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W. P. FALKENBERG

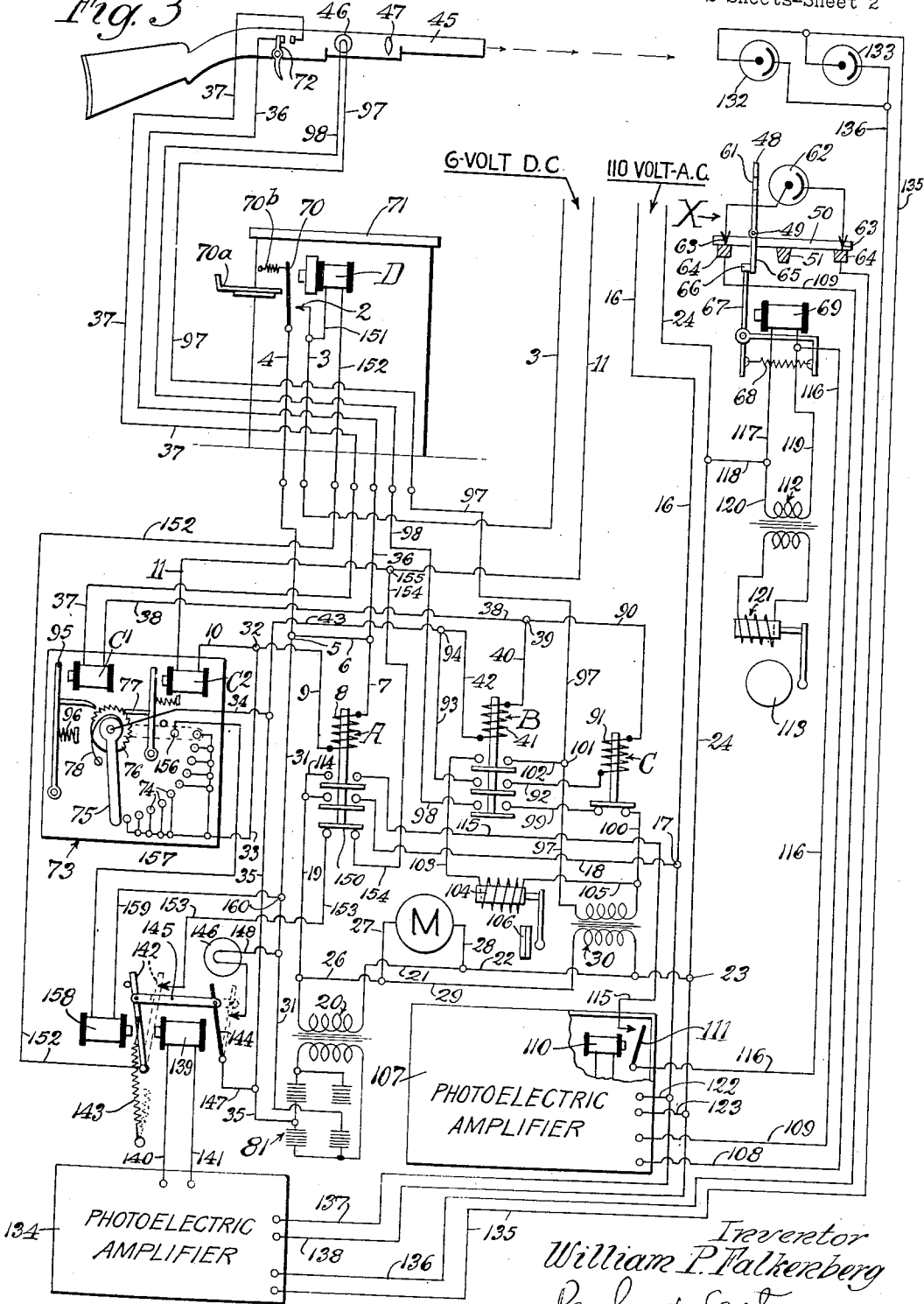
2,269,258

TARGET RIFLE RANGE

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2 Sheets-Sheet 2

Fig. 3



Inventor  
William P. Falkenberg  
by Parker & Carter  
Attorneys

## UNITED STATES PATENT OFFICE

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## TARGET RIFLE RANGE

William P. Falkenberg, Hollywood, Calif., assignor  
to Rayolite Rifle Range Company, Chicago, Ill.,  
a corporation of Oklahoma

Substituted for abandoned application Serial No.  
114,669, December 7, 1936. This application  
January 6, 1940, Serial No. 312,783

## 1 Claim. (Cl. 273—101.1)

My invention relates to an improvement in target devices for electric shooting galleries of the type in which a gun is employed shooting a flash of light at a target or targets including one or more photo-electric or photo-sensitive mem- 5 bers.

