

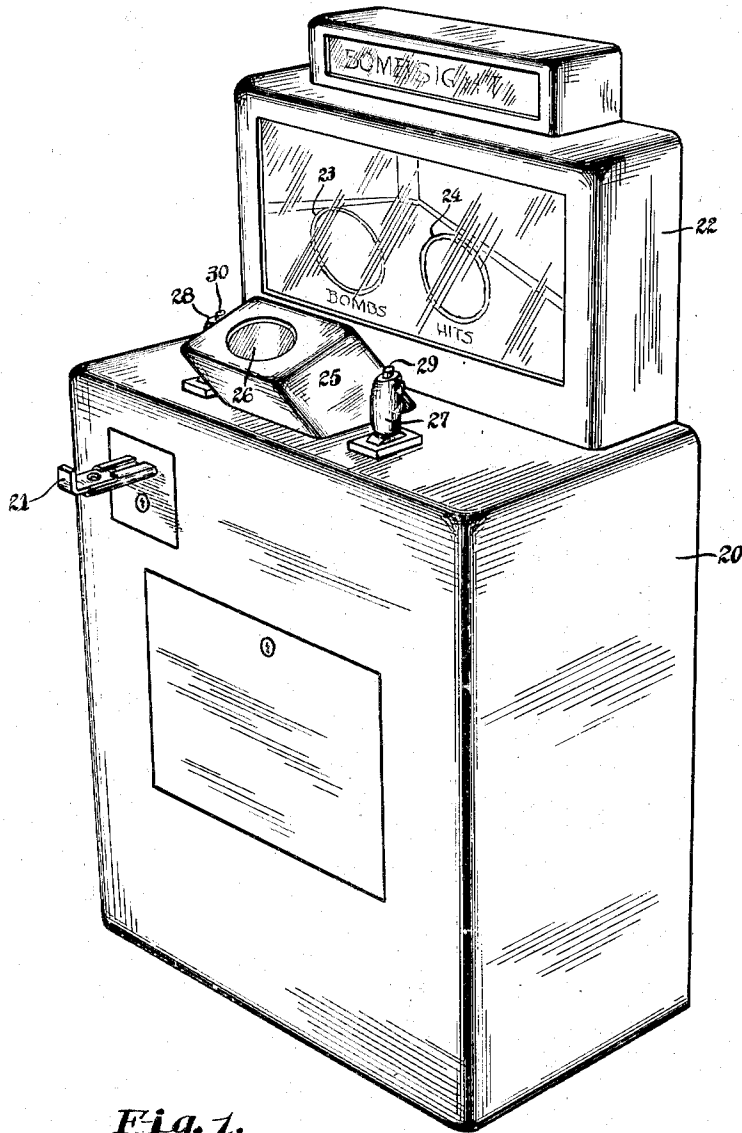
Nov. 28, 1950

F. J. BULA  
BOMBING GAME

2,531,608

Filed Aug. 31, 1946

6 Sheets-Sheet 1



*Fig. 1.*

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6 Sheets-Sheet 2

Fig. 2.

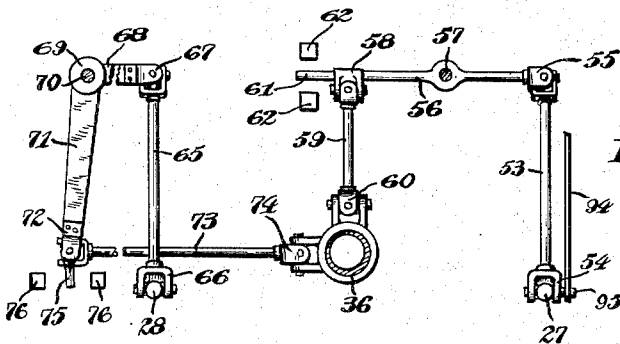
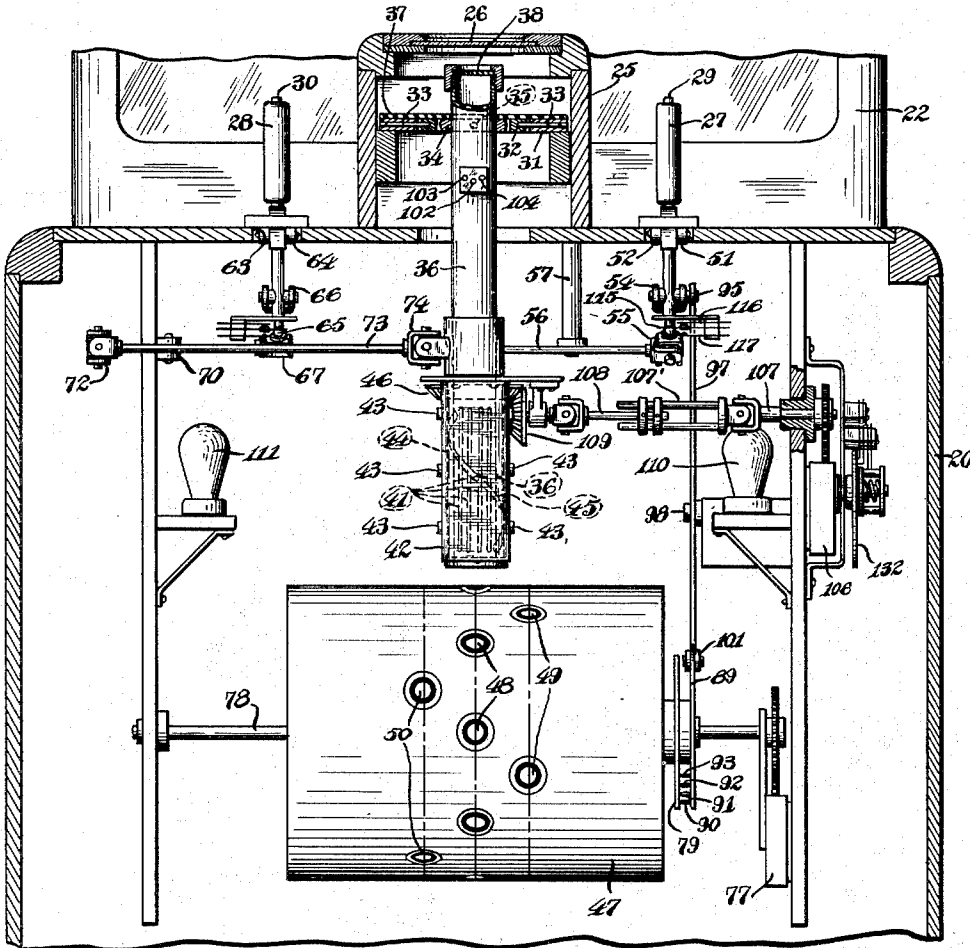


Fig. 3.

