Dec. 5, 1939. F. C. McCLELLAN 2,181,948

TARGET PRACTICING APPARATUS

Filed Oct. 14, 1936

Fig. 1.

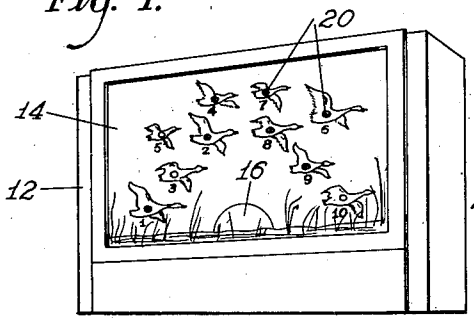

Fig. 2.

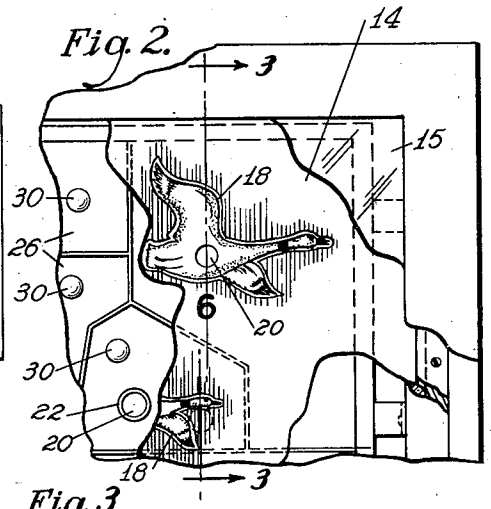

Fig. 3.

