Sept. 3, 1957 M. I. GLASS ET AL 2,805,064

ELECTRICALLY OPERATED TOY SHOOTING RANGE

Filed Oct. 11, 1955 4 Sheets-Sheet 1

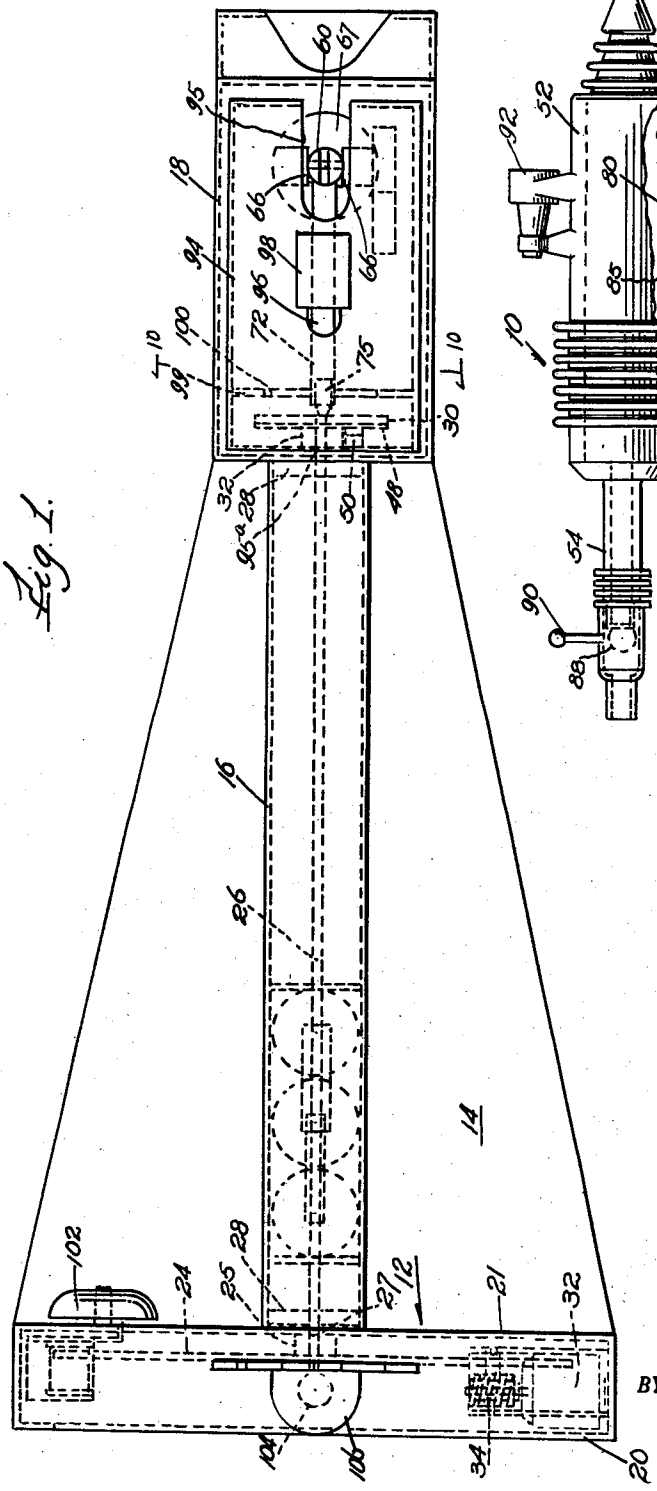


Fig. 1.

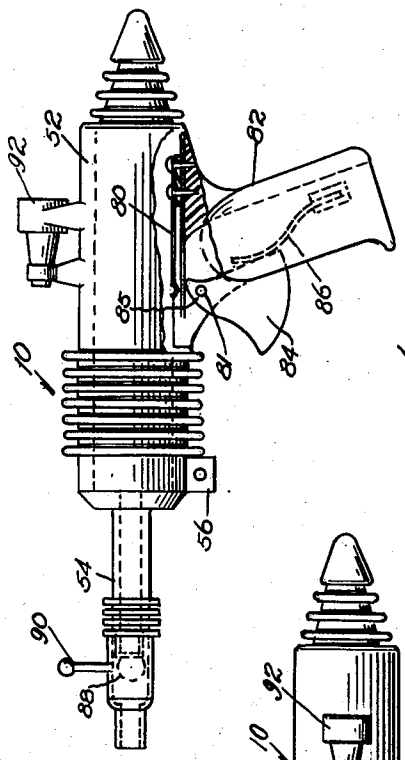


Fig. 3.