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6 Sheets-Sheet 3

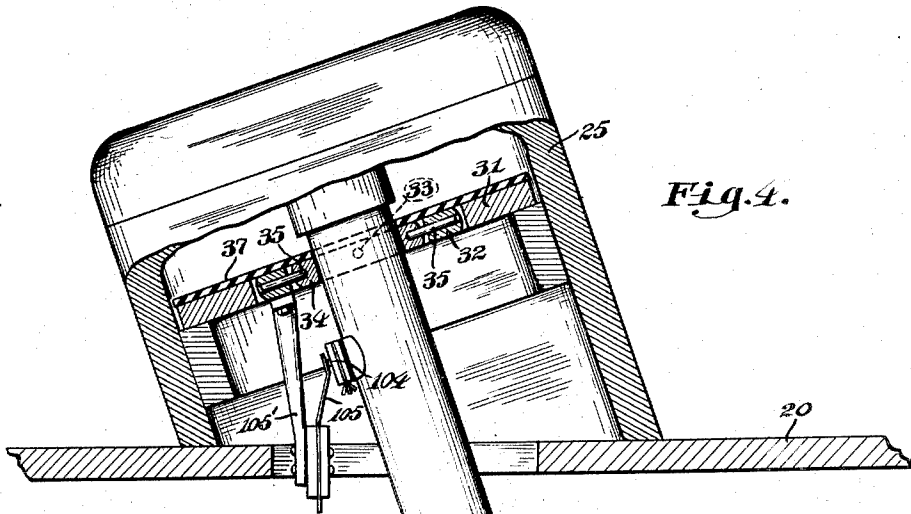


Fig. 4.

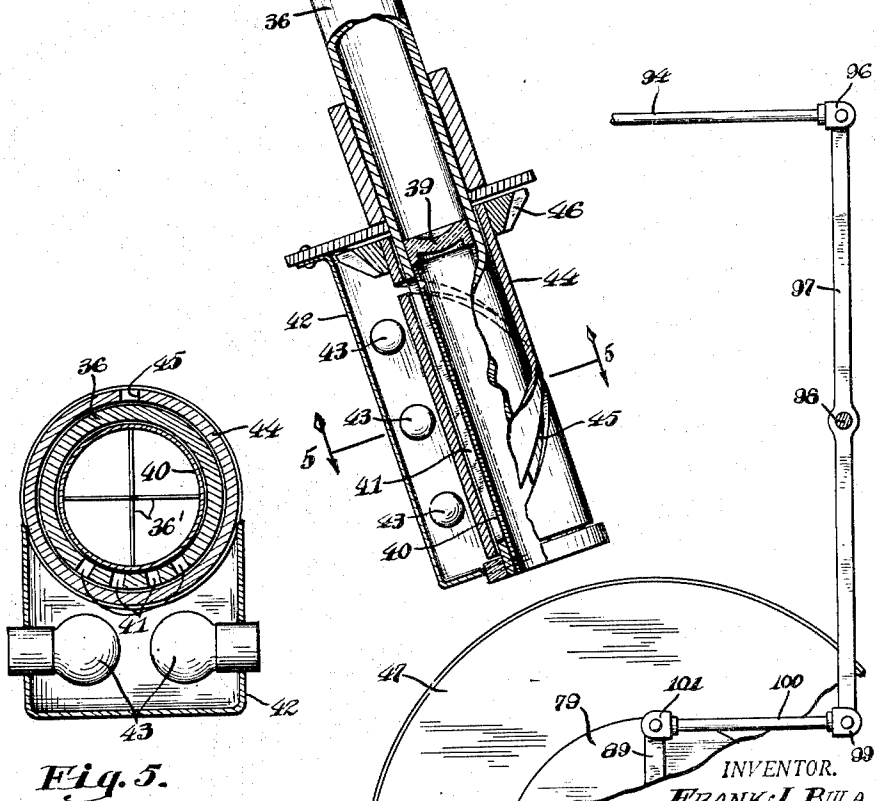


Fig. 5.

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6 Sheets-Sheet 4

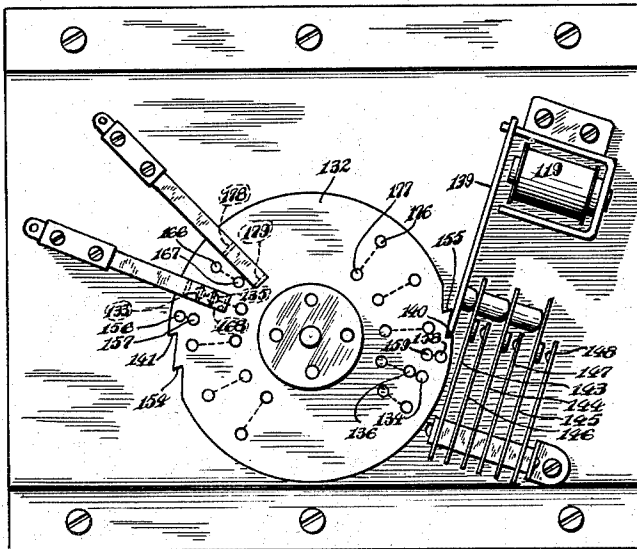


Fig. 6.

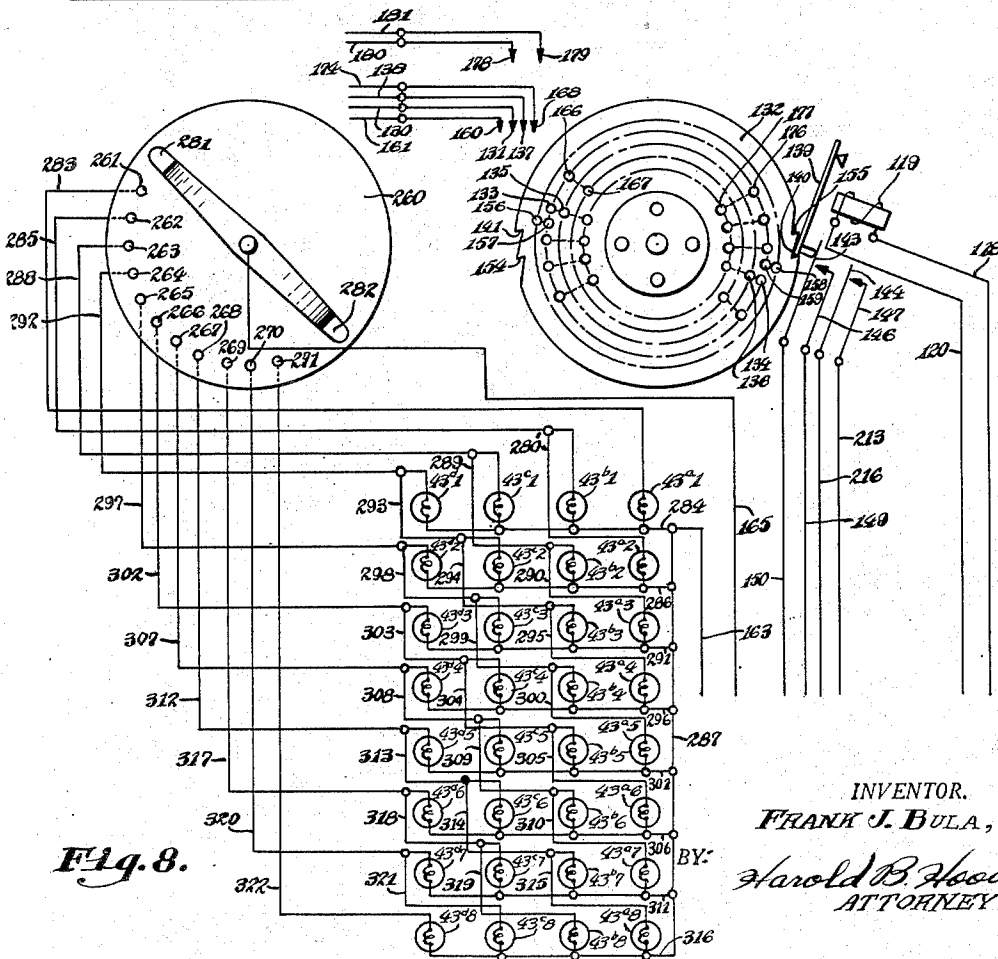


Fig. 8.

