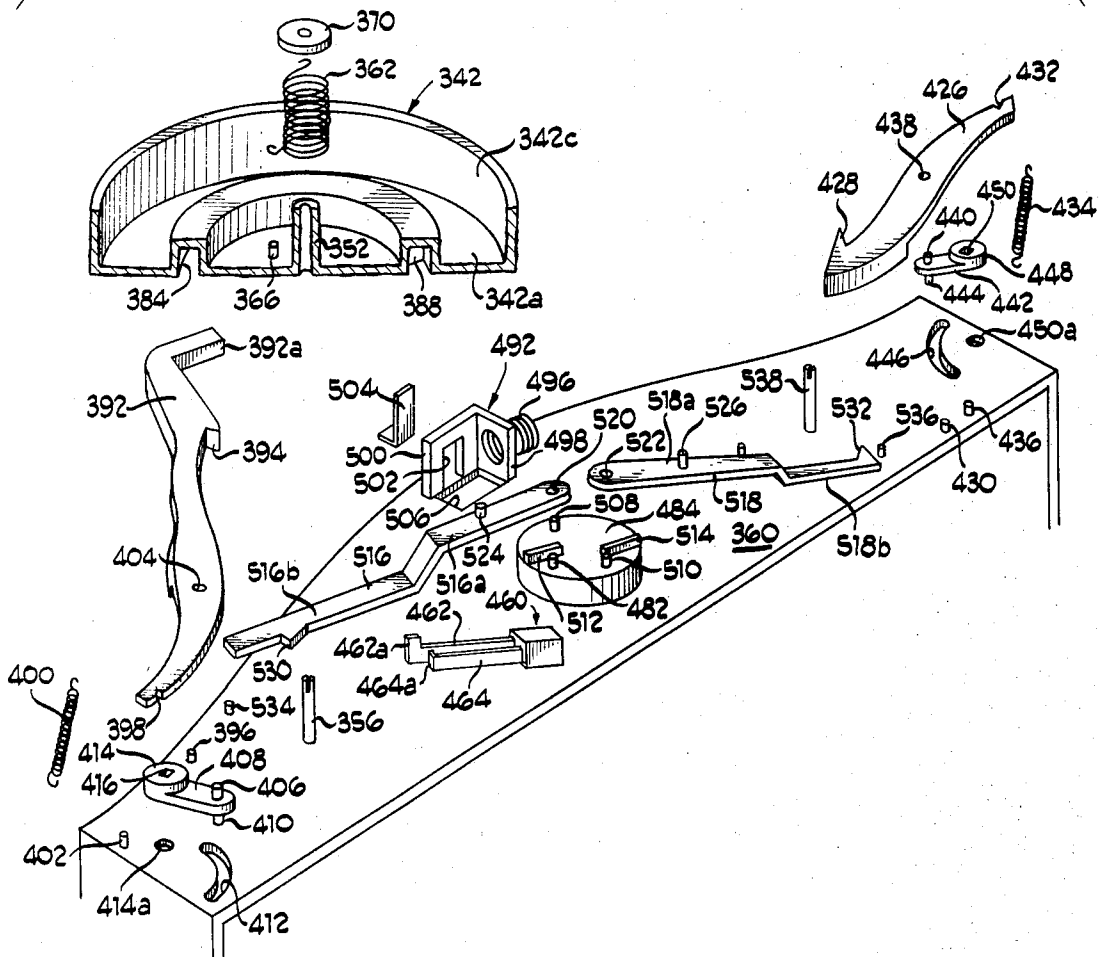
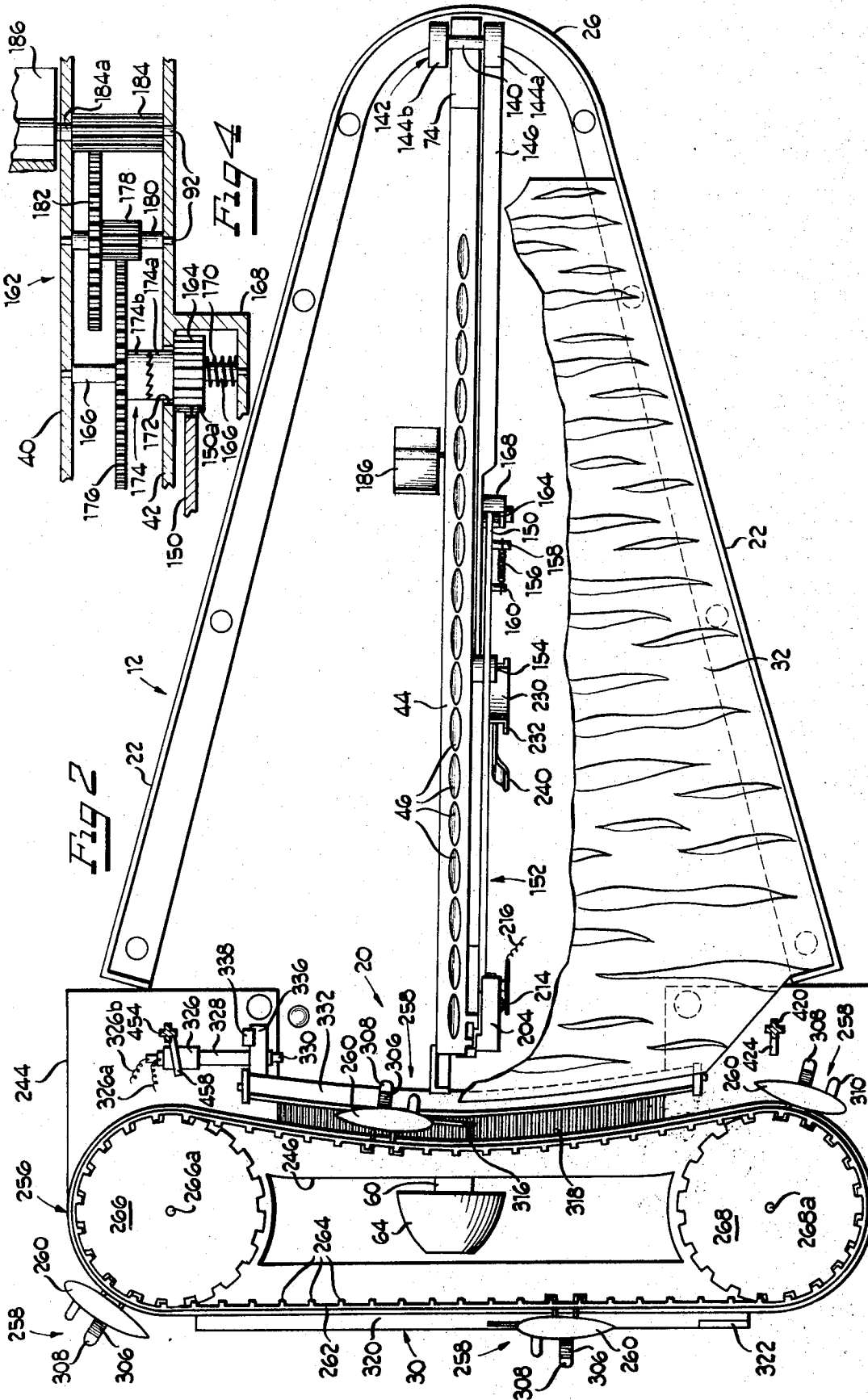
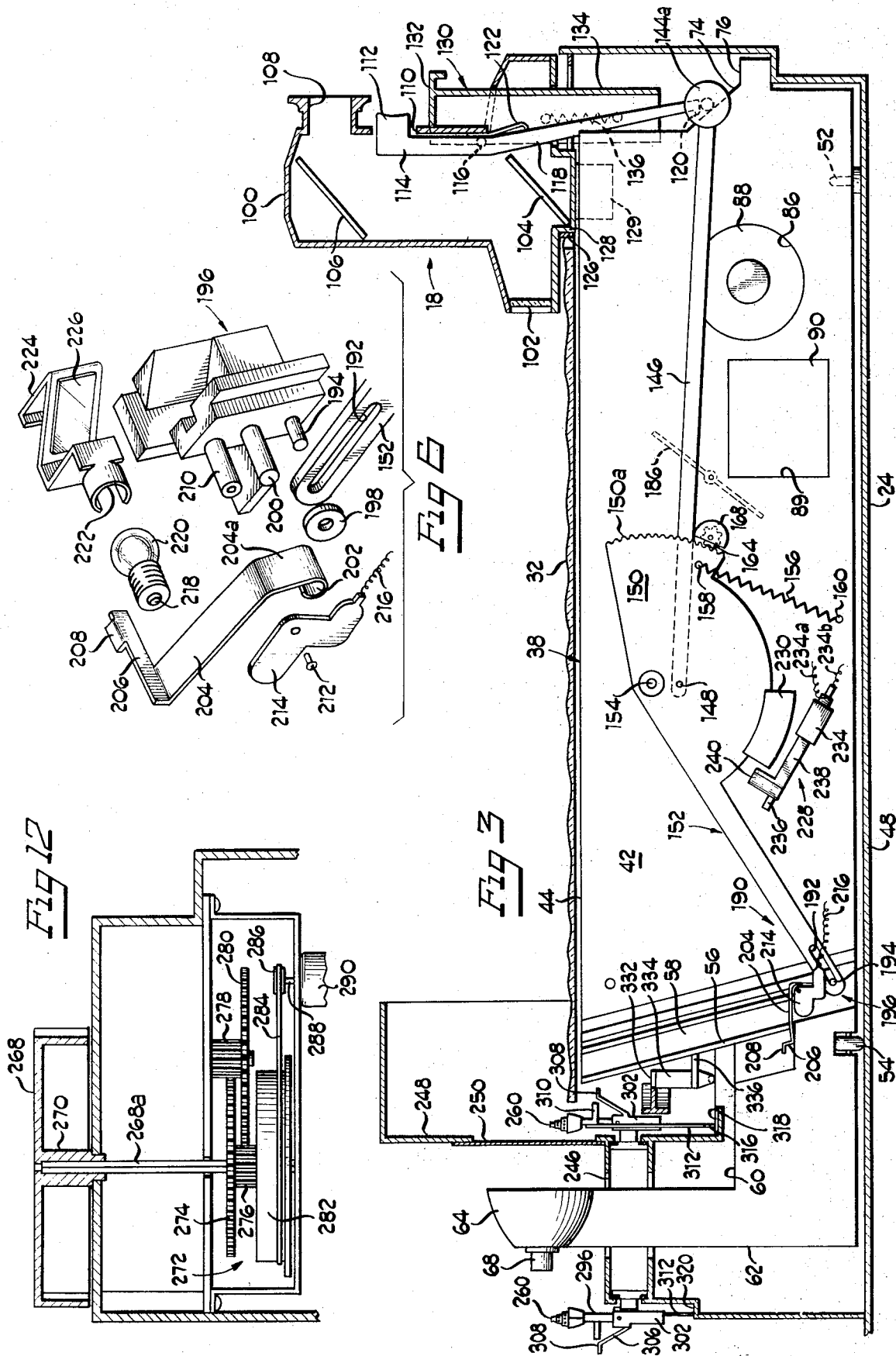
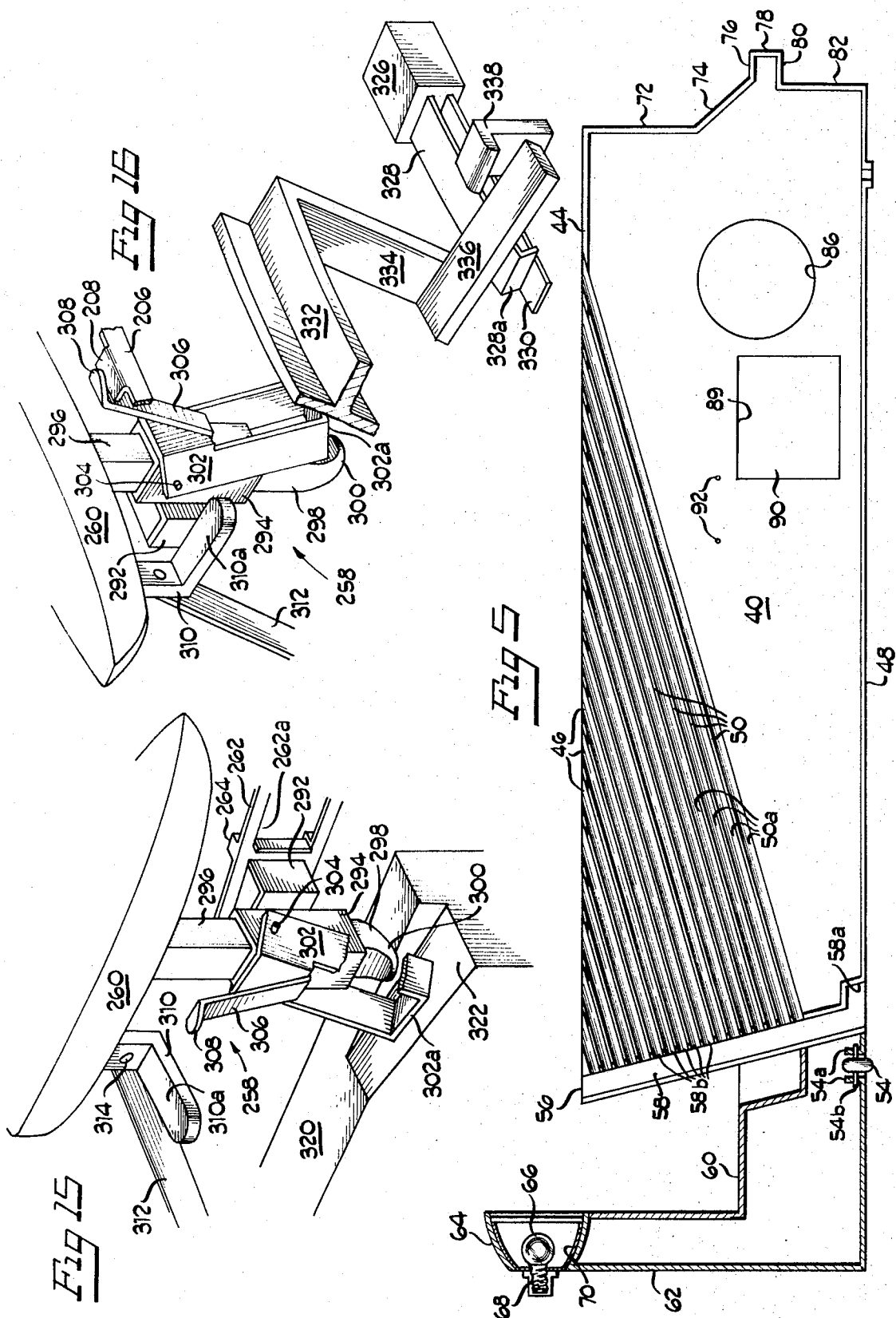


