

Nov. 8, 1938.

E. C. JOHNSON

2,135,667

TARGET DEVICE

Filed Sept. 20, 1937

2 Sheets-Sheet 1

Fig. 1.

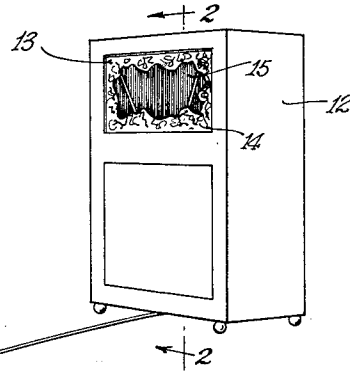
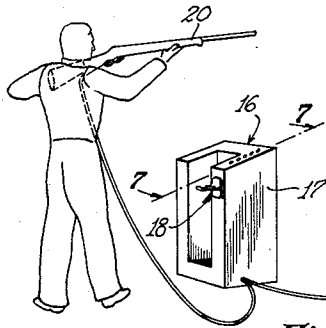


Fig. 3.

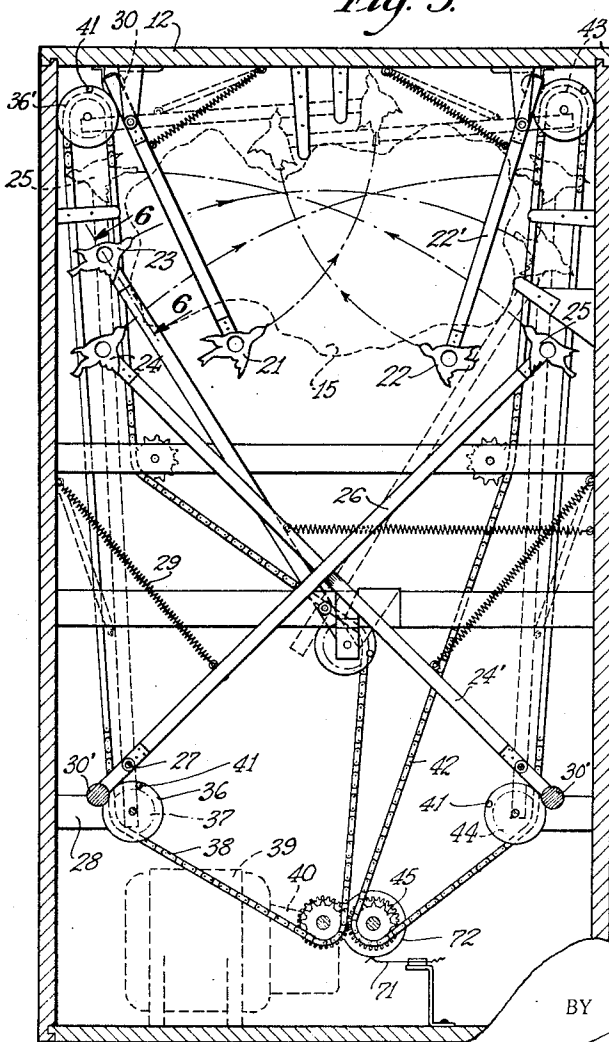
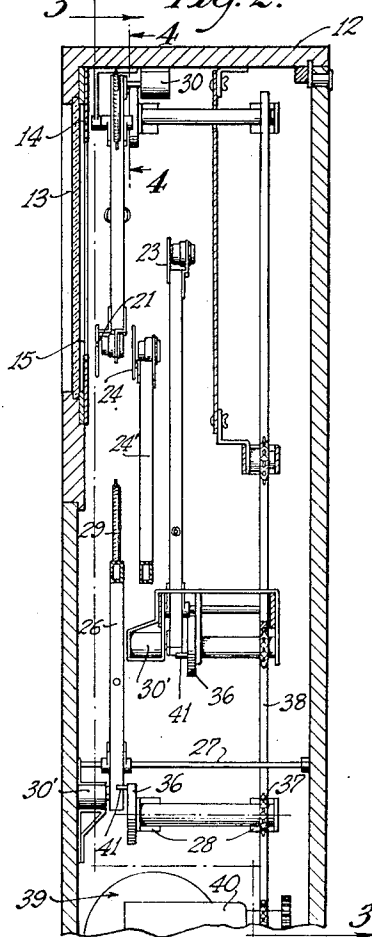


Fig. 2.