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6 Sheets-Sheet 5

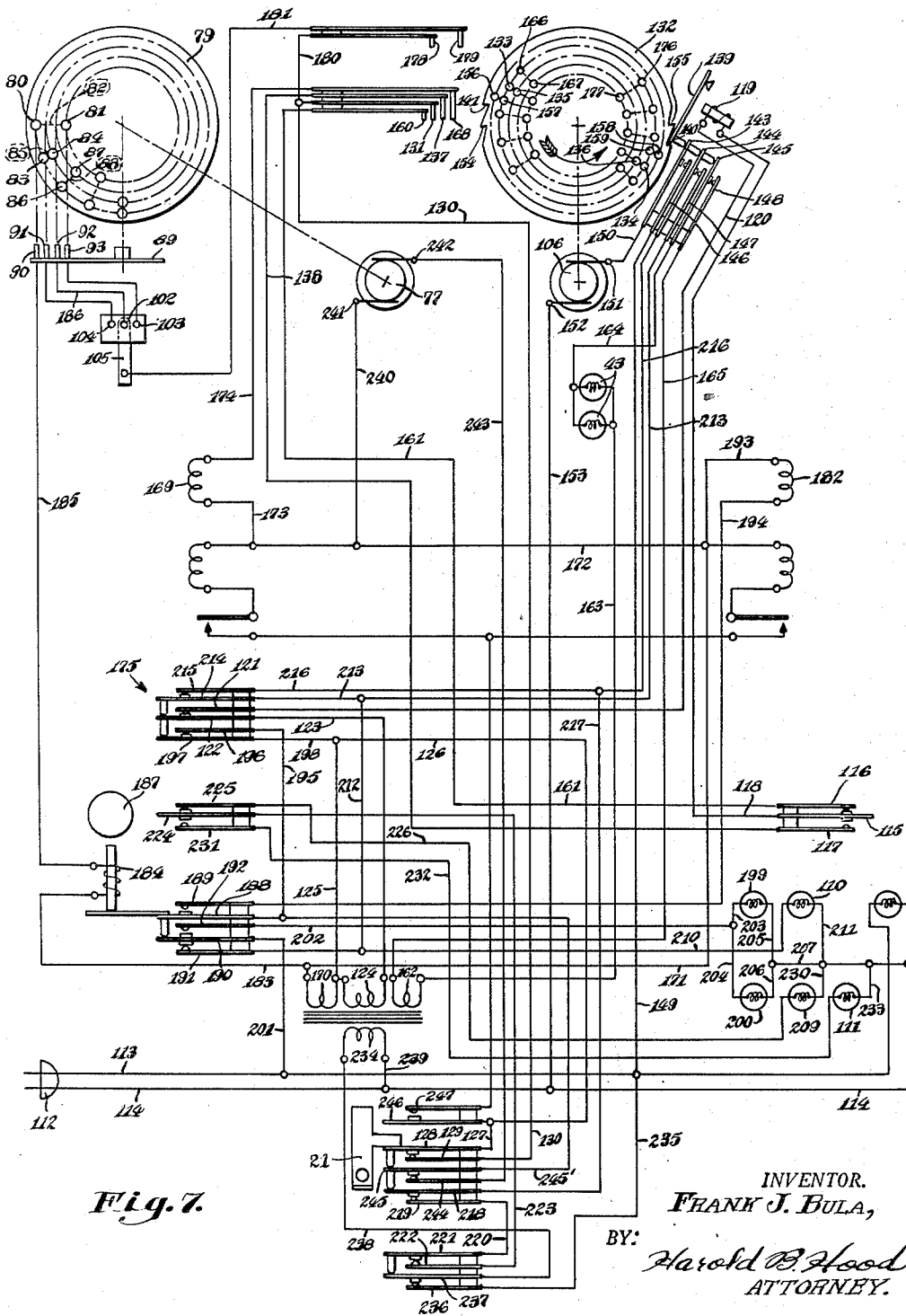


Fig. 7.

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6 Sheets-Sheet 6

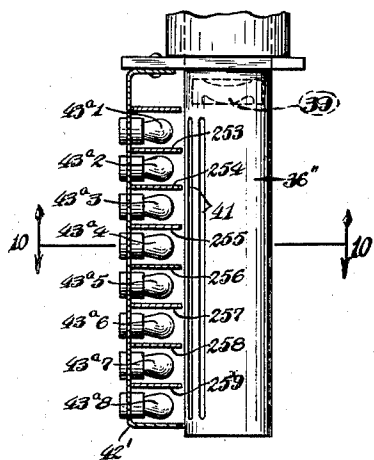


Fig. 9.

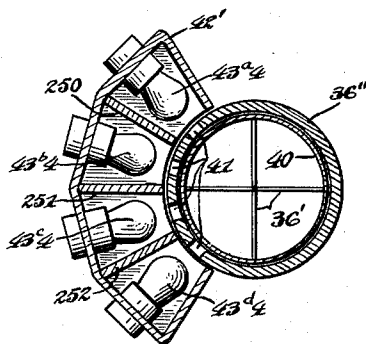


Fig. 10.

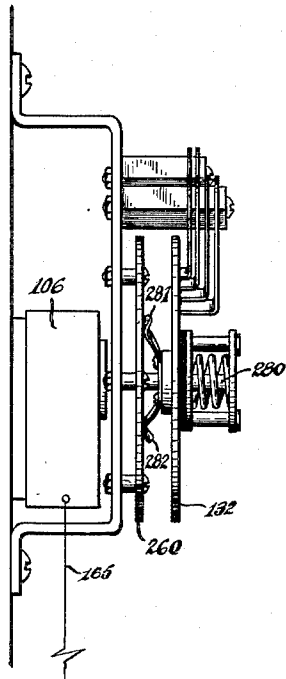


Fig. 11.

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# UNITED STATES PATENT OFFICE

2,531,608

## BOMBING GAME

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Application August 31, 1946, Serial No. 694,329

13 Claims. (Cl. 273—101.2)

1

The present invention relates to a bombing game, and more particularly to a device which may preferably be coin controlled, and which will simulate the operation of bombing from an airplane. More specifically, I provide a device which includes a pair of handles, a sighting device under the control of said handles, a moving target visible through said sighting device, means for simulating the fall of bombs through the air, means under the control of the player for activating the last-named means, and means effective, upon activation of such means at precisely the proper instant, to simulate the explosion of bombs.