One purpose is the provision of a target range in which both fixed and moving targets are employed.

Another purpose is the provision of a target range employing a plurality of separate fixed targets.

Another purpose is the provision of a target range in which the number of shots per coin inserted in a coin-operated switch may be increased by the success of the marksman.

Another purpose is the provision of a fixed photo-sensitive target which shall be effective, when hit, to increase the number of shots which may be had by the user to a number above the number of shots normally allowed.

Other objects will appear from time to time in the course of the specification and claim.

I illustrate my invention more or less diagrammatically in the accompanying drawings, where- 25 in:

Figure 1 is a perspective view of the device;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a wiring diagram.

Like characters are used to indicate like parts throughout the specification and drawings.

Referring to the drawings, the gallery includes a gun 45 having an electric light bulb 46 and a lens 47 or other suitable means for concentrating or directing a beam of light toward a target. In the present disclosure, two targets or types of target are shown. There is, in the first place, the traveling target structure generally indicated at X, as shown for example in the forward part of Figure 1. 40

The target is of the traveling type and is provided with a plurality of target portions or drops 48, herein shown as simulating ducks, which drop target portions are pivoted as at 49 upon target bases 50 which are secured to an endless belt 51. The belt 51 is trained around pulleys 52 and 53 whose shafts 54 and 55 may be suitably mounted upon a base 56 by any supporting or bearing means 56a. An electric motor M is mounted on the base 56 and is effective to drive with one of the belt pulleys to effect travel of the target portions or drops 48 together with the bases 50. In Figure 1, a pulley 57 is shown as driven by the motor M. It is employed to rotate a pulley 58 55

by means of the belt 59. The transmission 60 is diagrammatically indicated between the motor M and the pulley 57. Each target drop portion 48 is formed with an opening 61 and mounted on the base 50, behind and aligned with said opening, is a photo-sensitive member 62 which may be a known type of the photo-electric cell. In the normal use of the device, if the user directs a light flash through the opening 61 against the cell 62, the target drop portion 48 drops or is caused to fall, and at the same time an audible signal may be operated, all of which will be hereinafter more fully explained.

Each target base 50 carries contacts 63 for the cell 62, said contacts moving with the target base as shown for example at the upper right-hand corner of Figure 3. They are cooperable with the fixed contact rails 64, and with the rest of the circuit below described, to effect the dropping or falling of the drop portion 48 when the cell 62 is struck.

Each target drop portion 48 is equipped with an arm 65 depending beneath the level of the target base 50. During travel of the target portion and base along the tracks 64, this arm lies against a trip rail 65, which is carried by an arm 67 hingedly mounted on the base 56 in any suitable way. A spring 68 is normally effective to hold the arm 67 in normal position, and when in such position it holds the target drop portion 48 in the upright position in which it is shown in Figures 1 and 3. An electro-magnet 69 is provided which is effective, when energized, to draw the arm or armature 67 in a clockwise direction. This has for a result to move the arm 65 which depends from the target drop 48 far enough to move the target portion 48 off center and thereafter it falls forward into hit-indicating position. The electro-magnet 69 is energized only when a flash of light from the bulb 46 of the gun 45 is so accurately aimed as to strike the photo-electric cell 62.

The device herein shown is particularly applicable to slot machine usage in which a predetermined number of shots is allowed to the user who inserts a coin, and in which no shots can be taken unless or until a coin is inserted. 70 denotes a coin slot starting switch, shown as located at the shooting post 71, and is effective for bringing the motor M into play to drive the target and for preparing the entire gallery for operation. 72 indicates a trigger switch carried by the gun 45 and effective to illuminate the bulb 46 in response to a trigger pull.

73 generally indicates a normally open shot

through lines 97 to the light 46 in the gun 45, thence through line 98 across the lower contacts of the relay B, line 99, across the closed contacts of the relay C, and line 100 back to the transformer 30. This circuit illuminates the light 46 in the gun.