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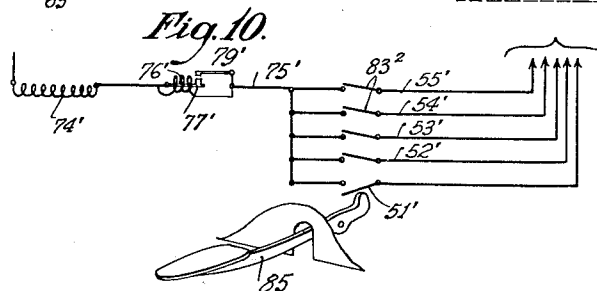
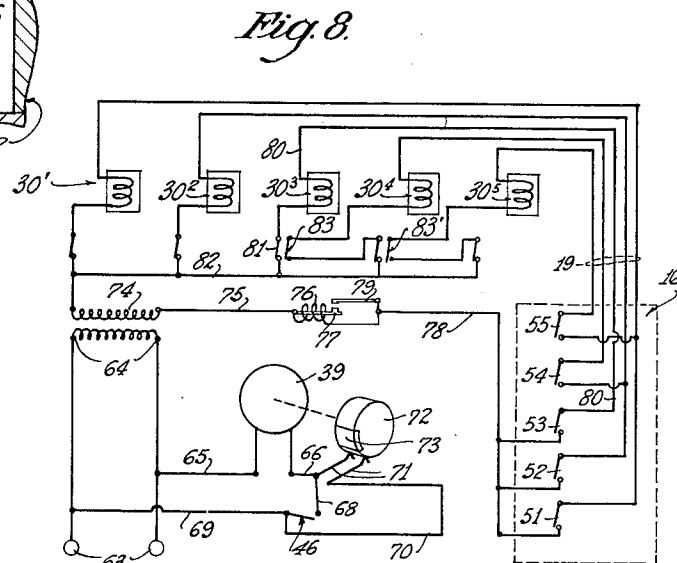
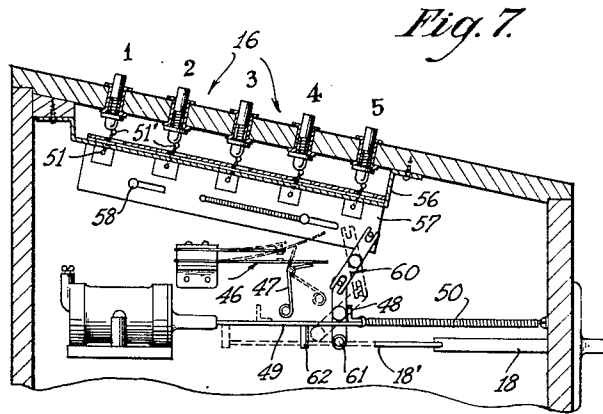
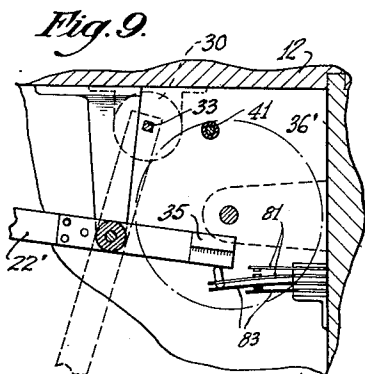
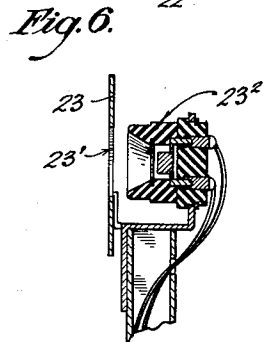
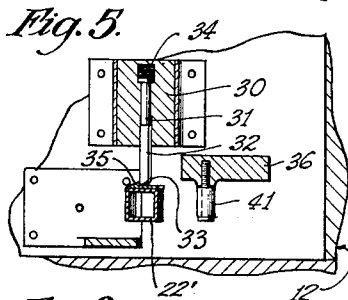
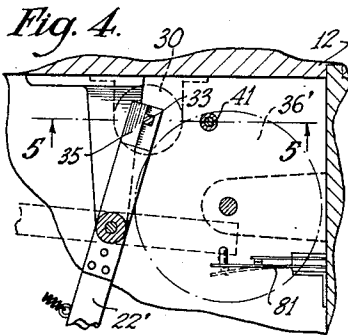
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TARGET DEVICE

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2 Sheets-Sheet 2



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TARGET DEVICE

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11 Claims. (Cl. 273—105.2)

This invention pertains to amusement devices and more particularly to an electric shooting gallery employing a light gun and novel photo-electric targets and mechanism for controlling the movement of these targets in a particular manner.