A major feature of the invention resides in the concept of providing an unusually effective optical illusion simulating the falling of bombs through the air. My sighting device comprises a tubular structure, visually open at its opposite ends, one end thereof being visually accessible to a player and the other end thereof being located within a substantially closed cabinet adjacent a moving target device. It is a primary object of the invention to provide means for causing a plurality of spots of light to appear, within the sighting device, when the activating means is actuated, and to cause said spots of light to move from points nearer the first-named end of the sighting device toward points more remote from said end, said spots of light following paths peripherally spaced from each other, and being located, throughout their movement through the sighting device, at different distances from the first-named end of the sighting device. A further object of the invention is to provide means for separately simulating the explosion of bombs at the instant of arrival of each spot of light at that point in its path most remote from the first named end of the sighting device.

Further objects of the invention include the provision of means connecting two player-accessible handles with the sighting device in such fashion that oscillation of one of said handles in a single plane will cause swinging movement of said sighting device substantially in a plane parallel to said single plane, while oscillation of the other handle in a plane parallel to said single plane will cause swinging movement of said sighting device substantially in a plane perpendicular to said single plane; the provision of a plurality of series of targets upon a moving target device, together with means for electrically operatively associating said sighting device selectively with any one of said series of targets; the provision of a novel form of commutator means for electrically

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ally associating the sighting device with the individual target device; and the provision of a plurality of kinds of means for producing the optical illusion above mentioned. Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a perspective view of a game machine constructed in accordance with the present invention;

Fig. 2 is an enlarged transverse section, showing the operative parts of one embodiment of my invention;

Fig. 3 is an enlarged transverse sectional view, showing the linkage connecting the control handles with the sighting device;

Fig. 4 is a further enlarged, fragmental sectional view, taken in planes substantially at right angles to the plane of Fig. 2, and illustrating certain details of the control mechanism;

Fig. 5 is a transverse section, upon a further enlarged scale, and taken substantially upon the line 5—5 of Fig. 4;

Fig. 6 is an elevational view of a commutator and associated parts, constructed in accordance with my invention;

Fig. 7 is a schematic wiring diagram of one embodiment of my invention;

Fig. 8 is a schematic wiring diagram of a modified form of my invention;

Fig. 9 is a longitudinal sectional view through a modified means for simulating the fall of bombs;

Fig. 10 is an enlarged transverse section taken substantially on the line 10—10 of Fig. 9; and

Fig. 11 is an enlarged fragmental elevation of commutator means incorporated in the embodiment of Figs. 8 to 10.

Referring more particularly to the drawings, it will be seen that I have illustrated a cabinet 20 provided with the usual coin receiving slide 21 and an upstanding supplemental housing 22 upon the forward wall of which are provided a shot indicating dial 23 and a hit indicating dial 24. The front panel of the housing 22 may be suitably decorated to represent what a bombardier would see when sitting at his station. The backs of the heads of a pilot and a copilot, standard instru-

ment board dials, and a section of a windshield may be suitably painted upon such panel. In the present drawings, I have indicated only an illustration of a part of an airplane windshield.

A supplemental housing 25 represents the external appearance of any standard form of bomb sight, and is provided with a transparent pane 26 through which the player peers into the interior of the machine. Two control handles 27 and 28, representing the handles for controlling a standard bomb sight, are positioned at opposite sides of the bomb sight housing 25, in such a location as to be readily and comfortably grasped by the two hands of the player as he peers through the pane 26. The handle 27 carries a button 29 and the handle 28 carries a button 30, for purposes which will appear as the description proceeds.

Within the housing 25 (see Fig. 2) is suitably supported a ring 31 carrying a pair of aligned, oppositely positioned journal pins 33 which support a concentric ring 32 somewhat smaller than the ring 31. Obviously, the ring 32 is oscillable about the axis of the pins 33. A third ring 34, somewhat smaller than the ring 32, is supported therewithin upon a pair of aligned journal pins 35 (see Fig. 4), whose common axis is located in the same plane with the axis of the pins 33, but at right angles thereto, the ring 34 being oscillable about the axis of the pins 35. Suitably fixedly supported by the ring 34 is a sighting tube 36. It will be clear that the above described structure provides a universal mounting for the sighting tube 36. Preferably a rubber mat 37, snugly engaging the tube 36, overrides the mounting assembly for said tube to prevent the escape of light through the interstices between the described rings.

Preferably, but not necessarily, the upper end of the tube 36, which is positioned to be visually accessible to the player, may carry a transparent disc 38 for physically, but not visually, closing said upper end of said tube, against dust, dirt, and the like. Positioned within the tube, at any suitable point in its length, is a concavo-convex lens 39 (Fig. 4) of the type which creates an illusion of distance or remoteness. That portion of the interior wall of the tube beyond the lens 39 comprises a translucent screen 40. The character of said screen is such that a light beam directed thereupon from its external surface will produce a visible illuminated area on its internal surface, and the construction of the sighting device is such that any such illuminated area will be visible to the player looking into the upper end of said tube 36.

The lower end of the sighting device, positioned within the cabinet, is likewise visually open, but may preferably be physically closed by a transparent member, or the like, and a pair of cross hairs, indicated at 36' in Fig. 5 will preferably be provided somewhere in the sighting device.

The external wall of the tube 36 is formed with a plurality of longitudinally extending, peripherally spaced, slots or windows 41 separated by opaque areas, in the region of the screen 40. In the embodiment of the invention illustrated in Figs. 1 to 7, the region of the tube 36 in which said slots are formed is enclosed by a box 42 in which are mounted a plurality of light bulbs 43, which will preferably be red in color.

Sleeved on that portion of the sighting tube 36 in which are formed the windows 41 is a mask 44, mounted for rotation about the axis of said

tube and formed with a spirally arranged slot or window 45 having a peripheral extent of approximately 360 degrees reduced by approximately the peripheral distance between those slots 41 at the two extremes of the series of slots, and an axial extent substantially equal to the length of the slots 41. It will be clear that, if the mask 44 is rotated in the proper direction, the upper end of said slot 45 will come successively into registry with the separate slots 41, and that the point of registry of the slot 45 with each slot 41 will move downwardly as the mask rotates. Thus, when the lights 43 are energized, while the mask 44 rotates, a spot of light will appear on the screen 40 at the point of current registration of the slot 45 with each slot 41, and those points of light will move downwardly through the tube at different levels, from the top of each slot 41 to the bottom of each said slot.

The mask 44 carries a gear 46 driven in a manner later to be described.

Mounted for rotation within the cabinet 20 and beneath the sighting tube 36 is a target device or drum 47 carrying a plurality of series of target representations, the units of each series being spaced peripherally of the drum, and the various series being spaced axially of the drum. Thus the series 48 is disposed vertically beneath the point of support of said tube, while the series 49 is displaced to the right and the series 50 is displaced to the left, as viewed in Fig. 2.