The second circuit established by closure of the intermediate connection of the relay B energizes the relay C, the entire circuit of which is traceable from one terminal of the rectifier 81 through lines 31, 6, 36, gun trigger switch 72, line 37 to the electro-magnet C' of the shot counter, thence through lines 38, 90 and 91 of relay C, line 92, across intermediate connection of relay B, and lines 93, 43, 35 back to the other terminal of the rectifier 81. This circuit causes the relay C to break the electrical connection of the gun light 46. However, the relay C is so adjusted as to function a fraction of a second slower than the relay B in order to energize the light 46 for an instant only to cause in effect a flash of light.

A third circuit closed by the energization of the relay B by means of a trigger pull may be traced from the transformer 30 through the line 97 to intersecting point 101, thence through line 102 across the upper connection of relay B and line 103 to a thud sounder 104 from which a line 105 continues to line 109 and transformer 30. The thud sounder may, for example, be a suitable solenoid coil, which, when energized as above described, actuates a solenoid plunger which, in turn, may strike a member, indicated by numeral 106, to produce in effect the sound of a bullet hit.

Briefly stated, each time the trigger 72 is pulled, the shot counter 73 is advanced one step, a flash of light is projected from the gun, and the thud sounder 104 is actuated to simulate the report of a bullet hit. If the operator has not been successful in obtaining a hit, no further action takes place.

Assuming that the aim of the gun has been accurate and that the flash of light hit the photo-electric cell 62 of the moving target 48, electric current flows from the amplifying unit 107 through the photo-electric cell 62, contacts 63 and rails 64. The lines 108 and 109 connect the amplifying unit 107 with the rails 64. The amplifier in turn energizes a photo-electric relay 110 and closes a switch 111.

Closure of the switch 111 closes electric circuits through the electro-magnet 69, associated with the trip rail 66, previously described, and a transformer 112 for actuating a chime 113. The circuit of the electro-magnet 69 may be traced from the intersecting point 17 of the 110-volt alternating current power line 16 through line 18, intermediate connection of the relay A, line 114, across upper connection of the relay A, line 115, photo-electric relay switch 111, and line 116 to the electro-magnet 69, thence through lines 117, 118 to the other power line 24. The primary winding of the transformer 112 is connected in parallel to the lines 116 and 118 by lines 119 and 120 respectively. The secondary winding of the transformer supplies current for energizing the electro-magnetic coil 121 for sounding the chime 113.

As will be seen from the above description, each time the photo-electric cell 62 of the moving target 48 is hit by a flash of light, the electro-magnet 69 is energized to throw the target 48 into the hit indicating position, and in addition the electro-magnetic coil functions to sound the chime 113.

The photo-electric amplifier is shown in con-

ductive connection with the 110 volt source of power, as by the lines 122 and 123.

In addition to the above described moving target and control circuit therefor, I find it desirable to employ one or more fixed targets which have a double function. In the first place, the ordinary user may elect to shoot at the fixed target one or more times instead of at the moving target. In the second place, the fixed target may be employed as a means for giving the good marksman a "pay-off," such as ten more free shots.

Referring to Figure 1, I have illustrated a fixed target generally indicated at Y, shown in the form of an owl having eyes 130 and 131 in the form of apertures. Aligned with these apertures, and mounted to the rear of the owl Y are the photocells 132, 133. Extending from them to the amplifier 134 is a conductive connection including the lines 135 and 136. The two photocells 132 and 133 are shown as connected in parallel. The amplifier 134 is shown in conductive connection with the 110 volt source of power, as by the lines 137 and 138. 139 indicates a photo-electric relay adapted to be energized by amplifier current flowing through the circuit 140, 141 when either of the cells 132 or 133 is struck by a flash of light. When the relay 139 is energized, it moves the snap switch 142 from the full line position in which it is shown in Figure 3 to the dotted line position. The switch is normally held in whichever position it is moved to by the spring 143. 144 indicates an additional switch moved by the switch 142 as by the arm 145. When it is moved into the dotted line position it closes a circuit for the indicator lamp 146 which extends from the line 35 through the line 147, switch 144, and line 143 back to the line 31. In other words, when a hit is scored against either of the photocells 132 or 133, the signal lamp 146, herein shown as at the top of the owl, shines indicating that a hit has been scored against the fixed photocells of the owl.