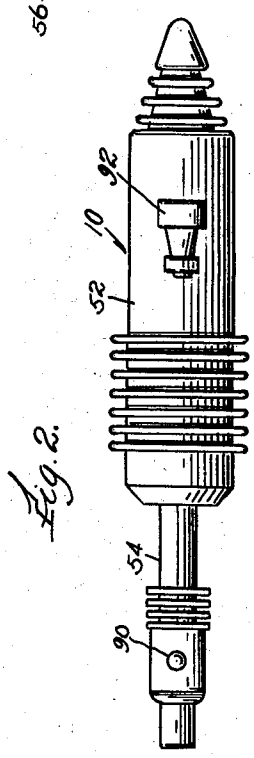


Fig. 2.

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Sept. 3, 1957 M. I. GLASS ET AL 2,805,064

ELECTRICALLY OPERATED TOY SHOOTING RANGE

Filed Oct. 11, 1955 4 Sheets-Sheet 2

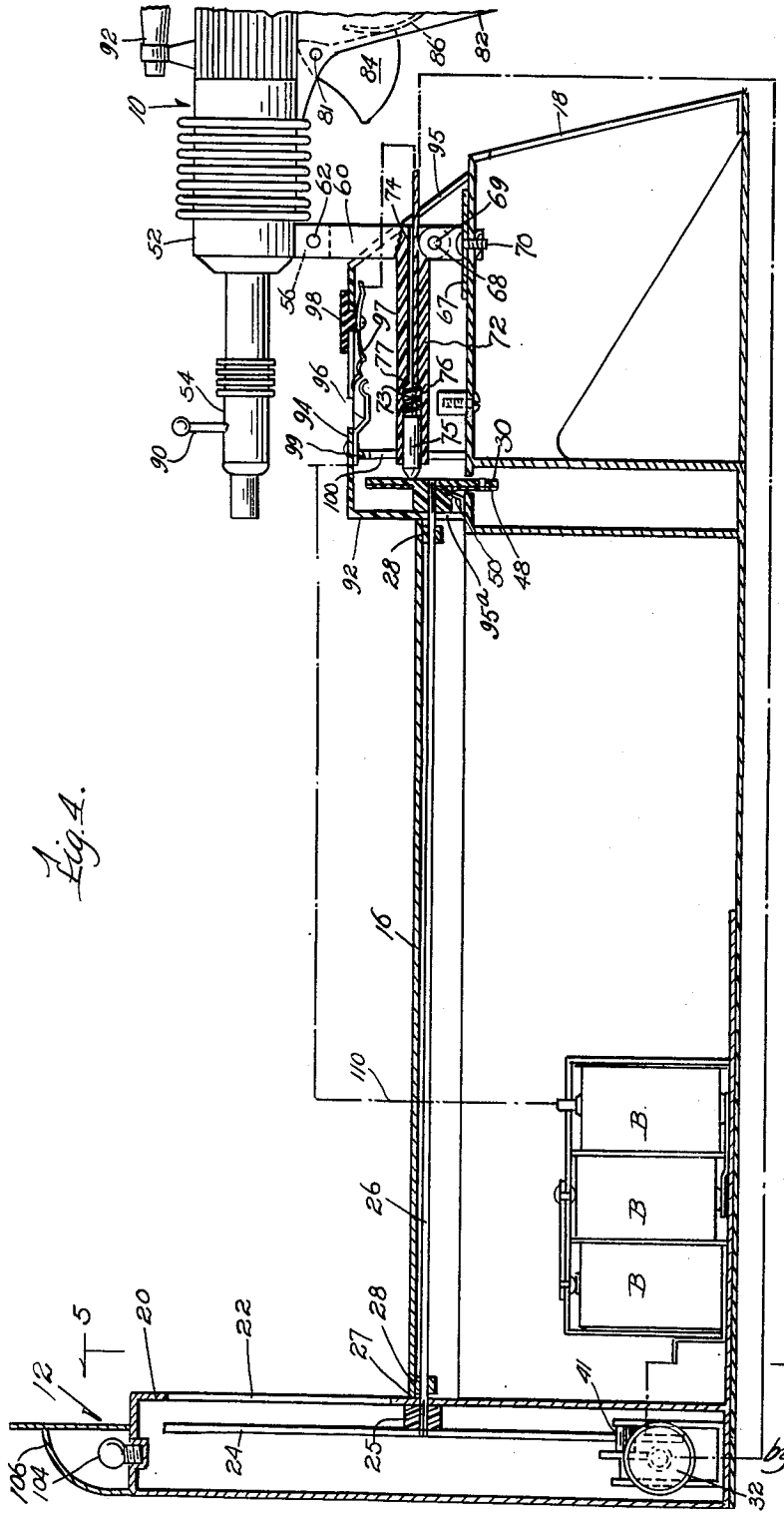


Fig. 4.