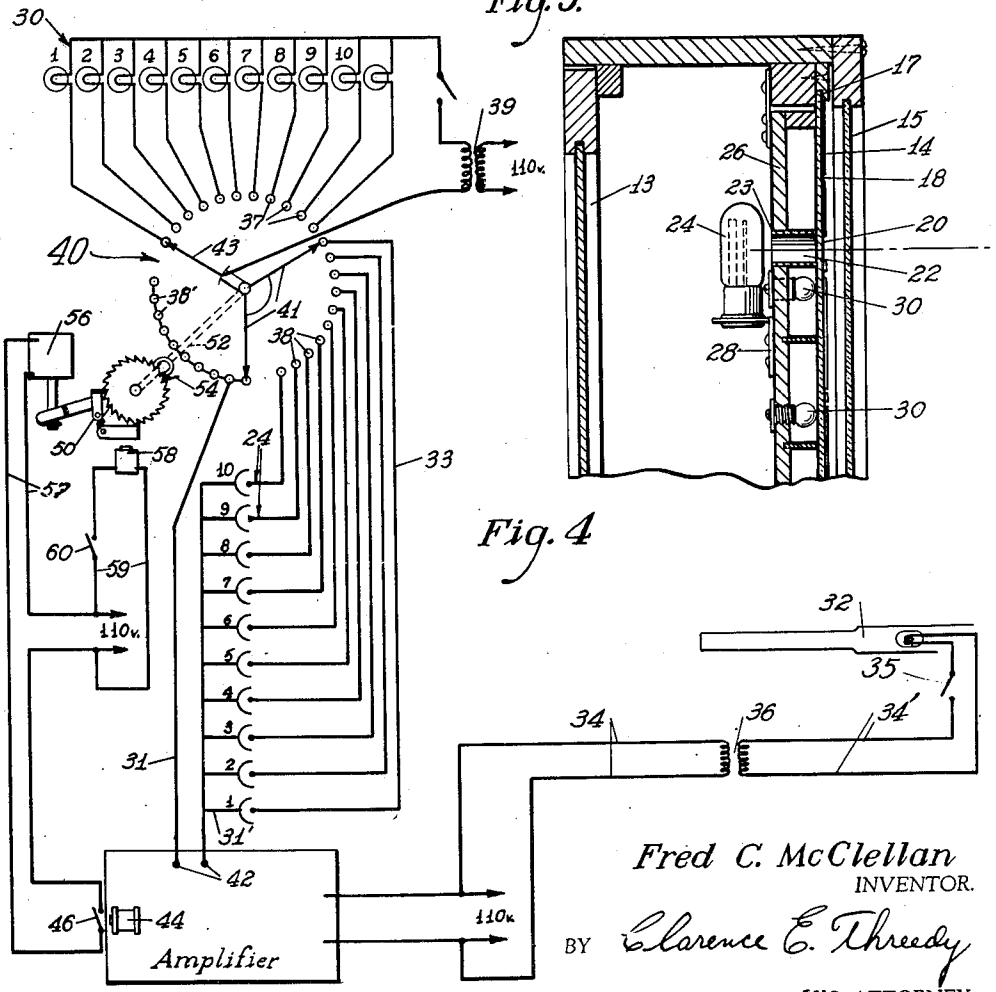

Fig. 4

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TARGET PRACTICING APPARATUS

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10 Claims. (Cl. 273—101.1)

This invention relates to amusement devices and particularly to a target practicing apparatus which includes a light gun and a novel target structure, and indicating means operable by photo-electric means actuated by the skillful aiming of said light gun.

One of the important objects of the invention therefore is the provision of a target having a display panel with opaque target portions delineated thereon, each of said portions being in the outline form of a suitable target object such as a duck, and having its marginal edge portions outlined by translucent areas, and the apparatus further providing illuminating means behind the panel for illuminating the marginal translucent portions of each of the targets, together with photo-electric control mechanism therefor, such that when one of said target objects or ducks, is struck by a flash of light from the light gun that particular target will no longer be illuminated about its marginal edge portions.

Other and more particular objects of construction and operation of the invention will appear in the following description in view of the attached drawing, in which:

Fig. 1 is a perspective view of the target structure;

Fig. 2 is an enlarged fragment in plan of the structure of Fig. 1;

Fig. 3 is a vertical side section taken along the lines 3—3 of Fig. 2; while

Fig. 4 is a circuit diagram.

The novel target structure as seen in Fig. 1 generally comprises a rectangular cabinet 12, having a rectangular target panel 14 disposed on the front side thereof, said panel being preferably of the translucent or transparent substance such as glass or Celluloid, and having delineated thereon suitable target characters in the form of ducks numbered consecutively 1 to 10, together with an appropriate scenic background for the particular target characters, in this instance the ducks, and also a score indicating character which in this instance is represented by a rising sun 16, the latter being delineated in translucent or transparent colors or paint while the background is delineated in an opaque paint or medium.

Each of the ducks 1 to 10 appearing on the target panel 14 is also delineated by an opaque paint medium, except that each of the target elements or ducks has its marginal extremities outlined by translucent or transparent panel portions 18 (Fig. 2), and also each of the ducks or target characters is provided with a translucent or transparent bull's eye or target spot 20 adapted to transmit light freely from the front side of the panel to the rear thereof, for transmission through a suitable conduit member in the form of a tube 22 (Fig. 3) to be directed upon a photo-electric cell or photo-sensitive device 24 positioned therebehind.

The target panel 14 as seen in Fig. 3 may be suitably secured in grooves 17 provided by members of the cabinet structure 12, and if desired a protective glass 15 may be similarly positioned in front of the target panel 14.

To the rear of the target panel is a supporting back or panel 26 extended in a plane parallel to the panel 14, the light tubes 22 being seated in suitable apertures 23 provided in the panel 26 and having their forward (right-hand) open extremities registered with the translucent bull's eye or target spots 20 of the several targets 1 to 10.

A suitable bracket 28 attached to the backing panel 26 supports the photo-electric cell 24 behind the rear (left-hand) open extremity of the light tube 22, in such manner that a beam of light properly impinging upon the bull's eye portion 20 and passing through the light tube 22, will impinge upon the photo-electric element of the tube 24 and actuate the latter to cause the extinguishment of a corresponding indicating light 30, also supported by the back panel 26 in a position behind the corresponding target character or duck, so as to cause the marginal illumination of the duck to disappear, indicating a hit, the lamps 30 having been previously energized to outline the said target character or duck with a margin of light transmitted through the translucent marginal edge portion 18 of that target.