Assume that the user shot at the owl at his first shot and scored a hit, as indicated by illumination of the lamp 146. This does not in any way affect the normal operation of the moving targets and they continue to move and are available for further shooting. At each shot the arm 75 of the shot limit switch 73 is moved one step. At the last or tenth shot, it moves it into the full line position as shown in Figure 3, just as if no hit had been recorded against the fixed target. One result is to de-energize the coil 8 of the relay A which permits that relay to move into the open position in which it is shown in Figure 3. This, however, closes the bottom contact as at 150 and this closes a circuit with the source of 6-volt direct current which includes the line 3, the line 151, the slow-acting magnet D, the line 152, the switch 142 which is at that time in dotted line position as a result of the previously scored hit, the line 153, the connection 150, the line 154, back by the connecting point 155 to the line 11. The result is to move the switch 70 into circuit closing position, just as if a coin had been inserted and the slide 70a had been moved, and all the results which would have grown from the insertion of a coin and the actuation of the switch immediately follow. In other words, the user has been given ten extra shots, even though he has not inserted an additional coin.

In order to move the switch 142 back and to prevent further unearned "pay-offs" and to re-

lease the switch 70, I provide an additional circuit which includes the contact 156, line 157, electro-magnetic coil 158, line 159 which extends to the line 31 at the junction point 160. The result of the actuation of this circuit is to return the switch 142 to the full line position in which it is shown in Figure 3. The spring 143 then holds it in position against any suitable stop, as shown in Figure 3.

Referring to Figures 1 and 2, the stationary target Y may be mounted, for example, on a bracket 161, which also supports the photo-electric cells 132 and 133. The photo-electric cells are preferably shielded by housings 162, illustrated in Figure 2, which may be provided with lenses 163 in alignment with the aperture 130, 131 respectively. The photo-electric cells 62 of the moving targets may be similarly shielded.

The use and operation of my invention are as follows:

I illustrate a target device in which the gun 45 is aimable just like an ordinary rifle but shoots a flash of light from the bulb 46. I illustrate two separate target arrangements.

In the first place, I shoot at moving target bases 50 which carry the photocells 62 and target drop portions 48. When the coin controlled switch 70 is closed, the motor M is energized and the targets begin to move and the switch arm 75 of the shot limit switch 73 is moved to its dotted line or initial position, the device is ready to operate. At each trigger pull a flash of light is directed from the gun. At each trigger pull, also, the thud sounder 104 is sounded, and the shot limit switch arm 75 is moved one step along the contacts 74. If the user is successful in hitting one of the cells 62, amplifier current energizes the relay 110 and thereby actuates the gong or signal 113 and also causes the drop 48 to fall, further indicating or signalling a hit.

If the operator wishes to shoot at a fixed target, he may do so and the combination of fixed and moving targets I find in practice interesting and stimulating to the user. Preferably the apertures 130 and 131 are considerably smaller than the apertures 61 in the target drop portions 48, which increases the difficulty of the shot. I may employ the fixed target as a means for giving a successful marksman additional free shots. I have illustrated means whereby, as shown in Figure 3, a hit recorded on one or the other of the photocells 132 or 133 not merely lights the

signal lamp 146 but eventually actuates the slow-acting electromagnet D and the switch 70 in such fashion as to give the marksman a second string of ten free shots after he has concluded his first string.

It will be understood also that whereas I have illustrated a separate fixed target that may be employed as any suitable back-drop or scenery, it might be positioned above or below or to one side of the moving target. Also, I may eliminate the light 146 or have it illuminated only at the last shot, even though the fixed target has already been hit, in order to insert an element of uncertainty. It will be understood that in the employment of the term "actuate" I wish to include broadly any means for putting any actuating member or mechanism into movement or play.

Attention is called to my application Serial Number 114,669, filed December 7, 1936, for Target rifle range, which application is the basis for the disclosure of the present application.

I claim:

In a target device, a target member, a light sensitive member, a light projecting gun, means responsive to the accurate aiming and firing of the gun at the target member for projecting a light beam upon the light sensitive member which changes the current flow characteristics of the light sensitive member, a shot counting means, a hit indicating means, an electric circuit including the shot counting means, means for energizing the circuit to cause the shot counting means to count a shot each time the gun is fired, an electric circuit including the hit indicating means, means for energizing the circuit whenever the current flow characteristics of the light sensitive member are changed to cause the hit indicating means to indicate a hit, means controlled by the shot counting means for making the entire target device inoperative after a predetermined number of shots have been fired, a starting switch controlled by the operator and independent of the shooting of the gun for resetting the various elements of the target mechanism to permit firing a successive series of shots, means actuated in response to the accurate aiming and firing of the gun and independent of the operator control of the starting switch for resetting the various elements of the target mechanism to permit the firing of an additional number of shots.