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ELECTRICALLY OPERATED TOY SHOOTING RANGE

Filed Oct. 11, 1955 4 Sheets-Sheet 3

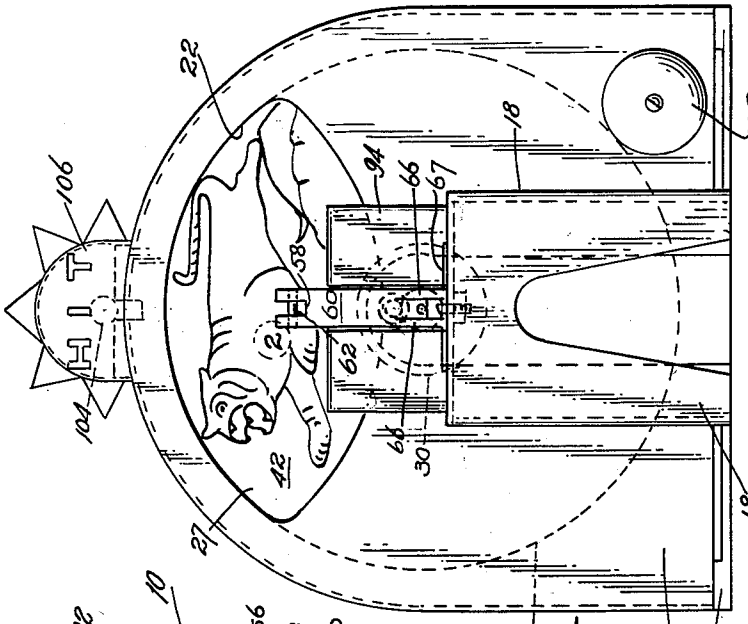


Fig. 6.

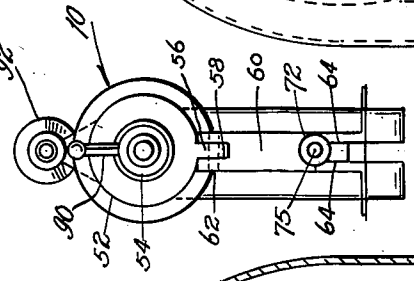


Fig. 7.

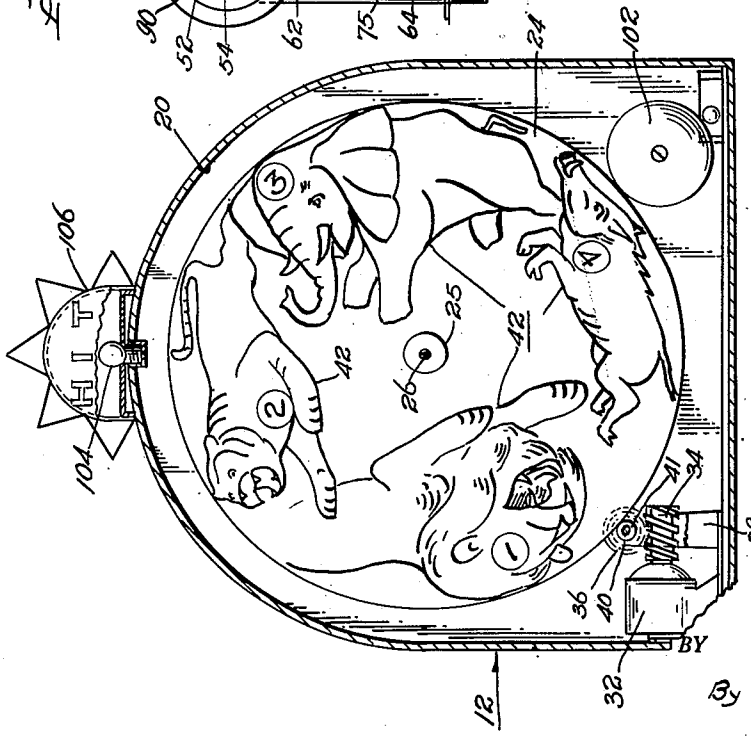


Fig. 5.