One of the novel features of the invention resides in the provision of a plurality of targets simulating flying ducks or the like and arranged in a cabinet for movement before a window so as to pass across the vision of the marksman from unexpected positions, somewhat in the manner of the marksmanship scheme commonly known as Skeet wherein the targets are released suddenly from unexpected positions in accordance with a predetermined plan in order to test the skill and alertness of the marksman.

A further feature resides in the provision of electrical control mechanism for effecting the release of various targets depending upon the operation of a selecting mechanism under the control of the marksman.

Still another object is the provision of selecting mechanism in which certain of the targets are directly controlled and hence may be actuated responsive to the marksman's operation of a particular control member, whereas others of the targets are dependent upon the previous operation or selection of other targets regardless of the marksman's selection, thus providing an additional element of surprise.

Still another and more particular object of the invention is the provision of a cabinet having a large sight opening preferably covered by a glass pane and a plurality of target figures mounted on pivoted arms in the cabinet for movement in horizontal flights in opposite directions across the sight opening, the targets being urged by spring means in the direction of their flight and normally latched against movement after being "set" or returned to a normal position by a motor driven resetting mechanism, each of the targets having electromagnetic release means and there being provided a control cabinet or panel for the marksman in which there are a plurality of push buttons selectively operable by the marksman to operate certain of the electromagnetic release devices, there being provided in the circuits to these release devices delayed-action switching mechanism for delaying the release of a particular target after the marksman has pushed a button so that he may have time enough to take aim.

Other novel aspects and objects of the invention reside in the particular arrangement of

parts and control circuits hereinafter to be described in detail in view of the drawings in which:

Fig. 1 is a perspective view of the target cabinet and control cabinet;

Fig. 2 is an enlarged fragmentary vertical section along lines 2—2 of Fig. 1;

Fig. 3 is an enlarged vertical section viewing the target cabinet from the front along lines 3—3 of Fig. 2;

Fig. 4 is a fragmentary vertical elevation of a target switch and resetting cam, as viewed along lines 4—4 of Fig. 2;

Fig. 5 is a horizontal section through the electromagnetic target release mechanism as seen along lines 5—5 of Fig. 4;

Fig. 6 is a fragmentary vertical section of a target and photo-electric cell as seen along lines 6—6 of Fig. 3;

Fig. 7 is an enlarged fragmentary vertical section through the control cabinet, as seen along lines 7—7 in Fig. 1;

Fig. 8 is a circuit diagram;

Fig. 9 is identical to Fig. 4 with the exception that a control switch 83 is added to the switch 81; while

Fig. 10 is a fragmentary circuit diagram for pedal operation and adapted to replace the manual switch circuits of Fig. 8.

In one embodiment of the invention, as seen in Fig. 1, the unitary apparatus includes a target cabinet 12 having a sight opening or window 13 behind which is a scenic panel 14 having central cut-away areas 15 across which a number of targets are adapted to move, there being provided in this housing driving mechanism for moving the targets variously under the control of a selective operative means in the form of a plurality of push buttons 16 arranged on a control cabinet 17 and including a coin-freed master control 18. The control cabinet and mechanism therein is connected by means of a cable 19 to the control mechanism in the housing 12. Connected with the control cabinet 17 is a light gun 20 adapted to emit a flash of light responsive to each pull of the trigger for actuation of photo-electric means, forming part of each target, when the gun is properly aimed.

In the present instance the targets are five in number and are in the form of flying duck figures, 21 to 25 inclusive. Taking for convenience the duck numbered 25, it will be observed that the latter is mounted at the upper end of a target arm 26 which is pivoted near its lower end as at 27 on a bracket 28 suitably attached to the