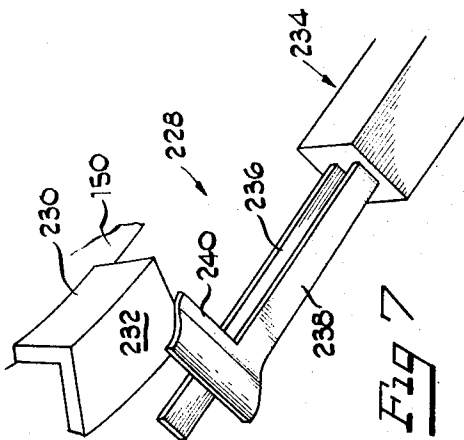
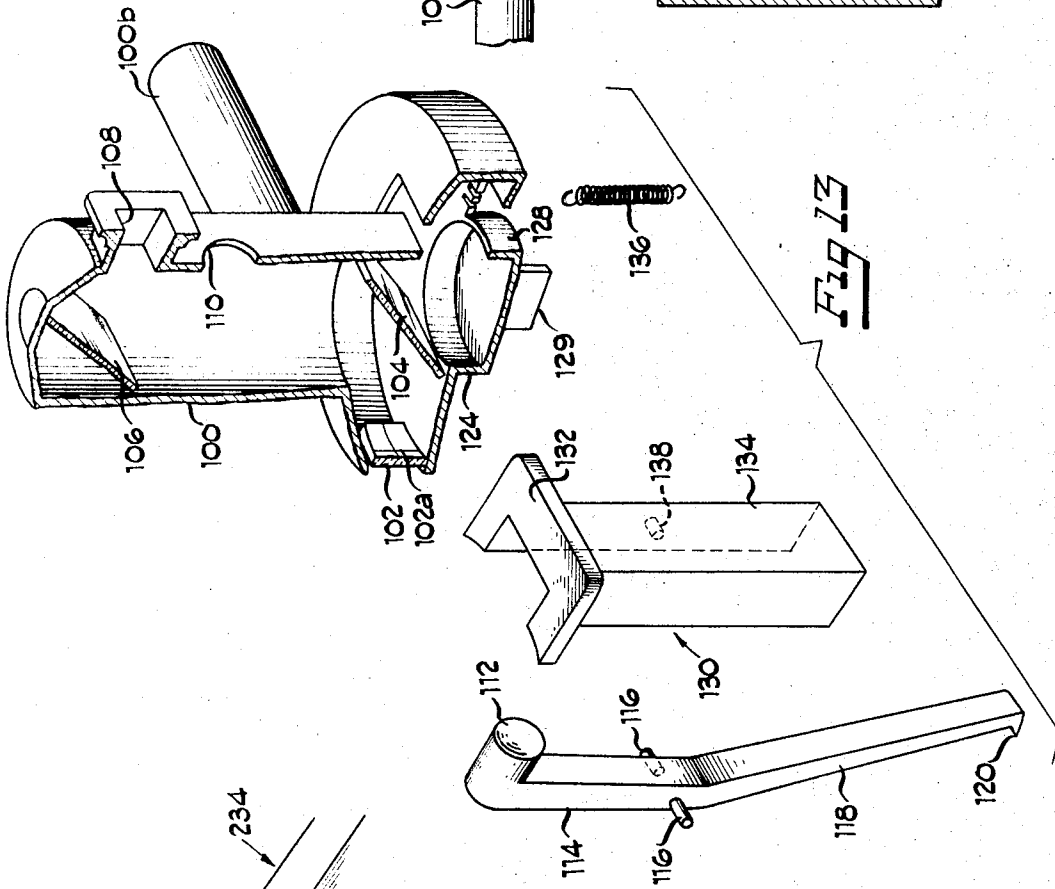
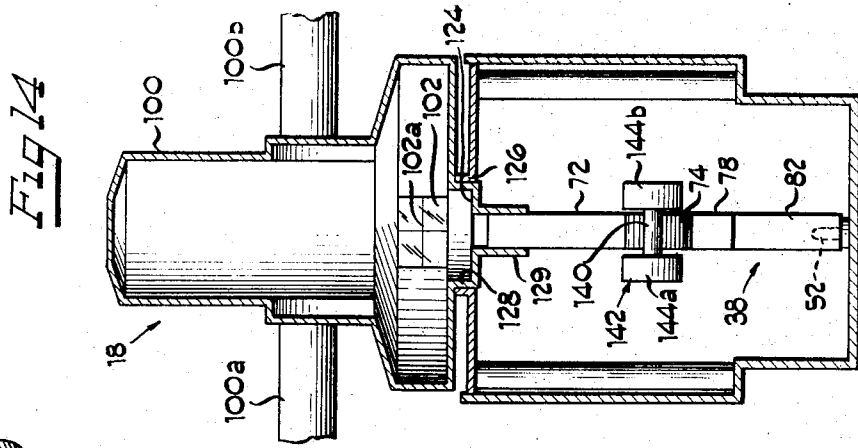
Fig 10