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ELECTRICALLY OPERATED TOY SHOOTING RANGE

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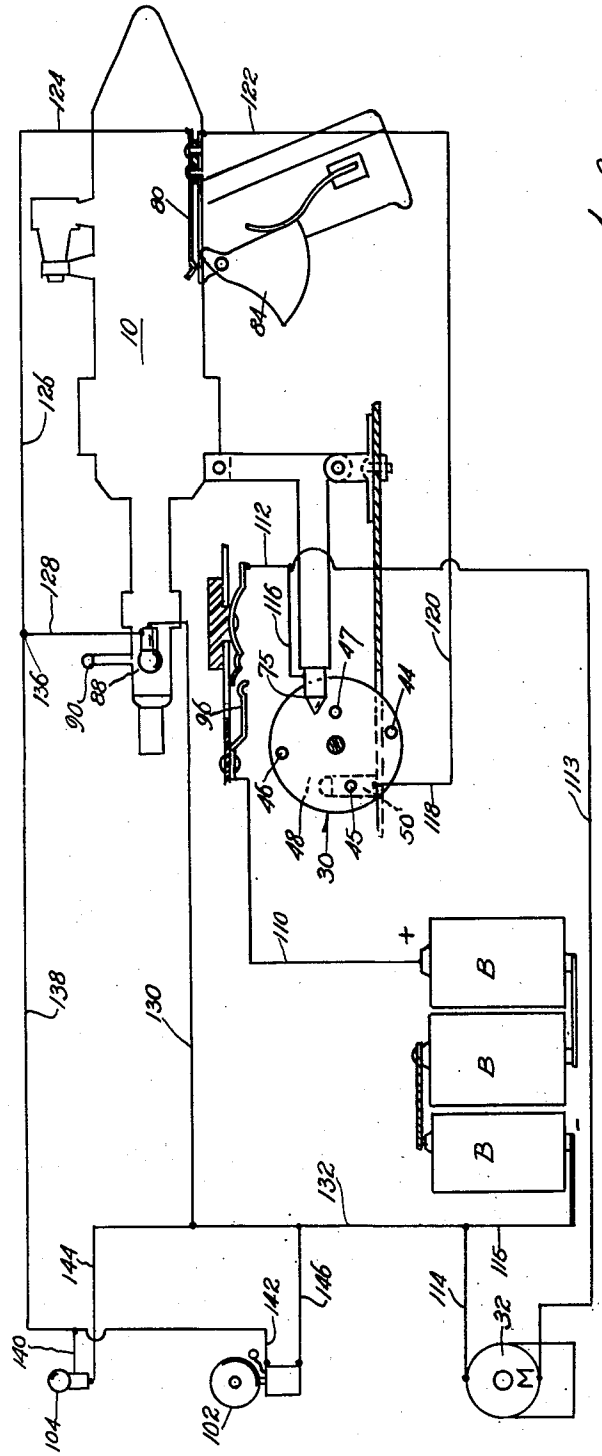


Fig. 8.

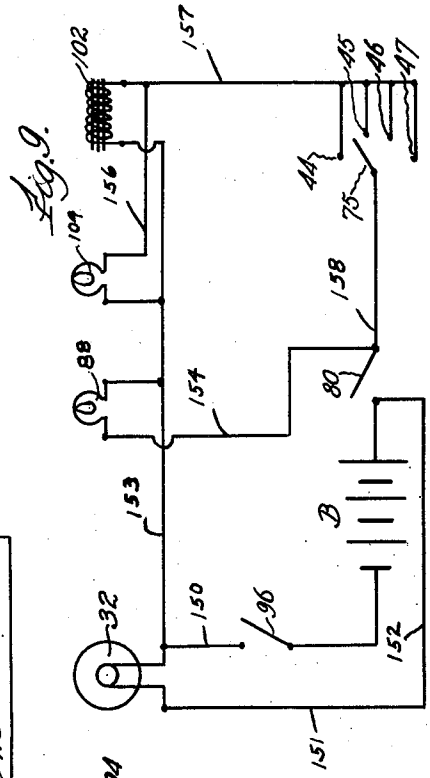


Fig. 9.

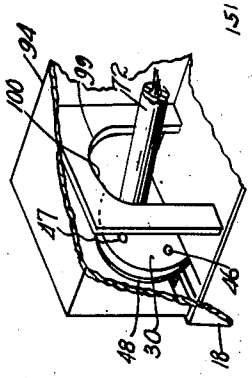


Fig. 10.

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United States Patent Office 2,805,064 Patented Sept. 3, 1957

2,805,064

ELECTRICALLY OPERATED TOY SHOOTING RANGE

Marvin I. Glass and Charles Pearson, Jr., Chicago, Ill.

Application October 11, 1955, Serial No. 539,730

6 Claims. (Cl. 273—101.2)

This invention relates to a toy shooting range which is electrically operated.