In an opening 51 in the top of the cabinet 20 spaced somewhat to the right of the housing 25, is mounted a bracket 52 upon which the lever 27 is pivotally mounted at a point intermediate the ends of said lever. A link 53 is pivotally connected at 54 to the depending arm of said lever 27; and the other end of said link is connected, through a universal joint 55, with one arm of a lever 56 pivotally mounted intermediate its ends upon a suitable journal 57. The lever 56 is mounted to oscillate in a plane substantially perpendicular to the plane of oscillation of the lever 27. The other arm of said lever 56 is connected, through a universal joint 58, with a link 59, said link 59 being connected to the tube 36 through a universal joint 60. It will be readily apparent that oscillation of the lever 27 will result in oscillation of the tube 36 in the same general direction and substantially in a plane parallel to the plane of oscillation of the lever 27. An extension 61 on the last mentioned arm of the lever 56 may preferably be positioned to engage a pair of rubber bumpers 62, 62 suitably mounted to cushion movement of the tube 36 near the ends of its throw.

In a suitable opening 63 on the other side of the housing 25 is provided a bracket 64 upon which the lever 28 is pivotally mounted, intermediate its ends, for oscillation in a plane substantially parallel to the plane of oscillation of the lever 27. One end of a link 65 is pivotally connected at 66 to the depending arm of said lever 28, and the other end of said link is connected, through a universal joint 67, with one arm 68 of a bell crank lever 69 pivotally mounted at 70 for oscillation in a plane substantially perpendicular to the plane of oscillation of the lever 28. The other arm 71 of said lever 69 is connected, through a universal joint 72, with one end of a link 73 whose opposite end is connected, through a universal joint 74, with the tube 36. It will be clear that because of the direction-changing effect of the lever 69, oscilla-



tion of the lever 28 will result in oscillation of the tube 36 substantially in a plane perpendicular to the plane of oscillation of said lever 28. Preferably, an extension 75 on said lever arm 71 is positioned to cooperate with a pair of rubber bumpers 76, 76 serving the same function performed by the bumpers 62, 62.

Thus, movement of the lever 27 away from the operator will swing the lower end of the sighting tube 36 away from the operator; while movement of the lever 28 away from the operator will move the inner end of tube 36 toward the operator's left.

An electric motor 77, when energized, will drive the shaft 78 upon which the drum 47 is mounted.

Moving with said shaft and drum is a commutator disc 79 provided, for each target 49, with a pair of buttons (Fig. 7) 80 and 81 electrically connected by a wire 82; for each target 50 with a pair of buttons 83 and 84 electrically connected by a wire 85; and for each target 48 with a pair of buttons 86 and 87 electrically connected by a wire 88. Mounted for oscillation about the axis of the shaft 78, but loose on said shaft, is a feeler arm 89 carrying fingers 90, 91, 92 and 93. The finger 90 is positioned for selective engagement with any one of the buttons 80, 83 and 86; the finger 91 is positioned for engagement with the button 84; the finger 92 is positioned for engagement with the button 87; and the finger 93 is positioned for engagement with the button 81. It is to be understood that there are as many button pairs on the commutator 79 as there are targets on the drum 47.

A link 94 has one end connected to the depending arm of the lever 27, at 95, and has its other end connected, at 96, to one arm of a lever 97 (Fig. 4) pivoted intermediate its ends at 98 for oscillation in a plane parallel to the plane of oscillation of the lever 27. The other arm of said lever 97 is pivotally connected at 99 to one end of a link 100 whose opposite end is pivoted at 101 to the feeler arm 89. The parts are so proportioned and dimensioned that, when the lower end of the tube 36 is properly positioned with respect to one of the targets 48, for instance, at the instant when one of the light spots above mentioned reaches the lower end of the screen 40, the fingers 90 and 92 will come into engagement with the buttons 86 and 87 at that same instant to establish an operative circuit later to be described. Similarly, operative circuits will be established through the finger 91 or 93 if the sighting tube is properly aligned with one of the targets 49 or 50 at the proper instant. The selection of the finger to enter into an operative circuit is controlled through a plurality of contacts 102, 103 and 104 carried on the tube 36, and a brush 105 (see Fig. 4) carried by a bracket 105' swung from the ring 32. So long as the tube 36 is generally aligned with the series of targets 48, the brush 105 will be in electrical engagement with the contact 102; but movement of the tube into alignment with the target series 49 will shift the contact 103 into engagement with the brush; while movement of the sighting device into alignment with the target series 50 will shift the contact 104 into engagement with the brush 105.

A second motor 106 is mounted to drive a shaft 107 which, through a universal connection 107', is operatively connected to a shaft 108 carrying a gear 109 meshing with the gear 46. It will be obvious from inspection of Fig. 2 that, since the shaft 108 is slidably associated with the

connection 107', the gear 109 may follow the universal movements of the tube 36 without destroying the driving connection of the motor 106 with said gear.

The interior of the cabinet 20 is illuminated, at times, by suitable lights, two of which are indicated at 110 and 111. Preferably, the bulb 110 will be white and the bulb 111 will be blue, for reasons later to become apparent. Other light bulbs will be suitably disposed within the cabinet, but are not shown except in Fig. 7.

For introducing power into the organization, I have illustrated a standard plug 112 to which are connected power leads 113 and 114. Much of the mechanism involved in the machine in which I have illustrated my invention is conventional, and therefore no specific description of those conventional parts, such as the step-up relays for the scoring indicator and the shot indicator, the resetting devices, the time switches, and like mechanisms, will be given herein. The features which I consider to constitute my invention, however, will be described in detail, and casual references to the environmental conventional units may be made from time to time.

The button 29 carried by the lever 27 is positioned in cooperative relation with a switch arm 115 which normally makes contact with a switch arm 116 but may be moved into contact with a switch arm 117 by depression of the button 29. A lead 118 extends from the switch arm 115 to one end of a solenoid coil 119 and a lead 120 extends from the other end of said coil to a switch arm 121 normally in contact with a switch arm 122 from which a lead 123 extends to one end of a transformer secondary coil 124. The opposite end of said coil 124 is connected by wire 125 with a wire 126 which leads to a wire 127 which, in turn, is connected to switch arm 128 normally in engagement with switch arm 129. From switch arm 129 extends a wire 130 connected to a feeler finger 131.

Said finger 131 is associated with a commutator 132 driven by motor 106; and, in the rest position of said commutator 132, the finger 131 contacts a button 133 on said commutator or a button 134 diametrically opposed thereto. A button 135 is electrically connected to the button 133, and a button 136 is electrically connected to the button 134. When the finger 131 is in contact with the button 133 or the button 134 a second feeler finger 137 will be in contact with the button 135 or the button 136. From the feeler 137 leads a wire 138 connected to the switch arm 117. Thus, depression of the switch arm 115 will energize the solenoid 119 to draw the detent arm 139 out of the notch 140 or the notch 141 in the periphery of the commutator 132.

Said detent arm cooperates with switch arms 143, 144 and 145 in such a manner that, when said detent arm is so moved, the switch arm 143 will be moved into electrical contact with the arm 146 and the arms 144 and 145 will respectively be moved into contact with switch arms 147 and 148. Thereby, the motor 106 is energized through a circuit which may be traced from power line 113 through wire 149, switch arm 146, switch arm 143, wire 150, motor terminal 151, motor terminal 152, and wire 153 to power line 114. As soon as the commutator 132 begins to rotate, of course, the energizing circuit for the solenoid 119 is broken as the buttons 133 and 135 move away from the feeler fingers 131 and 137.