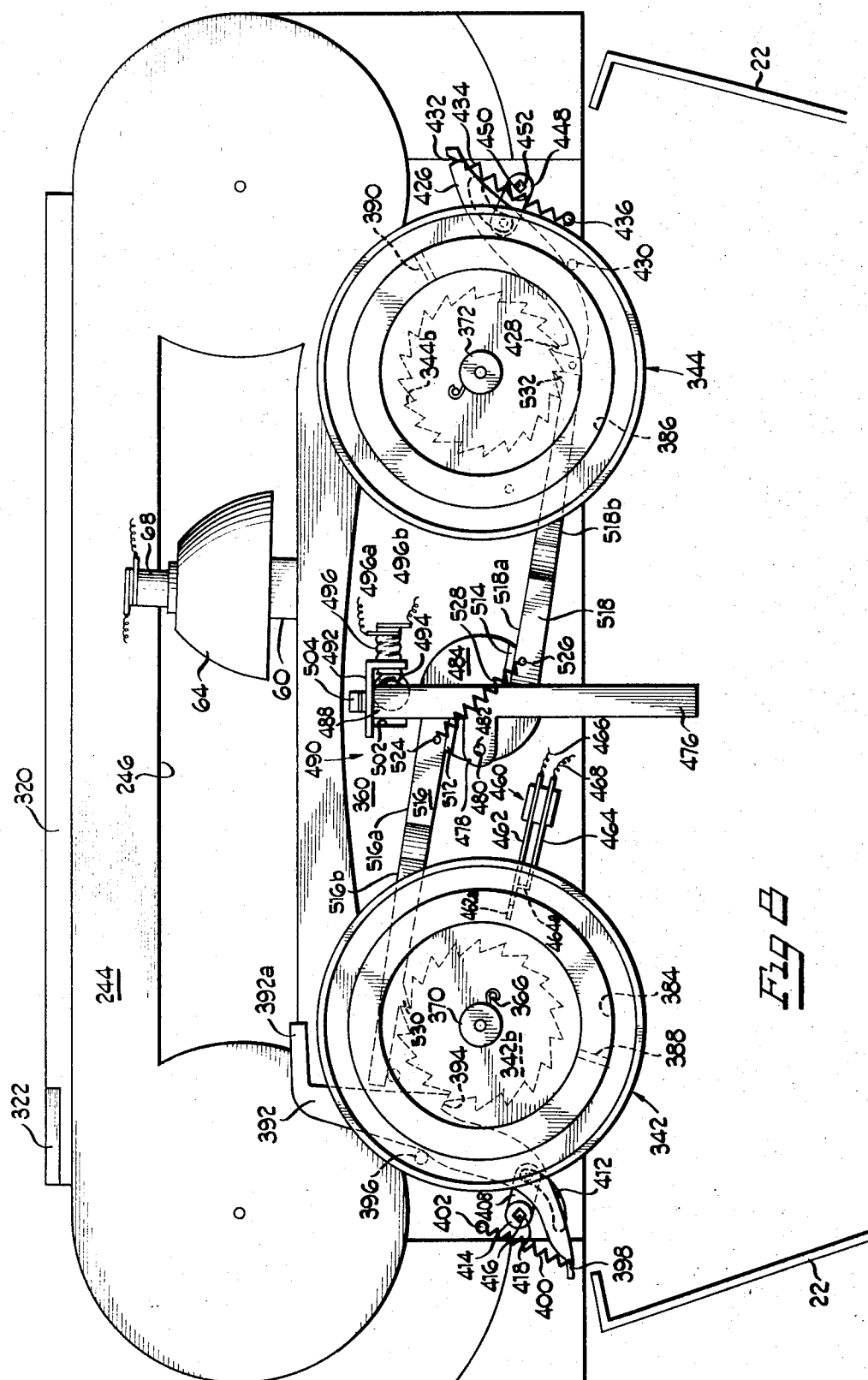


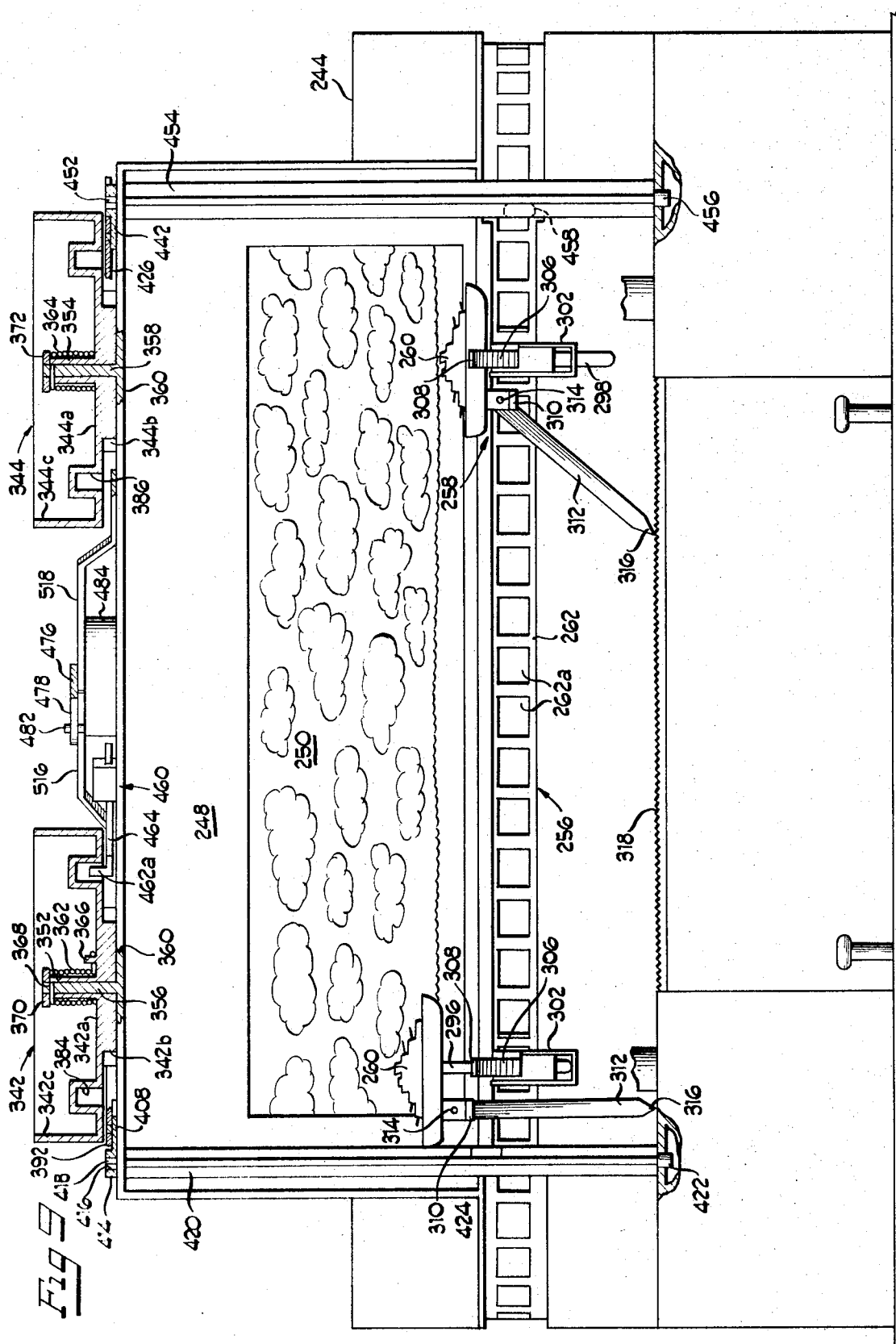


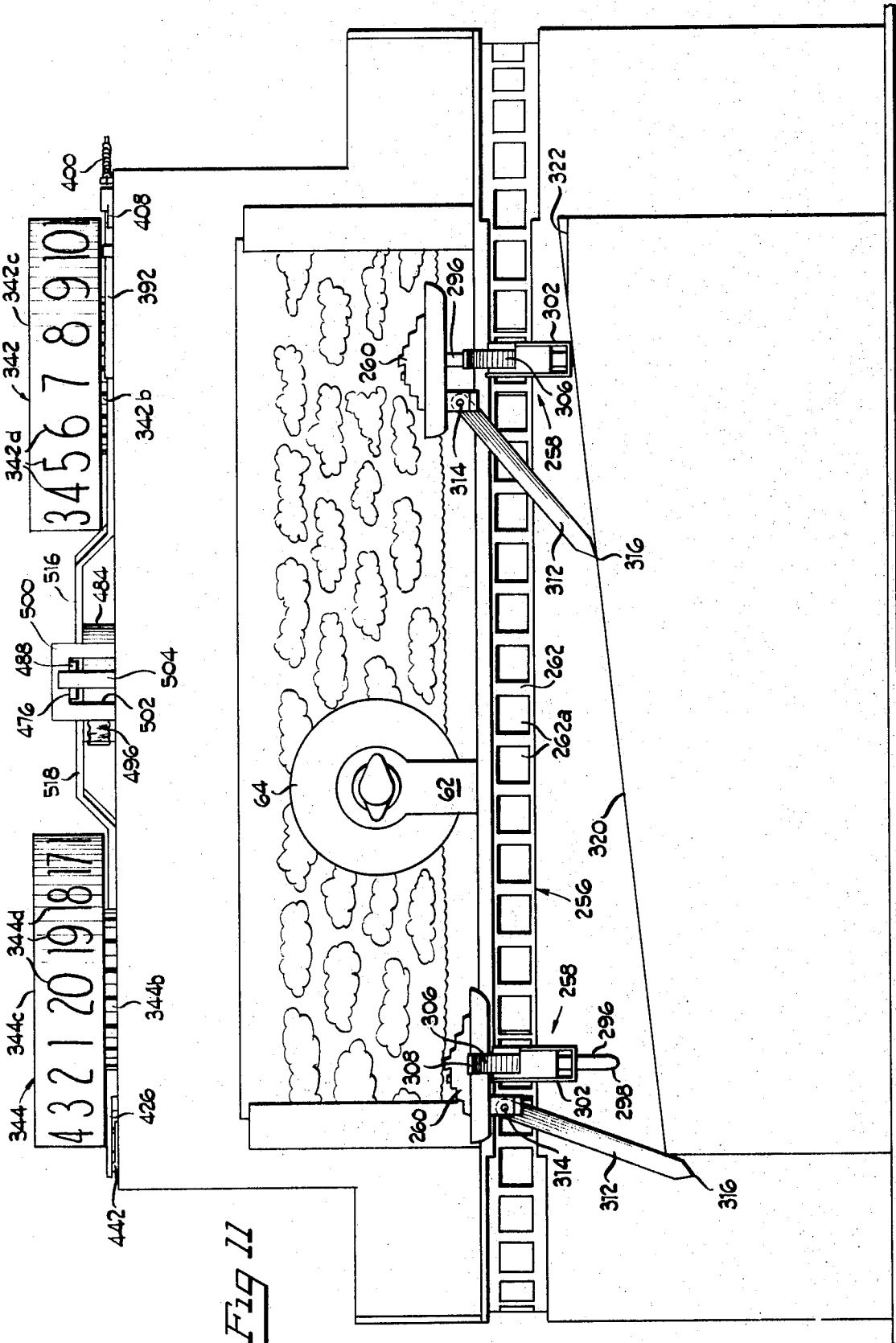












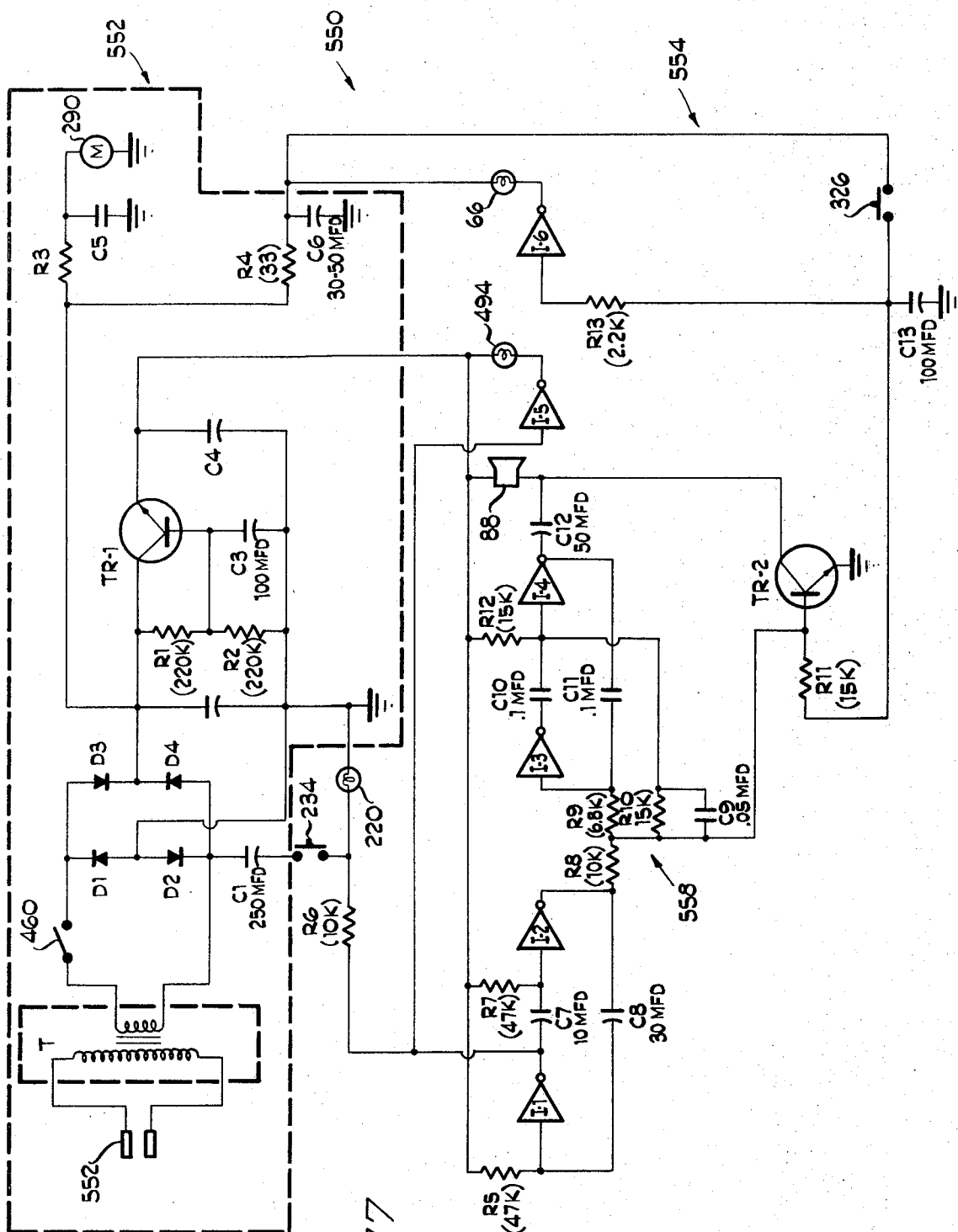


Fig 17

1

TARGET GAME

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to target game devices and more particularly to the types of target games found in Class 273 subclass 101 wherein a target laterally traverses one end of the game board and a firing assembly is pivoted at the other end of the game board and is associated with a radiating arm having a component for striking the target.

2. Brief Description of the Prior Art

Target games including pivoted projectors or missile firing elements for aiming at a moving target or stationary target include the following patents:

Glass 2,805,064
Glass 3,211,456

Koci 3,269,739
Zale 2,899,205

The new U.S. Pat. No. 3,200,132 shows a target game wherein simulated ships traverse one end of the game board and a simulated periscope is mounted to the other end of the game board. The periscope is connected with a pivoted radiating arm which includes a simulated light transmitting portion and has a displaceable end member for engagement with the laterally traversing ships.

The Fey U.S. Pat. No. 1,743,201 shows a target game wherein a gun is mounted to one end of the game board and connected with a radiating arm which has a movable plunger at the other end for tripping a laterally traversing target element if the gun is fired in proper timed sequence with respect to the lateral path of travel of the target element. Einfalt U.S. Pat. No. 3,620,534 shows a target game wherein a gun is provided at one end of the game board and is connected with a radiating arm. At the other end, the arm has an upstanding element which is intended to strike the rear of a target area to indicate a "hit" if the gun is fired in proper timed relationship with respect to the moving target.

Target games are generally well received in the art in that they require the combined skill of sighting and aiming so that the participant must fire in a proper timed relationship to a movable target. In being so well received, improvements in these types of games are further welcomed. Accordingly, the object of this invention is to provide an improved target game wherein the target laterally traverses one end of the game board and a sighting and firing assembly is connected at the other end and associated with a pivoted arm for aiming and firing a simulated projectile or missile toward the laterally traversing target.

SUMMARY OF THE INVENTION

This invention is directed, in brief, to an improved form of a target game.

The best mode currently contemplated for carrying out the invention includes the provision of a housing having a simulated ocean field of battle thereon. One end of the housing is provided with an upstanding stage-like target field and a plurality of ships are connected to a belt which is wrapped around at least one driving and one idler wheel for driving the ships laterally across the end of the housing in the area of the target field. The ships having depending tracking portions which are yieldable to lower the relative elevation of

2

the ships responsive to engagement thereof and the rear of the target field of the housing has a supplementary tracking portion for restoring the telescoped ships to the original elevation prior to traversal across the front of the target field on the next cycle of operation.

One end of the housing is provided with a simulated periscope assembly which includes sighting and firing type controls. This assembly is connected to one end of a pivoted, radiating arm. At its opposite end, the arm includes a movable leg which is provided with both a trip finger, for engagement with the ship support structure, and a light beam. The arm is provided with a series of downwardly and forwardly inclined light transmitting channels which terminate in forwardly extending openings at the top of the arm. The light beam and the movable finger travel upwardly in an upright channel at the opposite ends of the light transmitting channels so that, as the leg moves upwardly, the light beam shines through the channels and gives the illusion of a lighted object advancing toward the target.