One of the objects of this invention is to provide a toy shooting range which is electrically operated and which by a proper sighting of the gun on the target and actuation of the gun closes the circuit to operate signal means to indicate that the target has been hit.

Another object is to provide an electrically operated toy shooting range which eliminates the use of projectiles striking the target but which utilizes the closing of an electrical circuit to operate signal means when contact has been established by the proper sighting of the gun on the target.

Another object of this invention is to provide an electrically operated toy target range which simulates the operation of the photo electric cell principle in that when the gun is properly alined with the rotating target point and the trigger actuated the signal means will indicate that the target has been hit.

Another object of this invention is to provide a rotating target having spaced bull's eyes or target points to be aimed at, and a contact disc rotatable with said rotating target which contact disc has spaced contact points positioned in a definite relation to said bull's eyes and the axes of rotation of the gun so that when the gun is properly alined with said bull's eyes the circuit will be closed through said contact points to indicate that the bull's eye has been hit. The aforementioned elements are so positioned that respective lines drawn through the centers of each of the bull's eyes and corresponding contact points all pass through the point of intersection of the pivotal axes of the gun.

Another object of this invention is to provide a toy target range which requires skill in the sighting of the target, whch is highly amusing and entertaining, which is comparatively inexpensive to manufacture, which is safe for use by any child, which is durable and will not easily get out of order, and which is operated by small dry cell batteries.

Other objects will become apparent as this description progresses.

In the drawings:

Fig. 1 is a top plan view of the unit without the gun.

Fig. 2 is a top plan view of the gun.

Fig. 3 is a side elevational view of the gun.

Fig. 4 is a detail longitudinal section of the shooting gallery.

Fig. 5 is a face view of the revolving target and driving means taken on line 5—5 of Fig. 4.

Fig. 6 is an end view looking toward the target with the gun removed.

Fig. 7 is a front elevational view of the gun.

Fig. 8 is a schematic of the wiring diagram.

Fig. 9 is a schematic of a modified wiring diagram, and

Fig. 10 is a perspective view taken on lines 10—10 of Fig. 1.

The shooting gallery is an integral unit and includes

the gun member generally indicated at 10 which is at the forward portion of the unit and the target which is generally indicated by the numeral 12 which is at the rear portion of the toy. The flat base 14 which is generally of the shape shown in plan in Fig. 1 supports an upright housing generally indicated at 16 which supports the batteries and certain of the parts, which housing extends centrally and longitudinally of the base. Secured to front end of the base 14 and upright housing 16 is a stand 18 on which is mounted, as will be subsequently described, the gun and certain of the electrical contacts. Secured to the rear of the base 14 and upright housing 16 is a vertical target housing generally indicated at 20 which is at right angles to the upright housing 16 and within which is supported the rotating target. The front wall 21 of the target housing 20 is cut away as at 22 in the form of a sector so that the rotating target is visible therethrough.

Referring first to the target section 12 there is provided a rotatable target disc 24 which has a hub 25 secured thereto which in turn is fixedly secured to a horizontal rod 26 extending longitudinally of the unit. The rod 26 extends through an opening 27 in the front wall 21 of the target housing and is enclosed within the upright housing 16. The rod 26 is rotatably supported in a pair of spaced supports 28 secured to the top of housing 16. The front end of rod 26 supports a contact disc 30 which has its hub 32 fixedly secured to the rod 26 to rotate therewith. The contact disc 30 thus rotates simultaneously with the rotation of target disc 24. The top of stand 18 has a slot through which the contact disc 30 extends. The contact disc 30 is in parallel alinement with the target disc 24. Fixedly mounted in the target housing 20 on the base thereof is a small electric motor 32 having a worm 34 which drives a gear 36 journalled on a support 38. The gear 36 has a shaft 40 having a rubber bushing 41. The bushing 41 engages the peripheral edge of the target disc 24 to rotate said disc.

The front of target disc 24 is provided with pictorial representations of various animals 42 spaced around the surface of said disc which forms the target area and each of said figures has a circular space which is indicated by the numerals 1 to 4 inclusive on Fig. 5 which represents the target to be aimed at and represents the bull's eye. As the target disc 24 is rotating only one animal at a time will be presented for viewing through the arcuate shaped opening 27 of the target housing, as best seen in Fig. 6. The other figures remain hidden behind the front of the target housing and each figure is successively brought into view as the disc continues rotating.