lower inner wall of the cabinet. This target 25 is adapted to sweep across the window 13 along the dotted line trajectory seen in Fig. 3, a coil spring 29, attached to the arm and the cabinet, being provided for this purpose so that when the arm 26 is in the full line position seen in Fig. 3 the spring 29 will be tensioned for this purpose. The arm 26 is normally latched in the initial or "set" position seen in Fig. 3 by means of a spring urged latch pin identical in structure to that seen in Fig. 5 wherein is provided an electromagnet or solenoid 30 (indicated at 30' in Fig. 3 for the arm 26) conveniently mounted adjacent the end of the target arm near its pivotal point. The armature 31 of the electromagnet has a latching arm provided with a cam end 33, the armature and latch arm being normally urged outwardly of the solenoid by means of a spring 34 so as to project the cam end 33 of the latch arm 32 into the path of movement of the end of the arm (indicated at 26' in Fig. 5), there being provided a plate with a latch tooth 35 on each arm for its respective finger 32. Thus, each arm is latched into the full line position seen in Fig. 3 with its respective operating spring 29 tensioned so that when the electromagnet 30 is energized, its plunger and latch arm 31-32 will be drawn inwardly to dispose the latch or cam end 33 thereof out of latching engagement with the latch tooth 35 on the target arm, allowing the latter to be swung by its spring across the sight opening.

Means for resetting the targets includes the resetting wheel 36 also mounted on the bracket 28 and having a sprocket gear 37 driven by a continuous sprocket chain 38 which in turn is driven by a motor 39 having a reduction gear mechanism 40. By referring to the enlarged view of Fig. 4, it will be observed that the resetting wheel 36 therein is provided with an eccentric cam roller 41 effective when the target arm 22' is in the dotted line position to move in a clockwise direction and pivot the arm 22' back into its latched full line position.

Since it is necessary to return the target arms in opposite directions back to their normal positions, there is a second sprocket chain 42 trained over the sprocket 43 of the resetting wheel 36' (corresponding to target 22-22') and back over a resetting sprocket wheel 44 in the lower part of the cabinet and associated with the target arm 24', the driving sprocket 45 for chain 42 moving in reverse direction to the driving sprocket for chain 38.

Thus, when the motor 39 is energized, each of the targets is returned to its normal latched position by its respective resetting eccentric wheel.

Each of the target figures or ducks, for example the duck 23, is provided with a light penetrable target area 23' behind which is mounted a photo-electric cell 23², the latter being actuated by light from the gun 20 skillfully directed through the target opening 23' and being adapted to operate some form of hit-indicating mechanism such as a bell or score register or the like, not illustrated herein since the same does not form part of the invention.

The control mechanism, as seen in Fig. 7, is housed in the control cabinet 17 and includes a master control 18 in the form of a coin slide arranged to actuate a motor switch 46 through a pivoted operating arm 47 engaged by the lateral finger 48 on a dashpot arm 49. When the coin slide 18 is actuated in the well-known manner,

its reciprocating slide member 18' urges the dashpot arm 49 toward the left against the tension of a return spring 50, causing the operating finger 48 to pass the switch operating finger 47, and as the dashpot arm 49 slowly returns to its normal position responsive to the pull of the spring 50, the finger 48 will transiently engage the operative arm 47 and momentarily close the switch 46 to energize the motor 39. This will effect a resetting of any or all of the targets from released back to "set" position in the manner heretofore described, this operation being quickly effected and the motor 39 being automatically cut out of the circuit as will be described later in conjunction with Fig. 8.

The individual target control means includes a number of push buttons 16, numbered in Fig. 7 from 1 to 5 inclusive, each of the same being adapted to operate a snap switch 51 or 52, 53, 54, 55, when depressed. These switches are mounted on a bracket 56 and are provided with a gang reset plate 57 adapted to reciprocate on pin means 58 so as to reset in unison each of the operating levers 51', etc., of the several switches. This resetting operation is effected through a toggle lever system 60 including a tripping pin 61 engaged by the inner end of the slide 18' when the latter is reciprocated. Thus each time the coin slide 18-18' is operated by the deposit of a coin, the motor switch 46 is closed and also the several toggle or snap switches 51 . . . 55 are all reset.