Fig. 3 is illustrative of only one of the individual target characters such, for example, as shown in Fig. 2, and it is to be understood that a plurality of such target units are provided corresponding to the number of targets desired, and each of these units includes a target character or duck, a light tube behind the bull's eye part thereof, a photo-cell behind the light tube, and a delineating or margin outlining lamp suitably positioned between the backing panel and the target panel.

At this juncture it is convenient to observe that light from any of the sources 30 is prevented from reaching the photo-electric units 24 by the panel 26, the light tubes 22 being positioned close to the back sides of the targets 14 and being secured in their respective back panel apertures 23 to prevent any leakage of light. Thus, in effect, the lamps 30 are housed between the opaque target panel 14 and the backing panel 26, together with the adjoining parts of the cabinet structure. A rear

closure panel 13 is provided to further close off the interior of the cabinet 12 to prevent light from reaching the cells 24 from extraneous sources.

The electrical circuit connection for the several photo-electric devices 24 and the indicating lamps 30 controlled thereby, is shown in Fig. 4.

The novel target practicing apparatus is intended to be used with any suitable form of light gun, such as generally indicated at 32, the construction and operation of such guns being generally well known and such that by the operation of the trigger, a beam or flash of light is projected from the gun toward the target, in this instance toward one of the ducks 1 to 10 on the target panel 14, and particularly toward the bull's eye or target spot 20 of the particular duck or target character selected.

The light of the gun 32 may be energized from the 110 volt line source indicated in Fig. 4, through conductors 34, transformer 36 and conductors 34', and a trigger switch 35 provided in the circuit.

The several photo-electric cells generally indicated at 24 and individually indicated by the ordinals 1 to 10, in Fig. 4, are each connected respectively to a contact 38 of a commutating switch 40, and to one of the input connections 42 of a suitable photo-electric amplifier which includes in its output circuit a master relay 44, having a relay switch 46. The other input post 42 of the amplifier is connected to a common bank of contacts 38' of commutator switch 40, corresponding in number to the number of contacts 38, and the switch 40 is provided with a contact arm 41 which is adapted to bridge one of the common contacts 38' and one of the photo-electric cell contacts 38, the switch arm 41 having an independent contact arm 43 movable over a third bank of contacts 37, each of which is connected to one side of the bank of indicating lamps 30 (each individually indicated by an ordinal from 1 to 10), the other side of these lamps being connected to a transformer 39 to which the independent contact arm 43 is likewise connected, such that the movement of the latter over the contacts 37 will sequentially energize one of the lamps 30 when the transformer 39 is connected to a suitable source of energy indicated at 110 volts.

A pawl and ratchet drive 50 rotates a shaft 52 against the tension of a return spring 54 to correspondingly rotate the contact arms 41 and 43, the driving means for this ratchet mechanism being a solenoid 56 which is in circuit, through conductors 57, with a 110 volt (or other) source of power, through the switch 46 of the master relay 44, and the ratchet mechanism 50 is provided with an electro-magnetically releasable latch 58, the electro-magnet element of which is in circuit through conductors 59 and a master control switch 60, with the 110 volt power source. The master switch 60 may be coin controlled or some other form of proprietary switch control.

The operation of the device is such that assuming the switch 60 to be operated by a coin slide or by the proprietor of the apparatus, the electro-magnet 58 will be energized from a source of power through conductors 59, to release its latch member, which has a cam engagement with pawl 50 to disengage the latter from the ratchet and permit the return movement of the shaft 52 and the contact arms 41 and 43 to a normal position, such as indicated in Fig. 4, since the spring 54 may be assumed to have been wound by a previous operation of the machine. If the trigger switch 35 be closed, the circuit conditions will then be as represented in Fig. 4, and if a beam of light is projected from the gun 32 against the bull's eye or target portion 20 of one of the target characters or ducks 1 to 10, (on target panel 14), the light will pass through the target spot and through a light tube 22 (Fig. 3) and onto one of the photo-cells 24.