The radiating arm further includes a source of light at the far end thereof behind the stage-like portion. This source of light is fixed to, and travels with, the arm. If the arm is properly aimed so that the finger engages a supporting structure of a laterally moving ship then the ship will gradually lose its elevation, appearing to sink. At the same time a contact will be closed which activates the light at the end of the arm, behind the target field, indicating that a "hit" has been made.

In addition, the device includes counter means for indicating the number of targets which have passed through the target field and separate counter means for indicating the number of targets which have been successfully intercepted. The device further includes audible signal means which produces the first signal when the device is activated, a second signal when the simulated projectile has been launched, and a third signal after target has been successfully intercepted.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the game of this invention;

FIG. 2 is a top view, partially broken away in section, of the game shown in FIG. 1;

FIG. 3 is a vertical section view through the game shown in FIG. 1;

FIG. 4 is an enlarged fragmentary section view through a portion of the radiating arm shown in FIG. 2, illustrating the governor mechanism for the missile arm;

FIG. 5 is a section view through the firing arm and guide tubes utilized in the target game in this invention;

FIG. 6 is an exploded view of the details of the missile assembly of the missile arm;

FIG. 7 is a perspective view detailing the relationship between the cam surface of the missile arm and one of the contact members associated with the circuit for the missile light;

FIG. 8 is a top plan view through the target field of one end of the housing of the game of this invention showing the relationship of the drive mechanism for the counters;

FIG. 9 is a view, partially in section, of the target field at one end of the housing of the game of this invention;

FIG. 10 is an exploded view of some of the actuating components of the counter mechanism of the target field of the game of this invention;

FIG. 11 is an elevational view of the rear of the target field of the target game of this invention;

FIG. 12 is an enlarged section view detailing the relationship between the motor and drive arrangement for the target moving belt of the game of this invention;

FIG. 13 is a fragmentary enlarged exploded view, partially in section, of the components of the sighting and firing periscope of this invention;

FIG. 14 is a section view through the sighting and firing periscope of this invention.

FIG. 15 is a perspective view showing the relationship between the supporting posts of the movable targets and the reorientating tracking surface at the rear of the target field of the target game of this invention;

FIG. 16 is a perspective view showing the relationship between the supporting posts of the targets and the missile tab as well as the contact for the "hit" indicating light of the target game of this invention;

FIG. 17 is a wiring diagram of the target game of this invention.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail a specific embodiment thereof, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

The target game 10 of this invention includes a housing, generally indicated 12, having a front end 14 and a rear end 16. As is typical of games of this type, a sighting and firing assembly 18 is provided at the front end 14 and a target field or stage area 20 is provided at the rear end 16.

In the Preferred Embodiment, the target game is one which simulates an encounter between a submarine and ships, with the simulation including the firing of a projectile or missile in the form of a torpedo which is intended to be aimed at the laterally traversing ships. The housing 12 is generally triangular in plan and includes side walls 22, a bottom 24 and a generally rounded V-shaped front portion 26 and a widened segmental rear end 28. The rear end 28 includes the stage-like target field housing 30 and the portion intermediate the target field and front portion is provided with a surface sheet 32 which is intended to simulate water or an ocean surface.

Included in the game of this invention is a tracking and firing arm, generally indicated 38 (FIG. 2), comprising two spaced apart sheet-like panels 40 and 42. A narrow elongate top panel 44 spans side panels 40 and 42. A bottom panel 48 also spans the side panels 40 and 42. The arm 38 generally is a solid body having a plurality of upwardly inclined tubular bores or channels 50a which terminate at their upper extremities in oval openings 46 in the top panel 44. Thus rib portions 50 separate the tubes 50a. The tubes are coated with highly reflective material, such as by vacuum coating.

The arm 38 is pivoted at 52 to the front of the housing 12 and is provided with a rear tracking wheel 54

which is pivoted between brackets 54a about an axle 54b to mount the arm 38 for a lateral to a forward tracking movement with respect to the housing. The arm 38 also includes a relatively L-shaped extension 56 having an upwardly and rearwardly inclined missile tracking channel 58. The channel 58 includes an offset bottom portion 58a and a plurality of openings 58b at the end of the several channels 50a opposite from the light transmitting openings 46 in top 44.

The arm 56 also includes a reduced extension portion 60 which is intended to travel below the target field or stage portion 30, as will be subsequently described, and a rear upright 62. Upright 62 supports a light housing 64 within which a bulb 66 is mounted in a socket 68 with the appropriate reflective surface 70 thereabout. The light 66 is intended to function as the so-called "hit" or "sink" light, and is activated when the participant has properly aimed and fired the tracking and firing arm in timed relationship to a target traversing across the stage portion so that the action of the components will cause the target to be "hit," as will be explained.

The forward portion of the tracking and firing arm 38 includes, in progression, a first vertical wall 72, a second downwardly and forwardly inclined wall 74, a horizontal wall 76, a vertical downwardly extending wall 78, and an undercut wall portion 80 which returns to the vertically downwardly extending portion 82.

The firing arm 38 is provided with openings, such as 86, in the panels 40 and 42 providing a receptacle for a speaker 88 (FIG. 3). In addition, another receptacle 89 is provided for a circuit board 90. A pair of aligned openings 92 are also provided in the two panels 40 and 42 to support gear shafts of part of a governor assembly.

The sighting and firing assembly 18 includes a periscope tower, generally indicated 100, which is connected to the tracking and firing arm 38 for pivoting therewith. In particular, the periscope tower 100 includes a forward opening or window 102 which faces toward the target field 30 and which may be provided with an aiming means, such as a conventional target cross hatch 102a or the like. Within the interior of the tower 100 is a pair of inclined mirrors 104 and 106 for reflecting the image projected through the window through the vertically and laterally offset eye opening 108. The tower 100 is also provided with an opening 110 for receiving a firing button 112 which is part of a firing lever or trigger 114 that is pivoted to the tower 100 on pivotal mountings 116 and is provided with an inclined offset lower end or leg 118, terminating in a bottom lip 120. A leaf spring 122 depends from the interior of tower 100 and bears against the lower end leg portion 118 so as to normally bias the firing lever or trigger 114 for movement in a clockwise direction, causing the upper portion thereof to bear against the interior of the tower 100. This provides a means for automatically returning the trigger 114 to a retracted position with the bottom 112 projecting through opening 110, following the depression thereof.

Tower 100 is provided with a depending hub 128 which is generally matingly received within the upstanding annular ring 126 on the body of housing 12 to provide a rotatable mounting for tower 100 with respect to the housing. The boss 124 includes two depending guides or legs 129 which straddle the panels 40 and 42 of the sighting and firing assembly 38 so that,

as the tower 100 is turned, the sighting and firing assembly 38 will pivot about the post 52 and will track on the wheel 54 against the bottom 24 of the interior of the housing 12.

The periscope tower 100 is further provided with a channel-like cocking member, generally indicated 130. The cocking member 130 has a generally horizontal shelf 132 which is intended to be activated by finger or thumb pressure to depress the cocking member. The shelf or horizontal surface 132 is located at the top of a generally "U" shaped depending member 134. A cocking spring 136 is connected between the interior of the tower 100 and a stub 138 in the interior of the cocking member 130 to normally bias the cocking member to an upper, or retracted position, as shown in FIG. 3, but to permit depression of the cocking member to a depressed, extended, or cocked position, downwardly away from the tower 100 and away from the position shown in FIG. 3 whereby spring 136 will be stressed to provide for the automatic return of member 130 to the upper or retracted position.

The end 120 of the trigger leg 118 is positioned against the shaft 140 of a spool 142. Spool 142 includes disc-like ends 144a and 144b which embrace the opposite side wall panels 40 and 42 of the sighting and firing arm 38 and guide the to and fro, up and down, tracking of the shaft 140 along the end wall surfaces 72 and 74. One spool end 144a is connected to a loading bar 146 which is pivoted at 148 to a gear sector 150. In addition, as best seen in FIGS. 2 and 3, the loading bar 146 is connected to the gear sector portion 150 which includes a gear surface or arcuate rack portion 150a. Gear sector portion 150 is part of a missile arm 152 which is pivoted, at 154, to the sighting and firing arm 38 for movement in a clockwise direction from a retracted position to an extended position.

A spring 156 is connected to a stub 158 on the gear sector portion 150 of the arm 152, and is also connected to a post 160 on the sighting and firing arm 38, for normally urging the missile arm 152 in a clockwise direction. Thus, when the arm 152 is moved in a counterclockwise direction, the spring 156 is extended or stressed so as to place the arm in a retracted, cocked position. This is accomplished by depressing the bar 130 which bears against the shaft 140 of spool 142 and therefore urges the end of the loading bar 146 downwardly which, through the pivotal connection 148 with the missile arm 152, causes the missile arm to be moved in a counterclockwise direction, thereby placing the spring 156 in a stressed state, as shown in FIG. 3. The end 120 of trigger 118 moves over the shaft 140 of spool 142 and holds the loading bar 146 in this downward position, thereby holding the missile arm 152 in a cocked position. When the firing button 112 is pushed inwardly, the arm 146 is permitted to move counterclockwise, which permits the spring 156 to urge the missile arm 152 clockwise, or, toward the extended position.

As best illustrated in FIGS. 2 and 4, a governor 162 is provided for retarding the movement of the missile arm 152 between the retracted position and the extended position. Included in the governor means 162 is a pinion 164 which is engageable with the gear surface 150a of the gear portion 150 of the missile arm 152. Pinion 164 is mounted on a shaft 166 held in a mounting bracket 168 with a spring 170 positioned about the shaft between pinion 164 and the bracket 168 that ex-

tends outwardly from the firing arm 38. Panel 40 of the sighting and firing arm 38 is provided with an enlarged opening 172 for receiving a portion of the one way clutch 174, made up of two clutch components 174a and 174b. Clutch 174 permits slippage in one direction, such as the movement of the missile arm 152 downwardly to the retracted or cocked position; but provides for positive engagement in the other direction, such as the movement of the missile arm 152 toward the upward or extended position. Clutch 174 is connected with a gear 176 which, in turn, is in engagement with a pinion 178 mounted on shaft 180. Pinion 178 is connected with a gear 182 which is in engagement with a pinion 184 mounted on a shaft 184a. The shaft 184a also supports a vane 186 on the outside of panel 42. Thus as missile arm 152 is moved upwardly, responsive to the urgings of spring 156, it will, through the gear train aforescribed, caused rotation of the vane 186. The air resistance imposed upon the vane 186 will tend to reduce the rate at which the arm 152 moves upwardly.

As best shown in FIGS. 3 and 6, a missile assembly 190 is mounted at the end of arm 152. The missile assembly 190 is movable with the missile arm 152 from the retracted or cocked position, at the bottom of the channel 58, through a simulated missile moving position up through the channel, to a potential target intercept or "hit" position at the top of the channel.

The missile arm 152 is provided with a slot 192 which receives a stub 194 of mounting block 196. The mounting block 196 is connected with the arm 152 by means of a press fit washer 198 which is impaled on the stub 194 on the side of the missile arm 152 opposite of the block 196. By this arrangement, the mounting block 196 is mounted with arm 152 for tracking to and fro movement in the channel 58. The mounting block further includes a post 200 which extends outwardly in the same general direction as the stub 194 and extends through the looped end 202 of the missile finger 204 and, in particular, at the downturned end 204a thereof. The missile finger 204 is preferably made of a leaf metal material and has a laterally offset end 206 which terminates in an outwardly extending tab 208 which serves as the target intercept portion, as will be explained.

A post 210 also extends outwardly from the mounting block 196 and generally extends under the juncture of downturned end 204a with the remainder of the missile finger 204. A screw 212 extends through a contact plate 214 into the post 210 for securing the contact plate 214 onto the post. A lead wire 216 extends from the contact plate to one side of a circuit. The contact plate 214 bears against the end 218 of light bulb 220 which is received in a socket 222, which is part of a mirror assembly 224 mounted in the mounting block 196. Mirror assembly 224 includes a mirror 226 which is positioned at a 45° angle relative to the light bulb 220 so as to transversely redirect light rays emanating therefrom. This will cause the light rays to be directed through the channels 50a and the translucent openings 46 of the sighting and firing arm 38.