Thus, the shaft 108 is driven to rotate the sleeve 44, and the cycle above described takes place, simulating the falling of a stick of bombs, as viewed through the sighting device, the gearing arrangement being such that one-half revolution of the commutator 132 results in one full revolution of the sleeve or mask 44.

The energizing circuit for the motor 106 is maintained so long as the detent arm 139 rides the outer periphery of the commutator 132; but when the detent arm 139 drops into the notch 154 or 155, the switch arms 143 and 146 will be separated and the motor 106 will be deenergized; and it will be noted that the cycle thus will be stopped even though the player holds the button 29 depressed, since the finger 137 to which the switch arm 117 is connected is not then in contact with any button on commutator 132.

If, now, the button 29 is released, the switch arm 115 will move back into contact with the switch arm 116. When the detent arm 139 is engaged in the notch 154 or the notch 155, buttons 156 and 157, or buttons 158 and 159, electrically connected together, will come to rest under feeler fingers 160 and 131 respectively. An energizing circuit for the solenoid coil 119 will thus be established as follows; transformer coil 124, wire 123, switch arm 122, switch arm 121, wire 120, coil 119, wire 118, switch arm 115, switch arm 116, wire 161, feeler finger 160, button 158, button 159, feeler finger 131, wire 130, switch arm 129, switch arm 128, wire 127, wire 126, and wire 125 to coil 124; and the detent 139 will thereby be withdrawn from the notch 154 to close the switch arms 143 and 146. Thus the motor 106 is energized to move the commutator 132; but the arm 139 will drop into the notch 141 almost immediately after the buttons 158 and 159 leave the feeler fingers 160 and 131, thereby reopening the motor energizing circuit and leaving the system in condition to be reactivated by depression of the button 29.

Withdrawal of the detent arm from its notch likewise energizes the lights 43 by closure of the switch arms 145 and 148, establishing a circuit, which may be traced from secondary transformer coil 162 through wire 163, light bulbs 43, wire 164, switch arm 145, switch arm 148 and wire 165, back to said coil 162. Thus, the lamp bulbs 43 are illuminated only during such times as the detent arm is held in its outermost position, either by the coil 119 or by its engagement with the periphery of the commutator 132.

It will be remembered that rotation of the commutator 132 is accompanied by operation of the falling bomb simulating device. As the buttons 133 and 135 leave the fingers 131 and 137, a pair of electrically connected buttons 166 and 167 move into contact with feelers 131 and 168, thereby energizing the "shots fired" relay 169 through a circuit which may be traced as follows: transformer secondary coil 170, wire 171, wire 172, wire 173, coil 169, wire 174, finger 168, button 167, button 166, finger 131, wire 130, switch arm 129, switch arm 128, wire 127, wire 126 and wire 125 back to coil 170. The relay 169 is of well known construction, and need not be described further than to say that it actuates the indicator 23 through one step, upon each energization of the coil 169 and, after a predetermined number of such energizations, will open the switch 175.

As the spot of light on the screen 40 representing the lowermost bomb reaches the lowermost end of the sighting tube 36, a pair of elec-

trically connected buttons 176 and 177 will come into contact with a pair of feeler fingers 178 and 179. The finger 178 is connected by wire 180 with wire 130. The finger 179 is connected by a wire 181 with the terminal finger 105. If, at the instant of engagement of the buttons 176 and 177 with the fingers 178 and 179, the hand levers 27 and 28 are properly positioned, the "hit" relay 182 will be energized in the following manner: assuming the finger 105 to be in engagement with the contact 102, current may flow from coil 170 through wire 183, coil 184, wire 185, finger 90, button 86, wire 88, button 87, finger 92, wire 186, contact 102, finger 105, wire 181, finger 179, button 177, button 176, finger 178, wire 180, wire 130, switch arm 129, switch arm 128, wire 127, wire 126, and wire 125 back to the coil 170. Energization of the coil 184 not only rings bell 187 but also moves switch arm 188 into contact with switch arm 189 and separates switch arm 189 from switch arm 191, moving switch arm 190 into engagement with switch arm 192. Now, current may flow from transformer coil 170, through wire 171 to wire 193, and thence through coil 182, wire 194, switch arm 189, switch arm 188, wire 195, switch arm 196, switch arm 197, wire 198, and wire 125, back to coil 170. The scoring mechanism is conventional and need not be described beyond saying that it acts upon the register 24, upon each energization of the coil 182.

Obviously, the finger 105 must be in contact with the terminal 102 when the finger 92 engages the button 87, and, at the same instant, the fingers 178 and 179 must register with the buttons 176 and 177. It will be clear that similar circuits will be established if the finger 105 engages the contact 103 when the finger 93 engages the button 81; or engages the contact 104 when the finger 91 engages the button 84 at the proper instant.

Closure of the switch arms 190 and 192 likewise flashes red lights 199 and 200 through a circuit leading from power line 113 through wire 201, switch arm 190, switch arm 192, wire 202, wires 203 and 204, bulbs 199 and 200, wires 205 and 206 and wire 207, to power line 114. Separation of the switch arms 190 and 191 momentarily extinguishes light bulb 110 and light bulb 209 or 111, normally energized through circuits including said switch arms, as follows: for light bulb 110, from power line 113 through wire 201, switch arm 190, switch arm 191, wire 210, light bulb 110, wire 211, and wire 207 to power line 114. For light bulb 209, from power line 113, through wire 201, switch arm 190, switch arm 191, wire 212, wire 213, switch arm 214, switch arm 215, wire 216, wire 217, switch arm 218, switch arm 219, wire 220, switch arm 221, switch arm 222, wire 223, switch arm 224, switch arm 225, wire 226, light bulb 209, wire 230 and wire 207 back to power line 114. For light bulb 111 the circuit last traced to switch arm 224, thence through switch arm 231, wire 232, bulb 111, wire 233 and wire 207 back to power line 114.

It may be here mentioned that the switch arm 224 is dominated by the button 30 on handle 28, is normally in contact with switch arm 225, but may be moved, by depression of button 30, into engagement with switch arm 231 to extinguish the white light 209 and energize the blue light 111 to simulate night bombing conditions.

It is to be noted that the above described circuits energizing the lights 209 and 111, extend through the switch arms 214 and 215, which

are part of the switch 175. As stated above, the switch 175 is opened upon the last energization of the coil 169; but obviously the lights 209 or 111 must be held energized during completion of the final falling bomb cycle. Therefore, I include in the switch organization dominated by the detent arm 139 the switch arms 144 and 147 which, when closed, provide a circuit by-passing the switch arms 214 and 215 as follows: power line 113, wire 201, switch arm 190, switch arm 191, wire 210, wire 212, wire 213, switch arm 147, switch arm 144, wire 216, wire 217, switch arm 218, switch arm 219, wire 220, switch arm 221, switch arm 222, wire 223, and switch arm 224; and thence, over the circuits just above described, through light bulbs 209 or 111 back to power line 114.

All of the secondary transformer coils 124, 162 and 170 are, of course, dominated by the primary coil 234, which coil is energized through a circuit which may be traced from power line 113 through wire 235, switch arm 236, switch arm 237, wire 238, coil 234 and wire 239 back to power line 114. The switch arms 236 and 237, as well as switch arms 221 and 222 are parts of a time control mechanism which is conventional in the art and which, therefore, is not illustrated or described in detail herein.