Assume that the cell indicated as 1 in Fig. 4 has been properly struck by a beam of light as aforesaid, it will be apparent that a circuit connection is established from one side of the photo cell through a conductor 33, one of the uppermost switch contacts 38, the contact arms 41 and one of the common contacts 38', by conductor 31 to one of the input connections 42 of the amplifier, the other input connection connecting with photo-cell numbered 1 by conductor 31'.

Thus the amplifier will be energized and cause the master relay 44 to pull up and close its switch 46, so that the ratchet solenoid 56 will be energized by conductors 57 from the 110 volt power source, whereupon the ratchet mechanism 50 will rotate the shaft 52 against the tension of spring 54, a distance corresponding to the movement of the switch arms 41 and 43 to the next adjacent contacts of their respective banks. Contact arm 41 will thus be moved off of its position, as indicated in Fig. 4, to the next adjoining contact, so that the photo cell numbered 1 will be removed from circuit with the amplifier, and the next photo cell numbered 2 will be substituted therefor.

Meanwhile, the corresponding lamp 30 (indicated at 1 in Fig. 4) which has been illuminated through a circuit from transformer 39, completed through switch arm 43 and one of the contacts 37, will be extinguished as the contact arm 43 moves to the next adjacent contact 37 to illuminate lamp numbered 2, so that the duck numbered 2 on the panel 14 will be outlined with an edge of light indicating that the marksman is to select that target next in order.

If the marksman now properly direct his next shot or beam of light onto the bull's eye or target spot 20 of the target numbered 2, which is now marginally illuminated as a result of the last hit, the photo-electric cell numbered 2 will be actuated to operate the master relay 44 through the amplifier and a circuit therewith established through the commutating switch 40 in like manner as above described, whereupon the solenoid 56 will again step the ratchet mechanism 50 and cause the contact arms 41 and 43 to assume the next sequential position, thus throwing photo cell numbered 3 in circuit with the amplifier, extinguishing lamp numbered 2 and illuminating lamp numbered 3, and target numbered 3 is marginally illuminated as the target next to be selected by the marksman. This operation is repeated as many times as there are targets or so long as the marksman desires to shoot at the targets, until the commutating switch 40 reaches the last contact and the machine is reset by tripping the electro-magnetic latch mechanism 58 so that the switch arms 41 and 43 may return to normal position under the urgence of spring 54.

After the tenth (or any desired number) hit, the marksman having made a perfect score, the switching mechanism 40 may be arranged to extinguish the lamp corresponding to duck numbered 10, and illuminate some score-indicating character, for example the sum 16, which in the

arrangement illustrated, is arranged to remain illuminated until the switch mechanism **40** is returned to normal by operation of switch **60**, for example.

It will be apparent, of course, that this arrangement is susceptible of wide variation without departing from the spirit of the invention.

While I have described the preferred embodiment of the invention in particular detail for purposes of illustration, I do not desire to be limited by such detailed recitation except as may be hereinafter provided for in the annexed claims which I desire to protect by Letters Patent of the United States.

I claim:

1. A target device comprising a translucent member having an opaque target character with translucent marginal edge portions, means including a lamp behind said member for illuminating said marginal edge portions, means including a photo-electric device positioned behind said member, and switching mechanism actuated by said photo-electric device when the latter is struck by a flash of light for extinguishing said lamp to indicate a hit, said target character having a translucent bull's eye portion for transmission of light from a light gun onto said photo-electric device.

2. A target device comprising a translucent panel having delineated thereon a plurality of opaque target characters against an opaque background, each of said characters having translucent marginal edge portions and a translucent target portion, means behind said panel for illuminating the marginal edge portion of said target characters, means including a photo-electric device positioned behind each of said target characters to be struck by a flash of light directed through the respective translucent target portions thereof for controlling the illumination of said lights of the respective target characters responsive to a skillfully directed flash of light onto the target portion thereof, and means behind said panel for shielding said photo-electric devices from said illuminating means.