As best seen in FIGS. 3 through 7, means 228 are provided for controlling the actuation of the light bulb 220. Included in this means 228 is a wiper cam 230 mounted on the bottom of the gear sector portion 150 of missile arm 152. Wiper cam 230 is generally L-shaped in section and has a transverse arcuate bottom

surface 232. A light contact assembly 234 is mounted on the sighting and firing arm 38 below portion 150 of the arm 152 and lead wires 234a and 234b extend therefrom, with the lead wires being connected to circuitry including the light bulb 220 and a source of power (not shown). Included in the light contact assembly is a first leaf contact 236 and a second spaced apart contact 238. The second contact 238 terminates in an enlarged end 240 which has a generally serpentine configuration in section. During the upswing of arm 152 in a clockwise direction, the cam 230 rides over the end 240 of the second contact 238 and causes the second contact 238 to move into engagement with the first contact 236, thereby closing the circuit across these contacts and activating the lightbulb 220. During the downswing of the arm or movement of the arm to the cocking or stressed position, the cam 230 rides inside of the end 240 and therefore keeps the contacts 236 and 238 apart. Thus the lightbulb 220 is activated only when the arm 152 is moved from the retracted position toward the extended position, in its clockwise path of travel.

The stage or target field portion 30 of the device of this invention includes a frame portion 244 which is generally "U" shaped in plan. Frame portion 244 includes a laterally extending slot 246 which receives, and permits the lateral traversal of, the neck 62 of the "hit" light assembly. Further included is a raised or stage like portion 248 which includes background scenery 250 for the target field area.

The targets in target drive system 256 are best shown in FIGS. 2, 3, 9, 11, 15, and 16. The target drive system 256 drives each target assembly 258 which supports the targets 260.

The target drive system 256 includes a belt-like element or chain means 262 having interruptions 262a and spurs or teeth 264 along its inner face. The belt 262 is wound about sprockets 266 and 268 which are mounted for rotation around shafts 266a and 268a at the opposite ends of the frame portion 244. Preferably, only one of these sprockets 266 and 268 is driven, with the other being an idler.

As shown in FIG. 12, the driven sprocket 268 includes a depending hub 270 through which the shaft 268a extends. Shaft 268a is associated with a gear train 272 which includes a gear 274, pinion 276, and a pinion 278 in engagement with the gear 274, and a gear 280 in mesh with pinion 276. Gear 274 is associated with pulley 282 and a belt 284 is wrapped around the enlarged pulley 282 and reduced pulley 286 at the end of the output shaft 288 of the motor 290. When the motor 290 is actuated, the sprocket 268 is rotated to drive the belt 262 in an endless path of travel around the target field 30 of the amusement device of this invention.

Target assemblies 258 include a base portion 292 which is intended to fit into the openings 262a of the belt 262. Sleeves 294 are mounted on the base portion 292. Sleeves 294 are generally vertically oriented and slidably receive a support post 296 therein. Each support post 296 terminates in a foot 298 which has a bottom tapered guide surface 300. A post support bracket 302, being generally box-like in configuration, is pivoted at 304 to each sleeve 294. The post support bracket 302 includes a bottom transverse web 302a which is intended to underlie and support the foot portion 298 of the supporting post 296 to hold the targets

260 in an elevated position. However, when the bracket is pivoted about its mounting 304, the support web 302a is moved away from the foot portion 298 of the support post 296, permitting the descent of the support post and the target 260.

A trip lever 306 extends upwardly and outwardly away from the post support bracket 302 and terminates in a trip lever tab 308 which extends forwardly away from the bracket 302 and the trip lever 306. The tab 308 is positioned so as to intersect the path of travel of the missile tab 208 when the missile tab moves upwardly during the movement of the missile arm 152 in the clockwise direction. If the missile tab 208 engages the trip lever tab 308, (which is dependant upon the proper radial orientation of the sighting and firing arm 38 and the timed actuation of the firing button 112), the missile tab 208 will strike the trip lever tab 308 and will cause the post supporting bracket 302 to be pivoted outwardly, moving the support web 302a away from the underside of the support post 296, thereby permitting the descent of the target 260. Generally speaking, as has been partially explained, and as will be further explained, the target assemblies 258 are constructed and arranged to normally hold the target in an elevated position but to permit the targets to drop to a lower or "hit" position, and these assemblies 258 have portions which cooperate with the target counter means to record each target that passes by the target field, and further have portions which cooperate with "hit" counter means to record each target which has been intercepted or "hit". Further, these target assemblies 258 have portions which cooperate with circuitry for activating a "hit" light 66 in those instances where a target assembly 260 has been intercepted by the missile assembly of the missile arm 152.

Means are provided for effecting a gradual descent of the target 260 after the tab 208 has intercepted the trip lever 308. Included in this means is a leg 310 of generally right angular configuration, including an outwardly extending tab portion 310a, which extends from the underside of each target 260. A bar 312 is pivoted at 314 to each leg 310. Each bar 312 terminates in a sharp pointed end 316. The frame 244 is provided with a serrated surface 318 in the area in front of the target field 250 and below the drive belt 256. As best illustrated in FIG. 9, as the targets 260 are driven by belt 256 and traverse from left to right across the target field 250 the pointed end 316 of the bar 312 generally terminates coplanar with the serrated edge 318 and drags thereacross. Once the trip lever 308 has been struck by the tab 208 so that the bracket 302 is pivoted forwardly and the web 302a no longer supports the post 296, the target 260 will begin to descend. However, the pointed end 316 of the bar 312 will engage in the teeth of serrated edge 318, and, in combination with its pivotal mounting 314 with the leg 310, create a pivot arm so that as the target 260 continues to traverse laterally as the belt 256 is driven, the descent of the target 260 will be attenuated by the engagement of the pointed end 316 with the serrated edge 318, until such time that the target 260 has descended to a point where the pointed end 316 may again drag along a serrated edge 318 responsive to continued driving of the belt 256.

As best shown in FIGS. 11 and 15, means are further provided for reorienting a "hit" or descended target 260 to an elevated position. The rear of the target field 30 is provided with a track 320 which is inclined up-

wardly in the direction of travel of the belt 256. As the lowered or descended targets 260 traverse along the rear of the target field, the bottom 300 of the foot 298 of each post 296 will gradually come in engagement with the inclined track 320 and will be raised upwardly. The far end of the track 320 is provided with a horizontal portion 322 across the width thereof. As each target assembly 258 approaches this portion 322, the bracket 302 is permitted to swing inwardly and under the guide surface 300 of the foot 298 of each post 296, thereby permitting the web 302a to hold the post 296 in the upright position.

As best seen in FIGS. 2 and 16, means are further provided for activating the "hit" light 66 responsive to the descent of a target 260. Included in this means is a light contact assembly 326 located on the exit side of the target field area and including lead wires 326a and 326b appropriately included in circuitry for the light 66 and a source of power (not shown). The contact assembly further includes an upper contact 328 having a downturned end 328a and a lower contact 330. A trip bar 332 extends across the target field, generally in the area of the lower end of bracket 302. Trip bar 332 includes downturned legs 334 terminating in outwardly extended feet 336, one of which overlies the upper contact 328. A retaining bracket 338 overlies each foot 336 restraining the movement of the trip bar 332. As the bracket 302 is pushed outwardly, responsive to the engagement between the tab 208 with the tab 308, the supporting web portion 302a of bracket 302 will engage the trip bar 332 and rock the trip bar rearwardly, thereby pushing the foot portion 332 downwardly. This will cause the foot portion 336 to push the upper contact 328 downwardly so that the downturned end 328a of the upper contact 328 will engage the lower contact 330, closing the circuit thereacross and activating the "hit" light 66.

The game of this invention is further provided with target and hit counter means 340 (FIG. 1) for recording the number of each target assembly which passes by the target field and also for separately recording the target which has successfully been intercepted during the play of the game. Included in the target and hit counter means is a target counter dial 342 and a hit counter dial 344. Each of these dials is substantially identical in construction and includes a base 342a and 344a; a gear surface or ratchet surface 342b and 344b on the underside of each base; and upstanding flange 342c and 344c; and numerical indicia 342d and 344d on the exterior of the flange 342c and 344c respectively. The dials 342 and 344 are received in the interior of a forward enclosure 346 of the target field with the forward enclosure having spaced apart viewing openings 348 and 350 of a size and shape to permit one of the numerical indicia 342d and 344d of the dial 342 and 344, respectively, to show therethrough.

Each counter further includes a hollow hub portion 352 and 354 which extends upwardly from the base 342a and 344a. Each hub 352 and 354 is rotatably mounted on a mounting stub 356 and 358, respectively, which extends upwardly from a base 360 that overlies the target field. A torsion spring 362 and 364 is mounted about each hub 352 and 354 respectively, with one end of the spring impaled on a post, such as 366, of each dial, and the other end of the spring mounted on a portion 368 of the press fit washers 370 and 372 which are mounted at the extreme end of each

of the mounting stubs 356 and 358 to hold the dials 342 and 344 in assembled relationship relative to the base 360. Each dial 342 and 344 is provided with an annular channel 384 and 386 in the base 342a thereof and a web 388 and 390 extends across one portion of each of the channels 384 and 386 respectively.

Referring now specifically to the target counter dial 342 and its related components, a pawl 392 is provided which has a tooth 394 of a size and positioning for engagement with the ratchet portion 342b on the underside of the target dial 342. Pawl 392 bears against a stub 396 of base 360 and is provided with a notch 398 at one end for receiving a return spring 400. A return spring 400 is also connected to a stub 402 on the base to normally bias the pawl 392 for movement in one direction, but permit movement in the opposite direction against the urging of the spring. Pawl 392 has an opening 404 which receives a stub 406 of a crank 408. Crank 408 also has a depending stub 410 which is movably received in an arcuate slot 412 in the base 360 to mount the crank, and therefore the pawl, for limited to and fro movement in opposition to the spring 400. During the limited to and fro movement of the pawl, the dial will be rotated one increment by the interengagement between the pawl tooth 394 and the ratchet 342b on the underside of the dial 342.

Crank 408 has a hub 414 with an opening 416 therein for receiving the end 418 of shaft 420. Shaft 420 has a lower end 422 mounted in the base of the game and is provided with a laterally extending tab 424 which is horizontally aligned with the target leg 310. By this arrangement, as each target assembly 258 passes by the area of the shaft 420, it will strike the tab 424, causing the partial rotation of the shaft 420, and thereby causing movement of the pawl 392 and limited rotation of the dial 342, through the interconnection of the crank 408 and the engagement of the pawl 392 with the ratchet gear 342b on the underside of the dial 342.

Referring now specifically to the hit counter dial, 344 and its related components, a pawl 426 is provided which has a tooth 428 of a size and positioning for engagement with the ratchet portion 344b on the underside of the target dial 344. Pawl 426 bears against a stub 430 on the base 360 and is provided with a notch 432 at one end for receiving a return spring 434. The return spring 434 is also connected to a stub 436 on the base 360 to normally bias the pawl 426 for movement in one direction, but permit movement of the pawl 426 in the opposite direction against the urging of the spring. Pawl 426 has an opening 438 which receives a stub 440 of crank 442. Crank 442 also has a depending stub 444 which is movably received in an arcuate slot 446 at the end of the base 360 opposite from slot 412. By this arrangement, the pawl 426 is mounted for limited to and fro movement in opposition to the spring 434. During the limited to and fro movement of the pawl, the dial will be rotated one increment by the interengagement between the pawl tooth 428 and the ratchet 344b on the underside of the dial 344.

Crank 442 has a hub 448 with an opening 450 therein which receives the end 452 of the shaft 454. Shaft 454 has a lower end 456 for rotatably mounting the shaft in the base of the game. The shaft is further provided with a laterally extending tab 458 intermediate its ends, with this tab 458 being horizontally aligned with the target leg 310 of a target which has been moved to the depressed position, as shown at the right hand side of fig-

ure. By this arrangement, as only those target assemblies 258 wherein the target 260 has been moved to the depressed position, pass by tab 458, the leg 310 will engage the tab 458 on the hit shaft 454, causing limited rotation of the shaft 454 and thereby causing movement of the pawl 426 and limited incremental movement of dial 344, through the interconnection of the crank 442 and the engagement of pawl 426 with the ratchet gear 344b on the underside of dial 344.

The game of this invention is further provided with a cycle switch means 460 for terminating the actuation of the target drive system 256 after a certain number of target assemblies 258 have passed by the target field. Cycle switch 460 includes a first contact 462 having an upturned end 462a which is positioned for occupation within the channel 384 of the counter dial 342. Cycle switch 460 also includes a contact 464 having an inwardly turned end 464a which normally engages the contact 462 and closes the circuit thereacross. Wire 466 and 468 are associated with a source of power (not shown) and with the motor 290 which drives the target drive system 256 that carries the target assemblies 258. During the play of the game, as each target assembly 258 enters into the target field, the leg 310 thereof will engage the tab 424, causing rotation of the dial 342 through one increment. It is intended that the numerical indicia 342d would be positioned relative to the web 388 in the channel 384, so that the web would be in engagement with the upturned end 462a of contact 462, following the entry of the desired number of targets into the target field, such as, in the illustrated embodiment, the entry of the 20th target. When the web 388 engages the upturned end of the contact 462, it forces the contact 462 away from the contact 464, thereby opening the circuit and terminating the source of power to the motor 290 which drives the target drive system 256. By this arrangement, the game is automatically inactivated after a finite number of targets 260 have passed by the target field. It is to be understood that only a mechanical rearrangement would be necessary for changing the number of targets which may pass by the field before the circuitry for the target drive system 256 is terminated.