The contact disc 30 is made of insulating material and the face of said contact disc is provided with four spaced contacts 44 to 47 which contacts are connected to the copper plate 48 secured to the rear of contact disc 30. The spacing and positioning of the contact points are in a definite relation to the bull's eyes 1 to 4 on the target disc 24 and the axes of rotation of the gun, as will be subsequently described. A metal wiper arm 50 is secured to the stand 18, as best shown in Fig. 4, and makes constant contact with the copper plate 48. The stand 18 is made of an insulating material. The wiper arm 50 is electrically connected in the electrical circuit and will be subsequently described in connection with the circuit diagram.

The gun generally indicated by the numeral 10 is mounted on the stand 18 so that it may be horizontally and vertically moved to be directed to the target area as the disc is rotating. The gun comprises a hollow shell member 52 having a reduced hollow barrel portion 54. The gun has a depending stub 56 which fits within the yoked end 58 of a supporting shaft 60 and is secured thereto by a pin 62 which immovably locks the two to-

gether. The lower end of supporting shaft **60** has two opposed flat surfaces **64** which fit between the upstanding ears **66** of a supporting plate **67** and is pivotally connected to said ears **66** by a pin **68**. The supporting plate **67** is rotatably connected to the top of stand **18** by a pin **70**.

The gun may be thus rotated about a horizontal axis and may also be pivoted about a vertical axis. Secured to the shaft **60** and extending rearwardly thereof is an elongated tubular member **72** which is made of an electrical insulating material having an enlarged bore **73** at the rear end thereof which communicates with a smaller bore **74** extending through the body of said member. Positioned within the enlarged bore **73** is a metal tapered pin **75** and a metal coil spring **76** interposed between the end of said pin and shoulder **77** to normally urge said pin rearwardly or in the direction of the contact disc **30**, as best shown in Fig. 4. A conducting wire is connected to the coil spring **76** and extends through the reduced bore for electrical connection as will be explained in connection with the electrical diagram of Fig. 8.

Mounted within the interior of the body of the gun is a switch member **80** in which the spring fingers of the switch are normally out of contact with each other so that the switch is in open position. Pivotally mounted as at **81** on the handle **82** of the gun is a trigger **84** which is held in non-actuating position by means of a leaf spring **86** secured in the body of the handle. When the trigger **84** is retracted or moved to the right as shown in Fig. 3, the upper end **85** of the trigger will move the switch **80** to closing position to close the electrical circuit as will be subsequently described.

Mounted in the hollow barrel **54** of the gun is a light bulb **88** which is electrically connected in the circuit. It will be noted that the front end of the barrel **54** adjacent the light bulb is made of transparent material while the rest of the gun is made opaque. Extending upwardly of the barrel adjacent the light bulb **88** is a front sight **90** which is also made of transparent material so that the light from the light bulb **88** in addition to passing out through the front of the gun barrel is also directed upwardly through the sighter **90**. The top of the gun has a rear sight **92** which is a hollow cylindrical member. Secured to the top of the stand **18** is a cover **94** which encloses the contact disc **30** and tubular member **72** and attendant parts. The front of the cover is inclined and has a slot **95** which accommodates the shaft **60**. The rear wall of the cover is slotted as at **95a** to accommodate the rod **26**. Secured to the underside of the cover is the main switch **96**. The switch has a slideable contact **97** manually operable by a slide button **98** to close the switch. The main switch **96** must be closed to start the device in operation. The batteries B are dry cell batteries which supply the current and they are supported within the upright housing **16**.

Secured to the inside of the cover **94** is a guide plate or wall **99** which has an arcuate shaped cutout **100**. The movement of the tubular member **72** is confined within the area of the arcuate shaped cutout **100** and since the tubular member is connected to the shaft **60** on which the gun is supported and moves correspondingly with the gun, the limits of movement of the gun both horizontally and vertically are determined by said arcuate shaped cutout. There is sufficient room however within said limits for free movement of the gun so that skill is required in a proper sighting of the target. When the gun has been properly alined with the bull's-eye of the movable target through the rear sight member **92** and the front sight **90**, as is well understood, the tapered pin **75** which is supported on the tubular member **75** will be in alinement to make contact with one of the respective contact points **44** to **47** of the rotating contact disc **30** thus closing the circuit so that when the trigger **84** is actuated the switch **80** is closed so that the light bulb **88** is lit and simultaneously energizing bulb **104** and bell **102**.

Inside of the target housing **20** the vibrator unit of bell **102** is mounted which is adapted to strike the bell mounted forwardly of the target housing. Also supported at the top of the target housing **20** is a light bulb **104** which is enclosed within a casing **106** on which is inscribed the word "Hit." When the target has been hit, as will be subsequently described, both the bell **102** rings and the signal light **104** illuminates thus indicating to the participant that the target has been hit.