Of course, throughout the time of play, the motor 77 is continuously energized through a circuit which may be traced from transformer coil 170 through wire 171, wire 172, and wire 243 to motor terminal 241, and thence from motor terminal 242 through wire 243, switch arm 244, switch arm 245, wire 245', wire 195, switch-arm 196, switch arm 197, wire 198 and wire 125 back to transformer coil 170.

The "shots fired" relay and the scoring relay are reset in a conventional manner when the coin slide 21 is moved to separate switch arms 126 and 129, 218 and 219, and 244 and 245, and to close switch arms 246 and 247; and the apparatus is returned to condition for further play by return of said slide to the illustrated position.

An alternative means for producing the four light spots moving downwardly along the screen 40 at different elevations is illustrated in Figs. 8 to 11 inclusive. Parts illustrated in those figures and corresponding directly to parts illustrated in Figs. 1 to 7 are indicated by the same reference numerals.

In such alternative embodiment, the sighting tube 35' has no part corresponding to the mask 44, and the light box 42', enclosing the four longitudinally extending windows 41, is divided, by longitudinally extending partitions 250, 251, and 252, into separate sections respectively registering with, and capable of supplying light to, the four windows 41. A series of eight light bulbs is associated with each of said slots 41, and the bulbs of each series are separated from each other by transverse partitions 253, 254, 255, 256, 257, 258, and 259, so that each bulb will cast light through only its individual portion of one window, the separate portions being vertically spaced from each other.

Thus, in Fig. 9, I have shown the eight bulbs of one series, respectively indicated by the reference numerals 43a1, 43a2, 43a3, 43a4, 43a5, 43a6, 43a7, 43a8, while in Fig. 10 I have illustrated one bulb of each series, indicating them by the reference numerals 43a4, 43b4, 43c4, and 43d4. The entire assembly of bulbs is schematically indicated in the diagram of Fig. 8.

Mounted upon the bracket supporting the motor

106, and electrically insulated therefrom, is a fixed commutator 260 provided with a series of peripherally spaced contactor buttons 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, and 271; and the shaft 280, through which the motor drives the commutator 132, drives also a brush having contactor fingers 281 and 282 at its opposite ends.

It will be remembered that the commutator 132 makes only one-half revolution during a bomb dropping cycle of the embodiment illustrated in Figs. 1 to 7. Similarly, in the present embodiment, said commutator, and therefore the brush with its fingers 281 and 282, must make only one-half revolution during a bomb dropping cycle. Thus, during one-half revolution of the shaft 280, the brush-finger 281 will sweep the contacts 261 to 271, inclusive; and during the next half revolution, the finger 282 will sweep said contacts.

As illustrated, the wire 165 (which leads from one end of the transformer coil 162) will be electrically connected to the brush with its fingers 281 and 282. This may be done, for instance, by permitting said shaft 280 to be electrically in contact with the motor base and with the brush, and by connecting the wire 165 to said motor base, as shown in Fig. 11. The wire 163 leads to the opposite end of said transformer coil 162.

Button 261 is connected, by wire 283, with one side of bulb 43a1, and the other side of said bulb is connected by wire 284 with wire 163. Thus, when brush finger 281 or 282 contacts button 261, bulb 43a1 will be energized.

Wire 285 connects button 262 with one side of bulb 43b1, the other side of which is connected to wire 284, and so to wire 163. A branch wire 289' leads from wire 285 to one side of bulb 43a2, the other side of which is connected by wire 286 with wire 287 which, in turn, is connected to wire 284. Thus, when brush 281 leaves button 261 and contacts button 262, bulb 43a1 will be extinguished and bulbs 43b1 and 43a2 will be energized through parallel circuits.

Wire 288 leads from button 263 to bulb 43c1 which is connected to wire 284. Branch wire 289 leads from wire 288 to one side of bulb 43b2, the other side of which is connected by wire 286 to wire 287. Branch wire 290 leads from wire 289 to one side of bulb 43a3, the other side of which is connected by wire 291 to wire 287. Thus, when brush 281 engages contact 263, bulb 43c1, 43c2, and 43a3 will be energized, while all other bulbs are extinguished.

Wire 292 connects button 264 with one side of bulb 43d1, the other side of which is connected to wire 284. Branch wire 293 connects wire 292 with one side of bulb 43c2, the other side of which is connected to wire 286. Branch wire 294 connects wire 293 with one side of bulb 43b3, the other side of which is connected to wire 291. Branch wire 295 connects wire 294 with one side of bulb 43a4, the other side of which is connected, by wire 296, to wire 287. Thus, when brush 281 contacts button 264, bulbs 43d1, 43c2, 43b3 and 43a4 will be energized, while all other bulbs will be deenergized.

Button 265 is connected, by wire 297, with one side of bulb 43d2, the other side of which is connected to wire 286. Branch wire 298 leads from wire 297 to one side of bulb 43c3, the other side of which is connected to wire 291. Branch wire 299 leads from branch wire 298 to one side of bulb 43b4 whose other side is connected to wire 296; and branch wire 300 connects one side of bulb 43a5 with wire 299, while the other side of said bulb is connected by wire 301 with wire 287.

Thus, when brush 261 engages button 265, bulbs 43d2, 43c3, 43b4 and 43a5 will be energized while all other bulbs are extinguished.

Button 266 controls bulbs 43d3, 43c4, 43b5 and 43a6 through wires 302, 303, 304, 305 and 306. Similarly button 267 controls buttons 43d4, 43c5, 43b6 and 43a7 through wires 307, 308, 309, 310 and 311. Bulbs 43d5, 43c6, 43b7, 43a8 are controlled by button 268 through wires 312, 313, 314, 315, and 316.

The parts are so synchronized that, when bulb 43a8 is illuminated, a score will be registered in case the parts are in proper relative positions.

As the brush 261 continues to move to button 269, only the three bulbs 43d6, 43c7, and 43b8 will be energized, since the fall of the bomb represented by the  $\alpha$  series has been completed. The last mentioned three bulbs are illuminated through wires 317, 318 and 319. Button 270 is connected by wire 320 with one side of bulb 43d7 the other side of which is connected to wire 311; and branch wire 321 connects wire 320 with bulb 43c9, the other side of which is connected to wire 316. The last button, 271, energizes only bulb 43d8 through wire 322 to wire 316. Hits will be scored as each of bulbs 43b8, 43c9 and 43d9 is illuminated, provided the parts are held in proper relationship at such instant.

I claim as my invention:

1. In a bombing game, a sighting device comprising a housing visually open at opposite ends, a portion of the internal wall of said housing visible through one end of said housing comprising a translucent screen, a light source outside said screen, means interposed between said screen and said light source and defining a plurality of light-permeable areas extending in the direction of a line drawn between said housing ends and separated by opaque areas, cycling means associated with said light source and operable to effect an apparent movement of a light image from said source, falling upon said screen, progressively from that end of said light-permeable areas nearer one end of said housing toward that end of said light-permeable areas nearer the other end of said housing, and manually-manipulable means for initiating the operation of said cycling means.