The game of this invention is also provided with reset means for resetting the target counter dial 342 and hit counter dial 344 to an initial orientation of zero position. More particularly, an opening 472 is formed in the forward portion of the forward enclosure 346 and reset button 474, which is mounted on one end of reset bar 476, extends outwardly through this opening. Reset bar 476 has a laterally offset leg 478 with an opening 480 therein for mounting the bar 476 on the stub 482 of disc 484. Disc 484 is rotatably mounted on the top of base portion 360 through a suitable pin and hub mounting (not shown).

The inner end 488 of reset bar 476 extends through a light assembly 490. Light assembly 490 includes a bulb bracket 492 for mounting a bulb 494 within the threaded recess 496 thereof. Lead wires 496a and 496b are associated with an on-off switch (not shown) for activating the light with the game activated for play. The bulb recess 496 is formed in one leg 498 of the bulb bracket with the other leg 500 being oriented transversely thereto. Leg 500 has an opening 502 through which end 488 of reset bar 476 may extend to bear against the leaf return spring 504 which is secured to the base 360. An opening 506 is formed in the base 360

within the confines of the bulb bracket 492 so that light from bulb 494 may shine therethrough and illuminate the area in front of the background scenery panel 250.

Disc 484 includes a pair of upstanding reset arm mounting stubs 508 and 510 and closely adjacent, generally radially oriented, upstanding arm ribs 512 and 514 respectively. A pair of reset arms 516 and 518, each having openings 520 and 522, are impaled on stubs 508 and 510 to mount arms 516 and 518 to the disc 484. Each arm 516 and 518 has an upper portion 516a and 518a, respectively, which overlies disc 484, and a lower portion 516b and 518b which extends under dials 342 and 344, respectively. Each rib 512 and 514 bears against portion 516a and 518a of each arm 516 and 518, respectively, on the counterclockwise side thereof.

Each arm 516 and 518 also has an upstanding spring receiving post 524 and 526 on the portion 516a and 518a thereof, respectively, for mounting opposite ends of return spring 528 to each arm. Spring 528 holds each arm 516 and 518 against each rib 512 and 514 so that the ribs may exert a pushing action when disc 484 is rotated responsive to inward movement of bar 476 resultant from depression of button 474.

Each lower offset portion 516a and 518a of each arm 516 and 518 has a laterally projecting tooth 530 and 532, respectively, with each tooth 530 and 532 normally occupying one of the teeth of gear 342b and 344b on the underside of dial 342 and 344, respectively, to hold each dial against movement in one direction in opposition to the constant rotative stress imposed by springs 362 and 364. Each arm 516 and 518 is held in this tooth occupying position by the pulling force of spring 528. Assuming a certain number of targets 260 have advanced by the target field and that one or more have been successfully intercepted, each dial 342 and 344 may be reset to an initial position by depressing button 474. This will push bar 476 inwardly, rotating disc 484 clockwise, and causing ribs 512 and 514 to push each arm 516 and 518 outwardly or away from each dial 342 and 344, lifting each tooth 530 and 532 out of engagement with each gear 342b and 344b, respectively. During this movement, end 516b of arm 516 will strike leg 392a of pawl 392 and release the engagement of pawl 392 with gear 342b, permitting spring 362 to reversely rotate dial 342 to an initial position.

Pawl 426 is normally held out of engagement with gear 344b on the underside of dial 344. The tooth 428 of this pawl 426 only engages gear 344b when the tab 458 is engaged by leg 310 of target assembly 258. Thus when tooth 532 of arm 518 is moved out of engagement with gear 344b, spring 364 will reversely rotate dial 344 to an initial position.

The electrical circuitry for the game of this invention, generally designated 550, is shown in detail in FIG. 17. The general purpose of the circuitry of FIG. 17 is to produce audio and video signals to simulate the firing of a torpedo and a subsequent "hit."

The electrical circuit 550 is connected to the ship's motor 290, light bulbs 494, 220 and 66, and speaker 88. Also included in circuit 550 is on-off switch 460, the normally open torpedo switch 234 and the normally open "hit" switch 326. The above components are shown in FIG. 17 in their relative position in circuit 550.

When the on-off switch is closed, circuit 550 is activated and a pulsating sonar "ping" sound is emitted from speaker 88. Associated with the speaker 88 is light bulb 494 which is green in color and blinks on and off in time with the speaker "ping" sound. Thus, when circuit 550 is initially activated, the sound from speaker 88 and the light from bulb 494 combine to give a simulated sonar system.

When it is desired to fire a torpedo, switch 234 is closed which alters the sound being emitted from speaker 88. The sound that is emitted simulates that of a fired torpedo which is travelling toward its target. Light bulb 220 is turned on when the torpedo switch 234 is closed signifying that a torpedo is being launched.

If the target is successfully intercepted by the launched torpedo, "hit" switch 326 is closed which alters the sound being emitted from a pulsating one to one simulating explosion. Simultaneously, light bulb 66 which is red in color is turned on bright and fades slowly simulating a burning ship sinking into the water.

For ease of discussion, the circuitry of FIG. 17 is divided into a power supply subcircuit, generally designated 552, and a signal subcircuit, generally designated 554. The power supply subcircuit 552 supplied the power to the signal subcircuit which times all of the sounds and light as will be discussed in greater detail hereinafter.

Turning now to the power supply subsection, it can be seen that the circuit 552 generally includes a step-down transformer T in the form of a power plug, a full wave bridge rectifier, an input filter capacitor C2, and an electronic filter. In the present circuit, the full wave bridge rectifier consists of diodes D1, D2, D3 and D4. The electronic filter consists of resistors R1 and R2, capacitors C3 and C4, and transistor TR-1.

Resistor R3 and capacitor C5 are provided to decouple the ship's drive motor 290 and keep the inherent static spikes out of the remainder of the power supply 552.

The resistor R4 and capacitor C6 decouple the voltage for the explosion light 66. When the decoupling of the explosion light occurs, R4 and C6 provide a somewhat higher current potential for the bulb 66 than would be available if taken from the electronic filter 558 in the power supply. The smaller the value to R4 the brighter the explosion light. However, if resistor R4 is made too small it will tend to present some residual light without the closing of the "hit" switch 326.

Similarly, resistor R3 can be changed to accomplish a difference in ship speed. However, if resistor R3 is too small a value, an inherent motor noise will tend to creep into the audio circuit.

The full wave bridge rectifier requires a smaller RMS transformer current for a given output load current. This allows about 56 per cent more current over that which is possible with half wave or full wave center tapped circuits. Even though there are four diodes (D1, D2, D3, and D4) used in the filter, each diode need only be rated half the inverse voltage as compared with a half wave or full wave center tapped circuit. Furthermore, only two wires need be used leading from the transformer T at the wall to the game as opposed to three wires which are required for a full wave center tap. Accordingly, the type of full wave bridge rectifier

disclosed herein is an economical and efficient means for use in the power supply subcircuit 552.

The electronic filter is necessary in order to lower the voltage potential for powering the signal subcircuit 554. If voltage in excess of those desired are supplied to the signal subcircuit 552, damage to the internal circuits would occur. The electronic filter disclosed is preferable over a simple dropping resistor and filter capacitor because of the size and cost of the capacitor that would be required.

The signal circuit 554 generally is seen to comprise an integrated circuit hex inverter and an amplifier connected to the speaker 88, the red explosion light 66, the torpedo light 220 and the green sonar light 494. The hex inverter is made up of six integrated circuit inverters I-1, I-2, I-3, I-4, I-5 and I-6 each consisting of a transistor and resistor (not shown). The amplifier includes transistor TR-2.

Inverters I-1 and I-2 are used to form a low frequency multivibrator or oscillator. The timing pulses of this low frequency multivibrator are determined by resistors R-5 and R-7 and capacitors C-7 and C-8.

Inverters I-3 and I-4 are used to form a higher frequency multivibrator or oscillator. The signal generated by this higher frequency multivibrator is determined by resistor R-12 and capacitors C-10 and C-11. The slow pulsation of the output from inverter I-2 when combined with the higher frequency signal provided by the multivibrator formed by inverters I-3 and I-4 form the sound emitted from speaker 88.

Capacitors C-7 and C-8 are not equal in value in order to make the duty cycle uneven, i.e., the period when the sound is emanating from the speaker as opposed to when no sound is generated. Thus, the sound emanating from the speaker 88 is on for a short period of time and off for a longer period of time.

The short duty pulse is coupled directly from the output of inverter I-1 into the input of inverter I-5. The signal from inverter I-1 to inverter I-5 turns off the sonar light 494 when the sonar sound is present.

The resistor network between the two multivibrators (that is, between the output of inverter I-2 and the input of inverter I-3) mixes the frequency and divides that portion of the signal which reaches the amplifier transistor TR-2. This network generally includes resistors R-8 and R-9.

Transistor TR-2 amplifies the sonar sound signal directly from when it becomes an input signal into inverter I-4. This input signal is directed through resistor R-10 which is shunted by capacitor C-9. The shunt serves to shape the voltage for the sonar ping.

The torpedo sound is generated when the torpedo switch 234 is closed and the alternating current voltage from the power supply is coupled into the first multivibrator as a component in the input as in I-2. When this occurs the pulse rate emanating from the first multivibrator dramatically changes its pulse rate. This new signal is coupled to the speaker from the output of the second multivibrator through capacitor C-12 at the output of inverter I-4 simulating the launching of a torpedo. As one can see only part of the signal is being amplified by transistor TR-2.

The loading effect of the torpedo light 220 on the power supply is minimized because of its size. Accordingly, only the one switch 234 is needed both to turn on the torpedo light 220 and to change the sound from the

sonar ping to the urged torpedo sound. This underrating of the bulb should insure long life.

The explosion circuit uses inverter I-6. When a ship is "hit" the direct current voltage is positive and is applied instantly to capacitor C-13 coming from the power supply subcircuit 552. This positive voltage has two paths through which to discharge. The first path is through resistor R-11 into transistor TR-2. The voltage flowing into transistor TR-2 turns on the transistor with an exponentially decaying voltage resulting in a distinctive squeal of the disintegration or explosion of the ship.

Transistor TR-2 has no fixed biasing voltage, therefore, current is conducted and amplification occurs only when a positive voltage reaches the base lead. It is because of this occurrence that the explosion sound is able to be amplified by the same circuit that amplifies the sonar sound.

The other path for the discharging capacitor C-13 is through resistor R-13 into inverter I-6. Again the voltage going into I-6 decays exponentially thereby causing the explosion light to turn on brightly and then decay slowly. This gives an illusion of a ship fading on the horizon. Lowering the value of R-13 would make the light brighter, however the fadeout would be faster.

In general, the voltages which may be used in the above discussed circuit are not critical. The integrated circuit voltage should be held at about five volts or less. The other voltages are dictated primarily by the circuit loads in the form of the light bulbs.

To briefly review the operation of the game of this invention, the several components are activated by inserting wall plug 352 into an appropriate receptacle. Assuming counter dial 342 has been reset, switch 460 will be closed, thereby activating circuit 550. Motor 290 will drive target assemblies 258 across the target field and a participant may view the targets 260 through opening 108 of periscope tower 100. As the periscope tower 100 is traversed to and fro, it will carry the sighting and firing arm 38 therewith. Depression of firing button 112 will release arm 146 and permit spring 156 to pull missile arm 152 upwardly, carrying the missile assembly 196 from a retracted position toward a target intercept position. During this movement, the missile light 220 will be actuated and this light will be directed upwardly and rearwardly through the several channels 50 of the tracking and firing arm 38 and will sequentially light the series openings 46 in the top of the arm, giving the illusion of a forwardly traveling missile, such as a torpedo.

If the missile tab 208 is in vertical alignment with the trip lever tab 308 when the missile assembly 196 reaches its upward position, this will cause post support bracket 302 to be tripped, permitting the target 260 to drop, simulating the sinking of a ship. The descent of the target 260 will be retarded when the pointed end 316 of arm 312 engages serrated edge 318 during the continual lateral movement of the target assembly 258 across the target field. At the same time, the post support bracket 302 will move the trip bar 332 closing the hit light circuit 326 activating the hit light 66 at the rear of the target field. Assuming the target has been intercepted, the leg 310 will be lowered, putting it in horizontal alignment with the tab 458 on the hit shaft 454 to deflect the tab and cause incremental advancement of the hit dial 344.