3. A target device including a translucent panel member having a target character delineated thereon and opaque to light, said character being surrounded by an opaque background and having translucent marginal portions and a translucent target portion, an electric light positioned behind said target character to illuminate the translucent marginal portions thereon, switch means for controlling the illumination of said light, a shield member behind said panel and adapted to support said light behind the target character, a photo-electric device supported on the side of said shield opposite to said light and in substantial alignment with said translucent target portion so as to be struck by a flash of light directed through the latter, a light tube supported by said shield to direct light from said translucent target portion onto said photo-electric device and exclude light from said electric light, together with means operable by said photo-electric device when the latter is struck by a flash of light to actuate said switch means and cause said electric light to indicate a hit.

4. A target device comprising a closed cabinet member having a translucent target panel closing one side thereof, said panel having an opaque target character thereon and an opaque background for said target character, the latter being provided with translucent marginal edge portions and a translucent target portion, an opaque supporting panel behind said target panel in the cabinet, means mounted by said support panel and operable for illuminating the marginal portions of said target character, a photo-electric device supported by said support panel in alignment with the said translucent target portion, means for directing light from said translucent target portion onto said photo-electric device and excluding from the latter light from said illuminating means, together with means actuated by said photo-electric device when the latter is struck by a flash of light directed through said translucent target portion of the target character to control the operation of said illuminating means.

5. In a target device a cabinet member having an open side, a translucent target panel supported by said cabinet and closing the open side thereof, said translucent panel being covered by an opaque substance and having an opaque target character delineated thereon with translucent portions exposed about the marginal extremities of the target character and the latter having a translucent scoring portion, a shield panel behind said target panel in the cabinet, an electric lamp supported by said shield panel behind said target character to illuminate the marginal extremities thereof, a photo-electric device supported by said shield panel on a side thereof opposite to said lamp in alignment with the translucent scoring portion of said target character, means including a light transmitting member positioned between said photo-electric device and said target panel for directing light from the said translucent scoring portion thereof onto the photo-electric device and excluding light from said lamp from said device, together with means including switching mechanism actuated by said photo-electric device when the latter is struck by a flash of light through said translucent scoring portion to control the illumination of said marginal extremities by said lamp to indicate a hit.

6. A target structure for use with light guns and comprising a glass plate provided with an opaque covering, portions of which delineate a target character, said opaque portion being cut away around marginal edge portions of said target character, said character further having opaque portions cut away to provide a translucent target portion, means supporting said target in aiming position to be struck by light from a light gun, together with illuminating means behind said structure and adapted to illuminate the marginal translucent portions of said target character.

7. A target structure for use with light guns and comprising a cabinet having an open side wall, a glass plate covering said open side wall and having an opaque background substance thereon with an opaque target character delineated thereon, said opaque background material being cut away around the marginal outline of said target character and the latter having body portions of said opaque matter cut away to provide a translucent target portion, means for supporting a photo-sensitive device behind said translucent target portion on said cabinet, illuminating means in said cabinet for illuminating the translucent marginal portions outlining said character, and means for shielding said photo-sensitive device from said illuminating means.

8. A target structure for use with light guns, said structure comprising a cabinet having an open side wall portion, a translucent member

arranged in said open side wall portion and having an opaque background covering with an opaque target character delineated thereon, said character having translucent marginal portions outlining the same and also having a translucent target portion in the outlined body portion of the character, a photo-electric cell supported in said cabinet behind said translucent target portion, together with illuminating means in said cabinet behind said translucent plate for illuminating the translucent marginal outline portions of the target character, and means shielding said photo-cell from said illuminating means.

9. A target structure for use with light guns and including a translucent panel having an opaque background formed thereon and an opaque target character delineated on said background formation by marginally translucent outlines formed by removing portions of said opaque background, said target character having a translucent target portion disposed within said marginal outline, means behind said panel for illuminating the translucent marginal portions of said character, a photo-sensitive device behind said translucent target portion, means shielding said photo-sensitive device from said illuminating means, together with mechanism operably controlled by said photo-sensitive device for extinguishing said illuminating means when the photo-sensitive device is activated by light projected through said translucent target portion.

10. A target apparatus comprising a box-like frame, a plurality of transparent images in a wall thereof, means within the frame defining housings corresponding to each image, an incandescent lamp in each housing, a photo-electric cell for each image, and an enclosure for the cell, each enclosure having a tubular portion extending towards the image.

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