WILLIAM P. FALKENBERG,

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E. F. ANDREWS

2,269,300

RADIO RECEIVER

Original Filed April 8, 1933

5 Sheets-Sheet 1

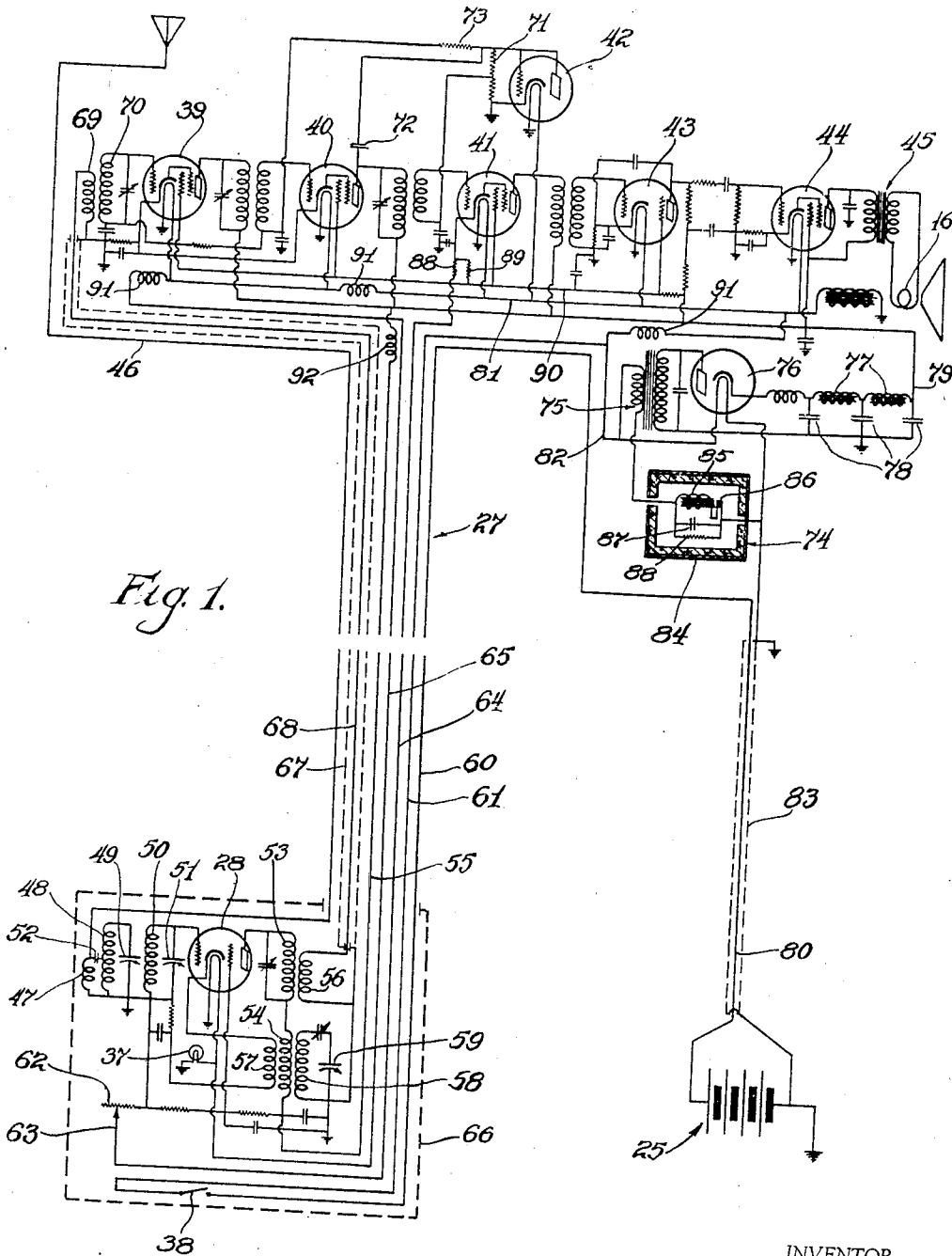


Fig. 1.

INVENTOR.  
Edward F. Andrews  
BY *Williams, Bradbury,  
McCaleb & Hinkle*  
ATTORNEYS