As the target continues around the rear of the target field, it will be reoriented through the combination of inclined track 320 and the horizontal terminal portion 322 which permits bracket 302 to be moved to a supporting position under the bottom tapered guide surface 300 of the target support post 296. As the target next advances toward the target field, the leg 310 will strike the counter tab 424, deflecting shaft 420 and incrementally advancing the counter target 342. When a finite number of targets, such as twenty, have appeared before the target field, the web 388 in the target dial 342 will engage portion 462a of contact 462, opening switch 460 and thereby de-energizing circuit 550. Upon depression of the reset button 474, the counter dial 342 and hit dial 344 will be reoriented in an initial position, and switch 460 will again be closed thereby activating circuit 550.

The foregoing detailed description has been given for clearness of understanding only and no unnecessary limitations should be understood therefrom as some modifications will be obvious to those skilled in the art.

We claim:

1. A target game, comprising: means defining a housing having a sighting area and a target area spaced therefrom; a sighting and firing assembly including an aiming portion located at said sighting area; a target field located at said target area; at least one target located adjacent to the target field and mounted for movement through a path of travel across the target field, said target being mounted on a movable target support including a movable retaining member, being movable between a support position, wherein said target support is held in a first position, to movement away from said support position, wherein said target support is free to move away from said first position through a path of travel simulating target intercept; a missile firing mechanism associated with said sighting and firing assembly and including a missile assembly having a target engaging portion, said missile assembly being mounted for movement from a retracted position to movement to a target intercept position wherein said target engaging portion generally intercepts the path of travel of the target in the area of the target field, engagement of said missile engaging portion by said target engaging portion causing movement of said retaining member, thereby permitting movement of said yieldable support through a target intercept path of travel; and target reorientating means in the target path of travel for returning said target support to said first position and returning said retaining member to said support position, said target reorienting means including an upwardly inclined track having a lower and an upper end, and wherein said target support is mounted for generally vertical to and fro movement with the target being mounted for movement across said track from the lower and toward the upper end during which said support is moved upwardly to the first position.

2. The target game of claim 1 wherein said inclined track includes a retaining member reorienting portion near the upper end thereof which permits movement of the retaining member subjacent to the support to hold the support in the first position.

3. The target game of claim 1 wherein said target field has a front and rear area and wherein the targets are connected to an endless belt for continuous movement across the front and rear of the target field, with

the inclined track being located at the rear of the target field.

4. A target game, comprising: means defining a housing having a sighting area and a target area spaced therefrom; a sighting and firing assembly including an aiming portion located at said sighting area; a target field located at said target area; a plurality of targets each having a depending post located adjacent to the target field and mounted for movement through a path of travel across the target field, each target being mounted on a movable target support including a target support bracket, said bracket having a portion normally underlying said target post for supporting and holding said target in a raised support position, said bracket being movable between a support position, wherein each target support is held in a first position, to movement away from said post to permit said post to vertically descend, wherein each target support is free to move away from said first position through a path of travel simulating target intercept, said target support bracket including an outwardly extending arm defining a missile engagement portion for causing movement of the target support bracket away from said supporting position to permit descent of a target; target drive means movably supporting each target mount; a missile firing mechanism associated with said sighting and firing assembly and including a missile assembly having a target engaging portion, said missile assembly being mounted for movement from a retracted position to a target intercept position wherein said target engaging portion generally intersects the path of travel of the target in the area of the target field, engagement of said missile engaging portion of said target engaging portion causing movement of said retaining member, thereby permitting movement of said yieldable support through a target intercept path of travel; and an inclined track having a lower end and an upper end positioned in the target path of travel to receive the target support post and move the post upwardly as the target moves along the inclined track from the lower end toward the upper end, said track including a horizontal portion at the upper end thereof to permit movement of the target support bracket below the elevated post to hold the post, and therefore the target, in the first position for subsequent presentation to the target field.

5. The target game of claim 4 wherein a hit light is provided with said hit light being part of a circuit which includes normally open contact members and wherein a contact closing arm is movably mounted adjacent to the movable retaining member and includes a portion mounted adjacent to said hit light contact members and movable toward and away from said contact members to close and open said circuit respectively, whereby, when said target has been successfully intercepted said retaining member will move said arm to close the hit light contact members, and therefore, activate the hit light circuit.

6. The target game of claim 5 wherein said sighting and firing assembly includes a laterally traversable arm connected to said aiming portion and extending to said target field and wherein said hit light is associated with said arm for movement therewith.

7. The target game of claim 6 wherein retarding means are provided for retarding movement of the target away from the support position, said retarding means including an arm pivoted to the target support bracket and terminating in a pointed end, and further

including a serrated surface on the housing below the target path of travel in the area of the target field.

8. The target game of claim 7 further including an audible signal producing circuit associated with said missile assembly and said target assembly and including means for connection with a source of power to activate the circuit for producing a first audible signal when said circuit is activated, a second audible signal when said missile assembly moves from said retracted position to said target intercept position and for producing a third audible signal when said target moves away from said support position.

9. The target game of claim 6 wherein said target field includes a background area behind said target path of travel and wherein said hit light is located behind said background area.

10. A target game, comprising: means defining a housing having a sighting area and a target area spaced therefrom; a sighting and firing assembly including an aiming portion located at said sighting area; a target field located at said target area; at least one target having a depending post located adjacent to the target field and mounted for movement through a path of travel across the target field, said target being mounted on a movable target support including an upright sleeve for slidably mounting said post and a retaining member movably mounted relative to said sleeve having a missile engaging portion, said retaining member including a retaining portion engageable with the bottom of the post to normally support the post and being movable between a normal support position, wherein said target is held in an elevated first position, to movement away from said support position, wherein said target support is free to move away from said first position through a path of travel simulating target intercept; a missile firing mechanism associated with said sighting and firing assembly and including a missile assembly having a target engaging portion, said missile assembly being mounted for movement from a retracted position to a target intercept position wherein said target engaging portion generally intersects the path of travel of the target in the area of the target field, engagement of said missile engaging portion by said target engaging portion causing movement of said retaining member, thereby permitting movement of said yieldable support through a target intercept path of travel.

11. The target game of claim 10 wherein said retaining member is pivoted to said sleeve and said retaining portion comprises a web which normally underlies said post in the first position.

12. The target game of claim 11 wherein said retaining member comprises a generally U-shaped bracket, and wherein said post terminates in a tapered bottom.

13. The target game of claim 12 wherein target reorienting means are provided for returning said target support to said first position, said target reorienting means included an inclined track having a lower end and an upper end, said track being generally below the target path of travel and intersecting the path of travel of a target support which has moved away from said first position.

14. The target game of claim 13 wherein the upper end of the inclined track includes a horizontal portion which permits return of the bracket web below the bottom of the post.

15. The target game of claim 12 wherein the missile engaging portion of the retaining member comprises an upwardly and outwardly extending arm.

16. The target game of claim 12 wherein target field has a front and rear area and wherein the targets are connected to an endless belt for continuous movement across the front and rear of the target field, with the inclined track being located at the rear of the target field.

17. A target game, comprising: means defining a housing having a sighting area and a target area spaced therefrom; a sighting and firing assembly including an aiming portion located at said sighting area; a target field located at said target area; at least one target located adjacent to the target field and mounted for movement through a path of travel across the target field, said target being mounted on a movable target support including a movable retaining member having a missile engaging portion, said retaining member being movable between a support position, wherein said target support is held in a first position, to a position away from said support position, wherein said target support is free to move away from said first position through a path of travel simulating target intercept; a missile firing mechanism associated with said sighting and firing assembly and including a missile assembly having a target engaging portion, said missile assembly being mounted for movement from a retracted position to a target intercept position wherein said target engaging portion generally intersects the path of travel of the target in the area of the target field, engagement of said missile engaging portion by said target engaging portion causing movement of said retaining member, thereby permitting movement of said yieldable support through a target intercept path of travel, and retarding means associated with the target for retarding movement thereof away from the support position including a link having a first portion connected to the target support and a second portion engageable with a portion of the housing.

18. The target game of claim 17 wherein the housing has a serrated surface which underlies the target path of travel adjacent to the target field and wherein the second portion of said link comprises a pointed end on said link engageable with said serrated surface.

19. The target game of claim 18 wherein a plurality of targets are provided and each target is connected to a target drive means by a target post which is mounted to the target drive means for vertical to and fro movement, and wherein the movable retaining member comprises a target support bracket which is also movably connected to the target drive means and has a portion which normally underlies and holds said target post in the first position and which is movable away from said post to permit said post to descend, with said target support bracket including an outwardly extending arm which comprises said missile engagement portion for engagement with said missile assembly target engaging portion for causing movement of the target support bracket away from said supporting position to permit descent of a target; and wherein an inclined track having a lower end and an upper end is positioned in the target path of travel to receive the target support post and move the post upwardly as the target moves along the inclined track from the lower end toward the upper end, with the track including a horizontal portion at the upper end thereof to permit movement of the target

support bracket below the elevated post to hold the post, and therefore the target, in the first position for subsequent presentation to the target field.

20. A target game, comprising: means defining a housing having a sighting area and a target area spaced therefrom; a sighting and firing assembly including an aiming portion located at said sighting area; a target field located at said target area; at least one target located adjacent to the target field and mounted for movement through a path of travel across the target field, said target being mounted on a movable target support including a movable retaining member having a missile engaging portion, said retaining member being movable between a support position, wherein said target support is held in a first position, to a position away from said support position, wherein said target support is free to move away from said first position through a path of travel simulating target intercept; a missile firing mechanism associated with said sighting and firing assembly and including a missile assembly having a target engaging portion, said missile assembly being mounted for movement from a retracted position to a target intercept position wherein said target engaging portion generally intersects the path of travel of the target in the area of the target field, engagement of said missile engaging portion by said target engaging portion causing movement of said retaining member, thereby permitting movement of said yieldable support through a target intercept path of travel; means for counting the number of targets which have moved across the target field including a projecting striker mounted on each target for movement therewith, said striker assuming an elevated or lowered position depending upon whether said target is in its support position, a displaceable target counter member movably mounted in said housing having a projecting counter tab adjacent the target path of travel and positioned for engagement by a striker in an elevated position as a target moves across the target field, and a target indicator associated with said target counter member having indicia thereon representative of the number of targets which have moved across the target field; and means for counting the number of targets which have moved across the target field and have been successfully hit including a displaceable hit counter member movably mounted in said housing having a projecting hit tab adjacent the target path of travel and positioned for engagement by said striker when in its lowered position as a target moves across the target field and a hit indicator associated with said hit counter member having indicia thereon representative of the number of targets which have been successfully intercepted.

21. The target game of claim 20 wherein the game is provided with motor means for driving the targets through the target path of travel, with the motor means being associated with the target counting means for inactivating the motor means following the presentation of a finite number of targets to the target field.

22. The target game of claim 21 wherein the motor is part of an electrical circuit which includes a pair of normally closed contacts and wherein the target counter indicator portion is displaceable and has a contact engaging web mounted for movement toward said contacts following displacement of said target counter, engagement of said web with said contacts causing separation thereof and causing said circuit to open and inactivate said motor.

23. The target game of claim 22 wherein the target counter indicator is movable from an initial position to a cycle terminating position, wherein the indicator web engages a contact to open the circuit, and wherein reset means are provided, including a manually operable portion, for returning the target counter indicator to said initial position and permitting said contacts to return to a closed condition.

24. The target game of claim 23 wherein the counter indicator is normally biased for movement to the initial position and wherein the target counter is associated with the indicator by means for incrementally advancing the indicator responsive to displacement of the counter, and wherein the reset means includes a holding member for holding the indicator in each incrementally advanced position, said holding member being movable away from its holding position responsive to movement of the reset means to permit movement of the indicator to the initial position.

25. The target game of claim 24 wherein the target striker is associated with the target for movement therewith when the target moves away from the support position, and wherein the housing includes a displaceable intercepted counter including a projecting tab adjacent to the target path of travel and spaced away from the target counter in the direction of target travel with the intercepted counter tab being offset relative to the target counter tab and positioned for engagement by the striker of a target which has moved away from the support position, with the intercepted counter member including an indicator portion having indicia thereon for indicating the number of targets which have been intercepted.