Referring to Fig. 8, the operating circuit includes a source of power 63 connected to the primary 64 of a transformer, the secondary of which is adapted to supply the releasing electromagnets. The motor 39 is connected on one side by a conductor 65 to one side of the power line 63, the other side of the motor being connected by a conductor 66 to a wiping contact finger 67 and also to a contact 68 of the motor switch 46 described in conjunction with Fig. 7, the other side of the switch 46 being connected by a conductor 69 to the opposite side of the power line 63. By closing the switch 46 the motor 39 will be energized. The return conductor 69 is also connected by a conductor 70 to a companion wiper finger 71 adapted to bear, with the finger 67, on a rotatable conductive disc 72 driven on the same shaft as the sprocket 45 (lower part of Fig. 3). The conductive disc has an insulated segment 73 which is normally positioned by the motor 39 against the two wiper fingers 67 and 71 so that no circuit is closed through the latter. When the master switch 46 is closed, however, the motor 39 will momentarily be energized through the same and move the conductive disc 72 a distance sufficient to rotate the insulating segment 73 away from the wiper fingers so that the latter may engage the conductive disc portion 72 and close the motor power circuit around the switch 46 so that the motor 39 will continue to run until the insulated segment again encounters the wiping fingers and breaks the motor circuit. One revolution of the motor control means 72 is sufficient to reset all of the targets, and thus the motor may be started by the coin slide control and automatically stopped after the targets are restored to "set" position.

The secondary 74 of the transformer is connected by a conductor 75 to one side of the heater coil 76 of a thermostatic switch arm 77 also connected to the conductor 75, the opposite side of the heater coil being connected to a conductor 78 which is common to the first three snap

switches 51, 52, 53. Also connected to the conductor 78 is a stationary contact arm 79 adapted to be engaged by the thermostatic arm 77 when the latter has been moved by heat developed in the heater coil 76 to short circuit the heater coil and permit a flow of current through the particular switch 51, etc., and its associated releasing solenoid 30, the actuation of the thermostatic switch requiring a predetermined interval of time before the heater coil 76 is short circuited, so that the target will not be released until the marksman has had an opportunity to take aim, the normal series resistance of the heater 76 being adequate to prevent operation of any of the releasing solenoids.

Assuming by way of example that the middle one of the buttons 16 has been pushed by the operator so as to snap the switch 53, it will appear that a circuit will be completed from the secondary of the transformer through the heater coil 76, the conductor 78, the switch 53 and the conductor 80, to the middle solenoid 30³ and from the other side of this solenoid through a normally closed switch 81 (there being one of these for each target) arranged in the cabinet for engagement by the end of the particular target arm with which it is associated to be opened when the target moves into operated position (as in dotted lines in Fig. 4), the return circuit from switch 81 being via the common conductor 82 back to the other side of the secondary 74.

One of the features of the control circuit previously mentioned includes the control of some of the targets by others regardless of the selection made by the operator. This is effected through the addition of a pair of normally open contact springs 83 (Fig. 9) provided in the switch 81 and arranged in series with one of the other release solenoids 30⁴ so that the latter is normally open, and the operation of its corresponding switch 54 will be ineffective until the switch 81—83 is first operated. This arrangement may be repeated so that others of the releasing magnets such as 30⁵ cannot be energized until the preceding solenoid 30⁴ has first been energized through operation of its associated target arm. It will be apparent that this circuit arrangement may be varied dependent upon the number of targets provided and the particular order in which it may be desirable to operate them, the principal object being to provide an element of surprise to test the skill of the marksman in sighting a moving target which appears from an unknown position responsive to his manipulation of the control buttons.

If desired, the manually operated push buttons 16 may be replaced by a pedal operated switch shown schematically in Fig. 10. In such case, there is only one switch 51' employed for actuation by a pedal 85 to initiate the sequential operation of the targets through a switch of the type 81—83 shown in Fig. 9, each target after the first being operative through such a switch to close a circuit through the next target and the time delay switch 77—79. In Fig. 10, the first switch 51' actuated by the pedal 85 is a snap switch while the remaining switches 83² are the same as the switch 83 shown in Fig. 9, the power connection being through the secondary 74' of a transformer and a time delay switch 77—79, as in the case of Fig. 8, and the several switches 51'—83² being connected to the individual release magnets 30 . . . 30⁵ in place of the connections to the switches 51—55.

It will be observed in Figs. 2 and 3 that some of

the target members are mounted to move in the same plane as others, this arrangement being provided for purposes of compactness, and the operating mechanism being arranged to restore the several targets in such sequence that they will not collide. If desired, the targets may be arranged to move in individual planes and the sequence of release of targets may be varied considerably.