2. In a bombing game, a sighting device comprising an elongated housing visually open at opposite ends, one end of said housing being visually accessible to a player, means including a light source outside said housing and an opening in said housing elongated axially of said housing for producing within said housing a visual simulation of a falling projectile moving from a point nearer said one end to a point more remote from said one end, and manually-manipulable means accessible to such player for initiating operation of said means.

3. In a bombing game, a sighting device comprising an elongated housing visually open at opposite ends, a portion of the internal wall of said housing visible through one end of said housing comprising a translucent screen, a plurality of series of lights located outside said housing but adjacent thereto, each series of lights extending longitudinally of said housing and being perimetally spaced from each other series of lights, means for confining the light shed from each series to a predetermined area of said screen perimetally spaced from the area illuminated by each other series, and cycling means for successively energizing the lights of each series.

4. In a bombing game, a sighting device com-

prising an elongated housing visually open at opposite ends, a portion of the internal wall of said housing visible through one end of said housing comprising a translucent screen, a plurality of series of lights located outside said housing but adjacent thereto, each series of lights extending longitudinally of said housing and being perimetally spaced from each other series of lights, means for confining the light shed from each series to a predetermined area of said screen perimetally spaced from the area illuminated by each other series, cycling means for successively energizing the lights of each series, and manually-manipulable means accessible to a player for initiating operation of said cycling means.

5. In a bombing game, a sighting device comprising an elongated housing visually open at opposite ends, a portion of the internal wall of said housing visible through one end of said housing comprising a translucent screen, a plurality of series of lights located outside said housing but adjacent thereto, each series of lights extending longitudinally of said housing and being perimetally spaced from each other series of lights, means for confining the light shed from each series to a predetermined area of said screen perimetally spaced from the area illuminated by each other series, and cycling means for energizing said lights, that light of each series nearest said one end of said housing being energized first, and the further lights of each series being energized in order progressively farther and farther from said one end, each light being extinguished as the next succeeding light is energized.

6. In a bombing game, a sighting device comprising an elongated housing visually open at opposite ends, a portion of the internal wall of said housing visible through one end of said housing comprising a translucent screen, a plurality of series of lights located outside said housing but adjacent thereto, each series of lights extending longitudinally of said housing and being perimetally spaced from each other series of lights, means for confining the light shed from each series to a predetermined area of said screen perimetally spaced from the area illuminated by each other series, and cycling means for energizing said lights, that light of one series nearest said one end of said housing being energized first, then the light of said one series next removed from said one end and the light of the next adjacent series nearest said one end being energized while said first-named light is extinguished and so on until each light of each series has been energized and then extinguished.

7. In a bombing game, a sighting device comprising a tubular housing visually open at its opposite ends, a portion of the internal wall of said housing visible through one end of said housing comprising a translucent screen, a light source outside said screen, means interposed between said light source and said screen and defining a plurality of light-permeable, longitudinally extending areas separated by opaque areas, an opaque mask telescopically associated with said housing between said light source and said screen for rotation about the axis of said housing, said mask being provided with a narrow translucent area extending spirally thereabout and having a longitudinal extent corresponding to the longitudinal extent of said light-permeable areas, and means for rotating said mask.

8. In a bombing game, a sighting device comprising a tubular housing visually open at its

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opposite ends, a portion of the internal wall of said housing visible through one end of said housing comprising a translucent screen, a light source outside said screen, means interposed between said light source and said screen and defining a plurality of light-permeable, longitudinally extending areas separated by opaque areas, an opaque mask telescopically associated with said housing between said light source and said screen for rotation about the axis of said housing, said mask being provided with a narrow translucent area extending spirally thereabout and having a longitudinal extent corresponding to the longitudinal extent of said light-permeable areas, and cycling means operable, when activated, to turn said mask through one complete rotation and then automatically to discontinue rotation of said mask.

9. In a bombing game, a sighting device comprising a tubular housing visually open at its opposite ends, a portion of the internal wall of said housing visible through one end of said housing comprising a translucent screen, a light source outside said screen, means interposed between said light source and said screen and defining a plurality of light-permeable, longitudinally extending areas separated by opaque areas, an opaque mask telescopically associated with said housing between said light source and said screen for rotation about the axis of said housing, said mask being provided with a narrow translucent area extending spirally thereabout and having a longitudinal extent corresponding to the longitudinal extent of said light-permeable areas, and manually-manipulable means under the control of a player for causing rotation of said mask.

10. In combination with a sighting device, means mounting said sighting device for universal rocking movement about a point in its length, a manually-manipulable lever mounted adjacent said sighting device for rocking movement in a single plane, linkage mechanism connecting said lever to swing said sighting device substantially in a plane parallel with said first-named plane, a second manually-manipulable lever mounted adjacent said sighting device for rocking movement in a single plane substantially parallel with said first-named plane, and linkage mechanism connecting said second lever to swing said sighting device substantially in a plane perpendicular to said first-named plane, a moving target device positioned to be viewed through said sighting device, a plurality of targets on said target device, a commutator moving with said target device and carrying a pair of electrically connected contacts for each target, a feeler positioned adjacent said commutator and carrying contactors adapted, upon proper registry with said commutator, to engage a selected pair of commutator contacts, and means connecting one of said manually-manipulable levers to shift said feeler relative to said commutator.

11. In a device of the class described a substantially closed cabinet, a sighting device having a portion disposed within said cabinet and providing substantially the sole means of view-

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ing the interior of the cabinet, a target device within the cabinet and visible through said sighting device, a pair of spaced handles projecting from the cabinet adjacent said sighting device and operable dependently to shift the portion of said sighting device within said cabinet substantially universally, means for producing, within the region visible to an observer looking through the sighting device, a simulation of the flight of a missile, means carried by one of said handles for activating said last-named means, a source of illumination within said cabinet simulating, when energized, daylight flight conditions, a second source of illumination within said cabinet simulating, when energized, night flight conditions, and means carried by the other of said handles for selectively energizing either of said sources of illumination.

12. In a coin-controlled game device, a cabinet, a sighting device movably mounted in said cabinet, two levers pivotally mounted on said cabinet and having portion located outside said cabinet and accessible to a player, motion-transmitting means connecting one of said levers to shift said sighting device, motion-transmitting means differently connecting the other of said levers to shift said sighting device, at least one of said motion-transmitting means including direction-changing means, said levers being operable separately or conjointly by a player to move said sighting device substantially universally within a predetermined range, said sighting device being wholly enclosed, and transparent means associated with said cabinet through which a player may peer into said sighting device in any position of said sighting device within such range.

13. In a game device, a cabinet having a top wall, a sighting device movably mounted within said cabinet and projecting through said top wall, two levers projecting through said top wall and having portions within said cabinet and other portions accessible to a player, means operatively connecting said levers to said sighting device to move the same within a predetermined range, said means connecting one of said levers to said sighting device including direction-changing means, and a housing associated with said cabinet top wall and enclosing the projecting portion of said sighting device to render the same physically inaccessible to a player, said housing being provided with a transparent section through which the projecting portion of said sighting device is continuously visually accessible to a player throughout its range of movement.

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