26. The target game of claim 25 wherein a plurality of targets are provided and each target is connected to the target drive means by a target post which is mounted to the target drive means by a target post which is mounted to the target drive means for vertical to and fro movement, and wherein the movable retaining member comprises a target support bracket which is also moveably connected to the target drive means and has a portion which normally underlies and holds said target post in the first position and which is movable away from said post to permit said post to descend, with said target support bracket including an outwardly extending arm which comprises said missile engagement portion for engagement with said missile assembly target engaging portion for causing movement of the target support bracket away from said supporting position to permit descent of a target; and wherein an inclined track having a lower end and an upper end is positioned in the target path of travel to receive the target support post and move the post upwardly as the target moves along the inclined track from the lower end toward the upper end, with the track including a horizontal portion at the upper end thereof to permit movement of the target support bracket below the elevated post to hold the post, and therefore the target, in the first position for subsequent presentation to the target field.

27. The target game of claim 26 wherein retarding means are provided for retarding movement of the target away from the support position, said retarding means including an arm pivoted to the target support bracket and terminating in a pointed end, and further including a serrated surface on the housing below the target path of travel in the area of the target field.

28. A target game, comprising: means defining a housing having a sighting area and a target area spaced therefrom; a sighting and firing assembly including an aiming portion located at said sighting area and an arm mounted at said sighting area for pivotal movement relative to the housing, said arm having a top with a series of intermittent openings therein, a vertically orientated missile tracking channel adjacent said target area and a plurality of light transmitting conduit means extending from said missile tracking channel to each of said openings in the top of said arm; a target field located at said target area; at least one target located adjacent to the target field and mounted for movement through a path of travel across the target field, said target being mounted on a movable target support including a movable retaining member having a missile engaging portion, said retaining member being movable between a support position, wherein said target support is held in a first position, to a position away from said support position, wherein said target support is free to move away from said first position through a path of travel simulating target intercept; a missile firing mechanism associated with said sighting and firing assembly and including a missile assembly having a target engaging portion and light means for generating and directing light through said conduit means to said intermittent openings in the top of the arm, said missile assembly being mounted for generally vertical to and fro movement within said tracking channel from a retracted position to a target intercept position wherein said light is transmitted through said conduit means to said openings for lighting said openings in series, said target engaging portion generally intersecting the path of travel of the target in the area of the target field so that the engagement of said missile engaging portion by said target engaging portion causes movement of said retaining member, thereby permitting movement of said yieldable support through a target intercept path of travel.

29. The target game of claim 28 further including an audible signal producing circuit associated with said missile assembly and said target assembly and including means for connection with a source of power to activate the circuit for producing a first audible signal when said circuit is activated, a second audible signal when said missile assembly moves from said retracted position to said target intercept position and for producing a third audible signal when said target moves away from said support position.

30. The target game of claim 29 wherein a hit light is provided with said hit light being part of a circuit which includes normally open contact members and wherein a contact closing arm is movable mounted adjacent to the movable retaining member and includes a portion mounted adjacent to said hit light contact members and movable toward and away from said contact members to close and open said circuit respectively, whereby, when said target has been intercepted, said retaining member will move said arm to close the hit light contact members, and therefore, activate the hit light circuit.

31. The target game of claim 30 wherein said sighting and firing arm includes an extension behind said missile tracking channel and said hit light is mounted on said extension for movement with said sighting and firing arm.

32. The target game of claim 31 wherein a plurality of targets are provided and each target is connected to a target drive means for vertical to and fro movement, and wherein the movable retaining member comprises a target support bracket which is also movably connected to the target drive means and has a portion which normally underlies and holds said target post in the first position and which is movable away from said post to permit said post to descend, with said target support bracket including an outwardly extending arm which comprises said missile engagement portion for engagement with said missile assembly target engaging portion for causing movement of the target support bracket away from said supporting position to permit descent of a target; and wherein an inclined track having a lower end and an upper end is positioned in the target path of travel to receive the target support post and move the post upwardly as the target moves along the inclined track including a horizontal portion at the upper end thereof to permit movement of the target support bracket below the elevated post to hold the post, and therefore the target, in the first position for subsequent presentation to the target field.

33. The target game of claim 32 wherein retarding means are provided for retarding movement of the target away from the support position, said retarding means including an arm pivoted to the target support bracket and terminating in a pointed end, and further including a serrated surface on the housing below the target path of travel in the area of the target field.

34. The target game of claim 28 wherein said missile assembly is mounted on the end of an arm which is normally biased for movement in one direction to an extended position, said movement of said arm to said extended position causing movement of said missile assembly from said retracted position to said intercept position.

35. The target assembly of claim 34 wherein said missile assembly arm is connected with a cocking arm having a portion extending outwardly of said sighting and firing area and a releasable locking member is provided at said sighting and firing area, said locking member being engageable with said portion of said cocking arm so that said cocking arm may be moved to a cocked position, thereby moving said missile arm to the retracted position and stressing the normal biasing means therefor whereby said cocking and missile arm may be held in said cocked position under the restraint of said releasable locking means.

36. The target game of claim 35 wherein said sighting and firing arm has a top with a series of missile light transmitting openings therein and wherein a source of missile light is associated with said missile assembly for movement relative to said arm as said missile assembly moves from said retracted position to said intercept position with said source of light being in communication with said light transmitting opening for lighting said openings in series as said missile assembly moves from said retracted position to said intercept position.

37. The target game of claim 36 wherein said missile light source is part of said missile assembly and moves to and fro in said missile tracking channel and wherein the arm includes a plurality of light transmitting conduit means extending from said missile tracking channel to each of said light transmitting openings in the top of said arm.

38. The target game of claim 37 wherein said missile light source is part of a circuit which includes normally open contact means adjacent to the path of travel of said missile arm and wherein said missile arm includes a wiper portion which is positioned for engagement with at least one of the contacts during movement of said arm from the retracted to the extended position to close the circuit across said contacts and activate said missile light source.

39. A target comprising:

means defining a housing having a target field area;

at least one target mounted at the target field area and being mounted for vertical movement between a normally raised position and a lowered position;

a target drive system associated with said target for moving said target laterally across the target field area in a given path of travel;

a sighting and firing assembly associated with said target path of travel and mounted in said housing including sighting means spaced from said target field area for aiming said assembly at said moving target, a missile assembly movable between a cocked position and a hit position and associated with said sighting means for movement therewith, said missile assembly having a target engaging portion which generally intersects the target path of travel when said missile assembly is in its hit position whereby engagement of said target engaging portion by said target causes said target to move from its raised position to its lowered position, a missile drive system to move said missile assembly from its cocked position to its hit position, and a trigger system for holding said missile assembly in a cocked position and selectively actuating said missile drive system; and

means for simulating an explosion representing the successful interception of said target by said target engaging portion, said explosion means including noise means for producing a sound simulating an explosion, light means for producing a flash of light, and actuating means operably associated with said target and said noise means and light means for sensing when a target has been successfully intercepted and for actuating said noise means and light means in response thereto, said explosion means comprising an electrical circuit including an electrical power source, an oscillator connected to said power source for producing a plurality of sound signals, a lightbulb connected to said power source for producing light, and a hit switch comprising said actuating means for permitting electricity to flow through said circuit whereby said electric circuit changes from one sound signal to another sound signal when the target has been successfully intercepted.

40. The target game of claim 39 wherein said hit switch includes two contact members mounted on the housing adjacent the target path of travel at a height intersecting said target path of travel when a target is in a lowered position, a target in a lowered position causing said contact members to touch one another thereby closing the circuit.

41. A target game comprising:

means defining a housing having a target field area;

at least one target mounting at the target field area and being mounted for vertical movement between a normally raised position and a lowered position;

a target drive system associated with said target for moving said target laterally across the target field area in a given path of travel;

a sighting and firing assembly associated with said target path of travel and mounted in said housing including sighting means spaced from said target field area for aiming said assembly at said moving target, a missile assembly movable between a cocked position and a hit position and associated with said sighting means for movement therewith, said missile assembly having a target engaging portion which generally intersects the target path of travel when said missile assembly is in its hit position, whereby engagement of said target engaging portion by said target causes said target to move from its raised position to its lowered position, a missile drive system to move said missile assembly from its cocked position to its hit position, and a trigger system for holding said missile assembly in a cocked position and selectively actuating said missile drive system; and

a target support associated with said target and target drive system including a depending vertical post secured to the bottom of the target, an upright sleeve for receiving said post for up and down movement therein, a post support bracket pivotally mounted to said sleeve having a web portion normally underlying said post to support said target in a raised position and a missile engaging portion adapted to engage the target engaging portion of the missile assembly, said bracket being movable between a support position wherein said post is supported and an unsupported position wherein said web portion is swung away from said post allowing said post and target to vertically descend in response to the engagement of said missile engaging portion by said target engaging portion.

42. The target game of claim 41 including target reorientating means having an inclined track with a lower end and an upper end positioned in the target path of travel, said track receiving the bottom of said target post when the target is in its lowered position and cause the post to move upwardly as the target moves along the inclined track from the lower end toward the upper end, said track including a horizontal portion at the upper end thereof to permit movement of a post support bracket into its support position below the post.

43. The target game of claim 42 including retarding means associated with the target for retarding movement thereof from the raised position to the lowered position, said retarding means including a depending movable link connected to the target support having a bottom portion engageable with a portion of the housing.

44. The target game of claim 43 wherein the housing has a serrated surface which underlines the target path of travel adjacent to the target field and wherein the bottom portion of said link comprises an end engageable with said serrated surface.

45. A target game comprising:
means defining a housing having a target field area;

at least one target mounted at the target field area and being mounted for vertical movement between a normally raised position and a lowered position;

a target drive system associated with said target for moving said target laterally across the target field area in a given path of travel; and

a sighting and firing assembly associated with said target path of travel and mounted in said housing including sighting means spaced from said target field area for aiming said assembly at said moving target, a missile assembly movable between a cocked position and a hit position and associated with said sighting means for movement therewith, said missile assembly having target engaging portion which generally intersects the target path of travel when said missile assembly is in its hit position, whereby engagement of said target engaging portion by said target causes said target to move from its raised position to its lowered position, a missile drive system to move said missile assembly from its cocked position to its hit position, and a trigger system for holding said missile assembly in a cocked position and selectively actuating said missile drive system, said sighting and firing assembly further including a firing arm mounted at said sighting means for pivotal movement relative to the housing, said arm having a generally vertical end opposite that of the sighting means forming a generally vertical tracking channel adjacent said target field area for mounting said missile assembly for up and down movement and a generally horizontal top with a series of intermittent openings therein, said arm having a plurality of light transmitting conduit means each extending from said channel to each of the top openings, said missile assembly including means for generating and directing light from said channel through said conduit means to said top openings when said missile assembly is moving upwardly, whereby the top openings are successively illuminated simulating a moving projectile.

46. The target game of claim 45 including an audible signal producing circuit associated with said missile assembly including an electrical power source, means for producing a first audible signal when said circuit is activated, means for producing a second audible signal when said missile assembly moves upwardly in the channel, and means for producing a third audible signal when said target moves from its raised position to its lowered position.

47. The target game of claim 46 wherein said circuit includes a hit light which flashes whenever a target is successfully intercepted.

48. The target game of claim 47 wherein said firing arm includes an extension behind said missile tracking channel having an upright portion behind said target field area for mounting said hit light.

49. A target game comprising:
means defining a housing having a target field area;

at least one target mounted at the target field area and being mounted for vertical movement between a normally raised position and a lowered position;

a target drive system associated with said target for moving said target laterally across the target field area in a given path of travel;

a sighting and firing assembly associated with said target path of travel and mounted in said housing including sighting means spaced from said target field area for aiming said assembly at said moving target, a missile assembly movable between a cocked position and a hit position and associated with said sighting means for movement therewith, said missile assembly having a target engaging portion which generally intersects the target path of travel when said missile assembly is in its hit position whereby engagement of said target engaging portion by said target causes said target to move from its raised position to its lowered position, a missile drive system to move said missile assembly from its cocked position to its hit position, and a trigger system for holding said missile assembly in a cocked position and selectively actuating said missile drive system;
means for counting the number of targets which have moved across the target field including a projecting striker mounted on the target for movement therewith, a displaceable target counter member movably mounted in said housing where the target enters the target field area, said member having a projecting counter tab adjacent the target path of

travel and positioned for engagement by the striker when a target is in its raised position as the target enters and moves across the target field, a target indicator associated with said target counter member having indicia thereon representative of the number of targets which have moved across the target field, and deactivating means for rendering the target game inoperable after a given number of passing targets have been sensed and registered, and means for counting the number of targets which have moved across the target field and have been successfully hit including a projecting striker mounted on the target for movement therewith, a displaceable hit counter member movably mounted in said housing where the target leaves the target field area, said member having a projecting hit tab adjacent the target path of travel and positioned for engagement by said striker when the target is in its lowered position as the target leaves the target field, and a hit indicator associated with said hit counter member having indicia thereon representative of the number of targets which have been successfully intercepted.

* * * * *

30

35

40

45

50

55

60

65