Moreover, various arrangements of the operating mechanism particularly described herein for purposes of illustration are within the ability of those skilled in the art, and it is to be understood that the appended claims are intended to include within their call all rearrangements and changes in form and location fairly coming within the scope of the invention.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a target apparatus, a plurality of movable targets, means for effecting movement of said targets individually, releasable means normally latching individual targets against movement, control means including a plurality of control members situated at a distance from said targets and severally operable to actuate said releasable means to effect movement of particular targets, said control means being so arranged and constructed as to effect movement of certain of targets only after certain other targets have first been operated.

2. In combination, target apparatus including a plurality of movable targets, means for effecting movement of said targets individually, controlled means normally restraining said targets against movement, and control mechanism constructed and arranged to be positioned at a distance from said targets and including manually actuated means for effecting operation of said controlled means so as to effect movement of individual targets interdependently in a predetermined sequence.

3. A target apparatus including a plurality of movable targets arranged to be normally out of view, means for moving said targets individually into view, and electrical means for setting said targets into viewing motion, together with manual switch means for operating said electrical means to set a particular target in motion as aforesaid, and automatic switch means operable by said particular target for sequentially operating said electrical means to set other targets sequentially in motion.

4. A target apparatus including a plurality of individually reciprocable targets and means effective when the same are "set" in one reciprocable position to move the targets individually into opposite reciprocable position, electrically releasable latch means normally holding said targets in said opposite position, electrical means for restoring said targets from said opposite position back to "set" position, means providing a field of vision across which said targets pass when moving from one of said positions to another and shielding said targets from view when the same are disposed in said "set" and opposite positions, together with electrical control means for said latch means and operable to effect delayed release of selected ones of said targets, and means for restoring said targets to said "set" position.

5. A target apparatus including a plurality of movable targets, means for moving said targets, releasable means normally restraining said targets against movement, and control means in-

cluding manually operable means for releasing said targets individually, and time delay means cooperable with said manual means for delaying release of the target a determined length of time after operation of said manual means.

6. A target apparatus including a plurality of movable targets, means for moving said targets, electrical release means for setting individual targets into motion, manual, delayed-action selecting means for actuating the release means of certain targets, and means operated by said certain targets after the same are set in motion for rendering the release means for other targets operable responsive to operation of said selecting means.

7. Target apparatus including a shield member providing a sight opening, a plurality of targets pivoted for movement severally across said opening, said targets normally being latched by releasable latch means in a "set" position behind said shield, means for moving said targets from "set" position across said opening to an opposite position out of view, resetting means including individual cam wheels for each target and common electrical drive means therefor, coin-freed control means for energizing said drive means, electrical latch-release means for each target, selective switch means for energizing said release means, and switch means operable by particular targets for preventing release of certain other targets until said particular targets have moved from "set" position to opposite position.

8. Target mechanism including a plurality of target figures mounted for individual movement across a field of vision, means normally urging said targets to move in one direction, electrical means releasably latching said targets into opposite position, means normally shielding said targets from view and providing a field of vision across which said targets may move and be viewed when released, together with control mechanism including manually operable switch means for actuating said electrical release means selectively so as to release a particular target, delayed-action means in circuit with said switch means for delaying the release of a target responsive to the operation of said switch means, and driven means

for restoring said targets in unison to said opposite positions.

9. Target mechanism including a housing providing a sight opening and a field of vision for moving target members, a plurality of target figures pivotally mounted in said housing for individual movement across said field of vision, spring means for individually moving said targets in one direction, electrically releasable means for latching said targets individually in an opposite "set" position with their respective spring members under tension, power driven eccentric restoring means for each of said targets and adapted to move the same from said opposite position into said "set" position, together with control mechanism including an individual electrical release means for each of said targets, a plurality of electrically operable switches for selectively actuating said release means, a master switch for energizing said driven restoring means, and delayed-action switch means in circuit with said electrical release means for delaying the operation of the latter a predetermined length of time after the operation of a selected switch for releasing a target.

10. In a target apparatus, a plurality of movable targets, means for moving said targets, releasable means normally latching individual targets against movement, electrical means for operating said releasable means, and control means including selectively operable switches for actuating said electrical means to release a particular target, together with delayed action means cooperable with said switch means for delaying the release of a said target a predetermined time after operation of a selected switch.

11. In a target apparatus, a plurality of movable targets, means for moving said targets, releasable means normally latching individual targets against movement, electrical means for operating said releasable means, and control means including selectively operable switches for actuating said electrical means to release a particular target, the operation of said electrical means being arranged for operation to release certain of said targets only after certain others of said targets have first been operated.

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