The circuit diagram on Fig. 8 will now be described.

The dry cell batteries designated by the letter B are arranged in series. By closing the main switch **96**, current flows from the positive terminal of the battery B, through conductor **110**, through main switch **96**, conductors **112**, **113**, motor **32**, conductors **114**, **115**, to the negative terminal of the battery. The motor **32** will be energized to rotate the target disc **24** and simultaneously rotate the contact disc **30** which carries the contacts **44** to **47**.

By pulling the trigger **84**, switch **80** is closed, then when tapered pin **75** engages one of the contact points **44** to **47** on the contact disc **30**, for the interval of contact, current will flow from a tap on conductor **112**, through conductor **116**, tapered pin **75**, through any of the contacts **44** to **47**, through the metal plate **48** on the rear of contact disc **33**, wiper arm **50**, conductors **118**, **120**, **122**, switch **80**, conductors **124**, **126**, **128**, lamp **88** to light same, conductors **130**, **132**, **115** to the negative terminal of the battery.

Concurrently current flows from tap **136** on conductor **126**, through conductors **138**, **140**, **142**, through signal lamp **104** and bell **102**, the same being connected in parallel, through conductors **144**, **146**, **132**, **115** to the negative terminal of the battery. When the current flows through signal lamp **104** and bell **102** both will be simultaneously energized to indicate that the target has been hit.

If desired, with a modification of the wiring diagram the light bulb **88** in the gun can be illuminated when the trigger **84** is actuated to close the switch **80**, even though the tapered pin **75** is out of contact with the contact points **44** to **47**, thus more nearly simulating an arrangement in which a photo electric cell is used. The schematic view shown in Fig. 9 will serve said purpose and operates as follows.

By closing main switch **96**, current from battery B will flow through conductor **150** through motor **32** to operate same and rotate the target disc **24**, through conductors **151**, **152** to the negative terminal of the battery. When the switch **80** has been closed by actuating the trigger **84** of the gun the current will flow from conductor **150** through conductor **153**, light **88** in the gun to illuminate same, through conductor **154** through switch **80** to the negative terminal of the battery.

When contact is established between tapered pin **75** and any one of the contact points **44** to **47** inclusive on the contact disc **33**, as when the gun is properly sighted on the target disc, the current will flow from conductor **153** to signal lamp **104**, conductors **156**, **157** through one of said contact points **44** to **47** inclusive, tapered pin **75**, conductor **158** through switch **80** to the negative terminal of the battery. Simultaneously current from conductor **153** flows through buzzer **102**, through conductor **157** and contact points **44** to **47** through tapered pin **75** through conductor **158**, through switch **80** to the negative terminal of the battery thus simultaneously energizing the signal lamp **104** and bell **102**.

As previously indicated the positioning of the contact points **44** to **47** are in a definite relation to the bull's-eyes **1** to **4** on the rotating target and the axis of rotation of the gun. The intersection of the axes of rotation of the gun designated at **69** which is the center point of pin **68** is located at a point corresponding to the intersection of

all of the lines passing through the centers of contact points 44 to 47 on the contact disc 30 and through the centers of corresponding bull's-eyes 1 to 4 on the target disc 24. For example, bull's-eye 1 and its corresponding contact point 46 are in a line which intersects the axes of rotation of the target disc 24 and contact disc 30 and also the intersection of the axes of rotation 69 of the gun. Within this line, bull's-eye 1, contact point 46, and the intersection of the axes of rotation 69 of the gun lie on the hypothenuse of a right angle triangle whose sides are the axis of rotation of the aforementioned discs and a radius on the target disc through the bull's-eyes. The same is correspondingly true with respect to bull's-eye 2 and contact point 47, bull's-eye 3 and contact point 44, bull's-eye 4 and contact point 45.

Briefly described, closing the main switch 96 causes the motor 32 to rotate the target disc 24 and contact disc 30. If the gun is properly sighted on the bull's-eyes 1 to 4 of the target disc and the trigger 84 of the gun is retracted, the light bulb 88 in the gun and the signal light 104 and bell 102 will all go on simultaneously to indicate that the bull's-eye has been hit. If, however, the gun is not properly sighted in relation to the bull's-eye the pulling of the trigger 84 will not energize any of the foregoing. In the modified schematic view of Fig. 9 the operation of the foregoing is the same except that the light bulb 88 in the gun goes on when the gun trigger is pulled irrespective of whether a bull's-eye is scored.

This toy gives the participant the illusion that he is operating a toy gun controlled by a photo electric cell, thus adding greatly to the participant's entertainment.

The gun is so mounted on its support that it can move and follow the target figure in the entire open area of the target during the entire movement of said target figure through said open area.

The toy can be made very inexpensively and skill is required in alining the gun with the bull's-eyes of the moving target for unless it is perfectly alined therewith there will be no score or hitting of the target. As previously stated the participant is under the illusion that it is an electronically operated magic eye and that the beam of light from the barrel of the gun in alinement with the target area is what is causing the action to take place. The toy is highly amusing and entertaining.

It will be understood that various changes and modifications may be made from the foregoing without departing from the spirit and scope of the appended claims.

We claim:

1. In an electrically operated shooting range comprising a housing, a vertically positioned target rotatably supported on a horizontal axis at one end of said housing, a gun exposed in full view and movably supported at the opposite end of said housing in spaced relation to said target to provide an exposed open area between said gun and target, a movable contact member movable simultaneously with the movement of said gun, a plate positioned adjacent said movable contact member and having a plurality of spaced contact elements, means extending between said target and said plate to connect same so that they rotate simultaneously, power means for rotating said target and said plate, signal means connected in electrical circuit with said movable contact member and said plate, said movable contact member adapted when the gun is properly aligned with the target to engage said contact elements to close the circuit to operate said signal means.

2. In an electrically operated shooting range comprising a housing, a vertically positioned target rotatably supported on a horizontal axis at one end of said housing, a gun exposed in full view and movably supported at the opposite end of said housing in spaced relation to said target to provide an exposed open area between said gun and target, a contact member movable simultaneously with the movement of said gun, a vertically positioned disc positioned adjacent said contact member and

arranged parallel to said target, said disc having a plurality of spaced contact points, means extending between said target and said disc to connect same so that they rotate simultaneously, means for rotating said target and said disc, signal means connected in electrical circuit with said contact member and said disc, said contact member adapted when the gun is properly aligned with the target to engage said contact points to close the circuit to operate said signal member.

3. In an electrically operated shooting range comprising a housing, a vertically positioned target rotatably supported on a horizontal axis adjacent one end of said housing, a gun exposed in full view and movably supported adjacent the opposite end of said housing in spaced relation to said target to provide an exposed open area between said gun and target, a contact member movable simultaneously with the movement of said gun, a vertically positioned plate positioned adjacent said contact member and arranged parallel to said target, said plate having a plurality of spaced contact points, connecting means extending between said target and said plate to connect same so that they rotate simultaneously, and power means for rotating said target to simultaneously rotate said plate through said connecting means so that said contact member engages said contact points when said gun is properly aligned with said target.

4. In an electrically operated shooting range comprising a housing, a horizontal shaft supported by said housing, a vertically positioned target supported on said horizontal shaft at one end of said housing for rotation with said shaft, a gun supported in full view and movably mounted at the opposite end of said housing in spaced relation to said target to provide an exposed open area between said gun and target, a movable contact member movable simultaneously with the movement of said gun, a plate vertically supported on said shaft for rotation with said shaft, said plate being arranged parallel to said target, said plate being positioned adjacent said movable contact member and having a plurality of spaced contact points, power means for rotating said target, plate and shaft simultaneously, a signal member connected in electrical circuit with said movable contact member and said plate, said movable contact member adapted when the gun is properly aligned with the target to engage said contact points to close the circuit to operate said signal member.

5. In an electrically operated shooting range comprising a housing, a horizontal shaft supported by said housing, a vertically positioned target supported on said horizontal shaft at one end of said housing for rotation with said shaft, a gun supported in full view and movably mounted at the opposite end of said housing in spaced relation to said target to provide an exposed open area between said gun and target, a movable contact member movable simultaneously with the movement of said gun, a disc vertically supported on said shaft for rotation with said shaft, said disc being arranged parallel to said target, said disc being positioned adjacent said movable contact member and having a plurality of spaced contact points, power means for rotating said target, disc and shaft simultaneously so that said movable contact member engages said contact points when said gun is properly aligned with the target.

6. In an electrically operated shooting range comprising a housing, a horizontal shaft supported by said housing, a vertically positioned target supported on said horizontal shaft at one end of said housing for rotation with said shaft, a gun supported in full view and movably mounted at the opposite end of said housing in spaced relation to said target to provide an exposed open area between said gun and target, a movable contact member movable simultaneously with the movement of said gun, a disc vertically supported on said shaft for rotation with said shaft, said disc being arranged parallel to said target, said disc being positioned adjacent said movable

contact member and having a plurality of spaced contact points, power means for rotating said target, rotation of said target simultaneously rotating said shaft and disc so that said movable contact member engages said contact points when said gun is properly aligned with said target.

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