Dec. 26, 1961 A. J. LEWIS 3,014,725

TARGET DEVICE

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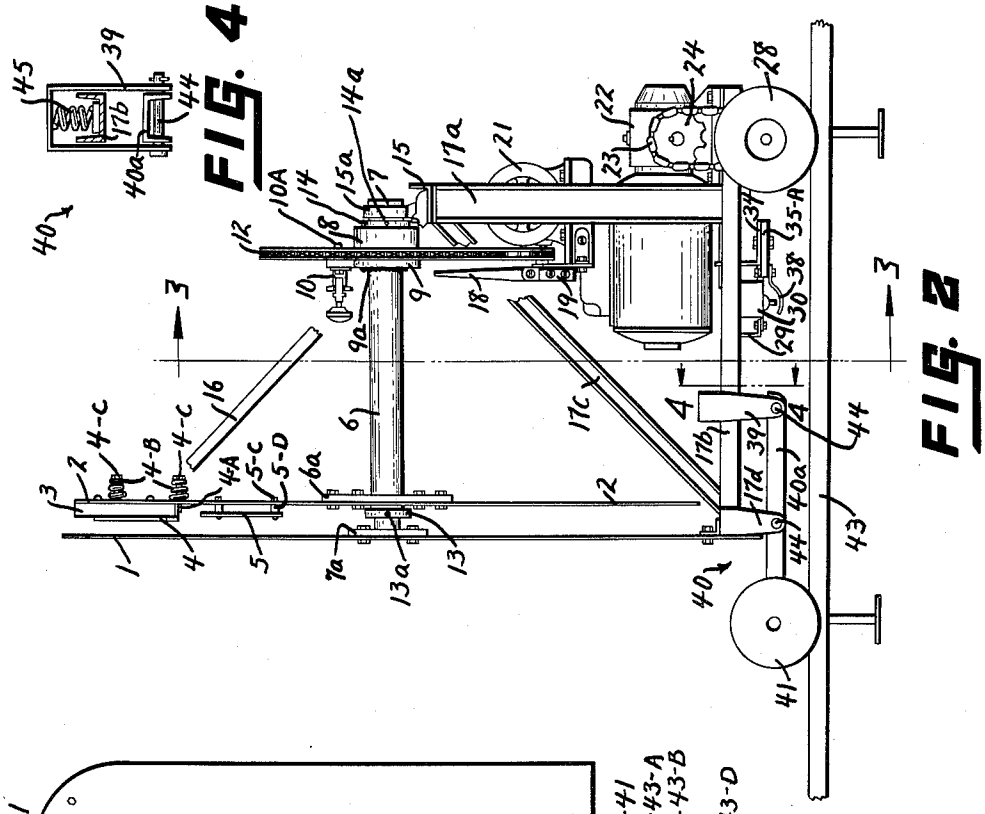


FIG. 4

FIG. 2

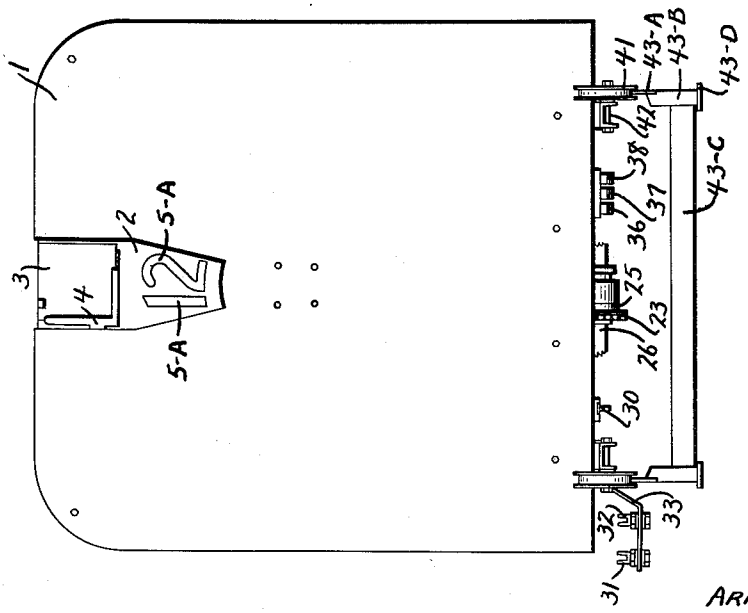


FIG. 1

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TARGET DEVICE

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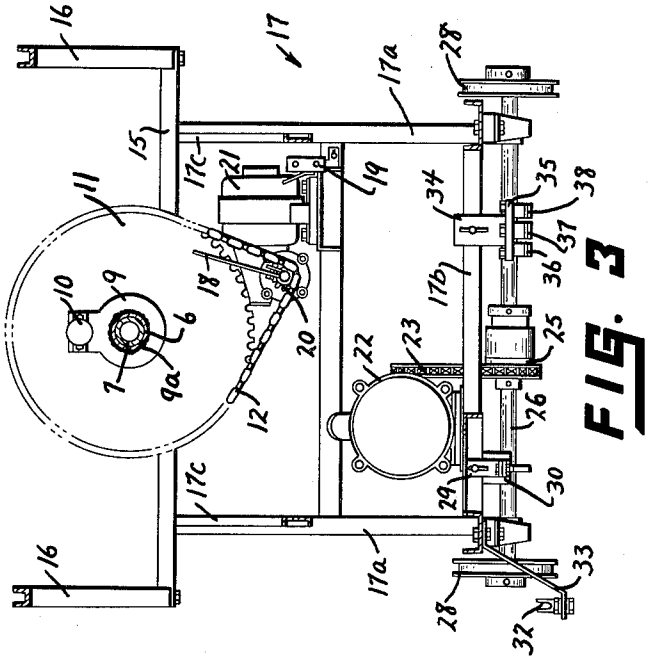


FIG. 3

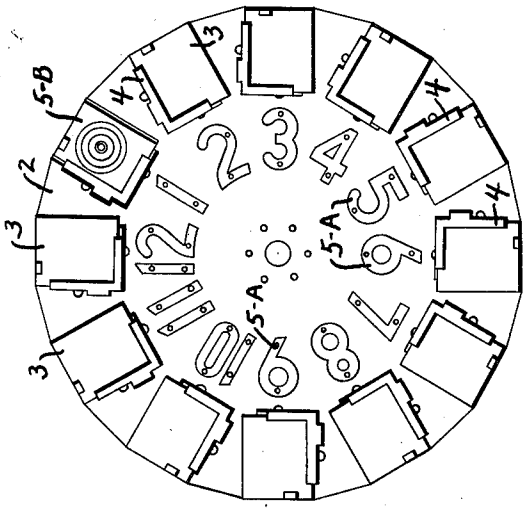


FIG. 5

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TARGET DEVICE

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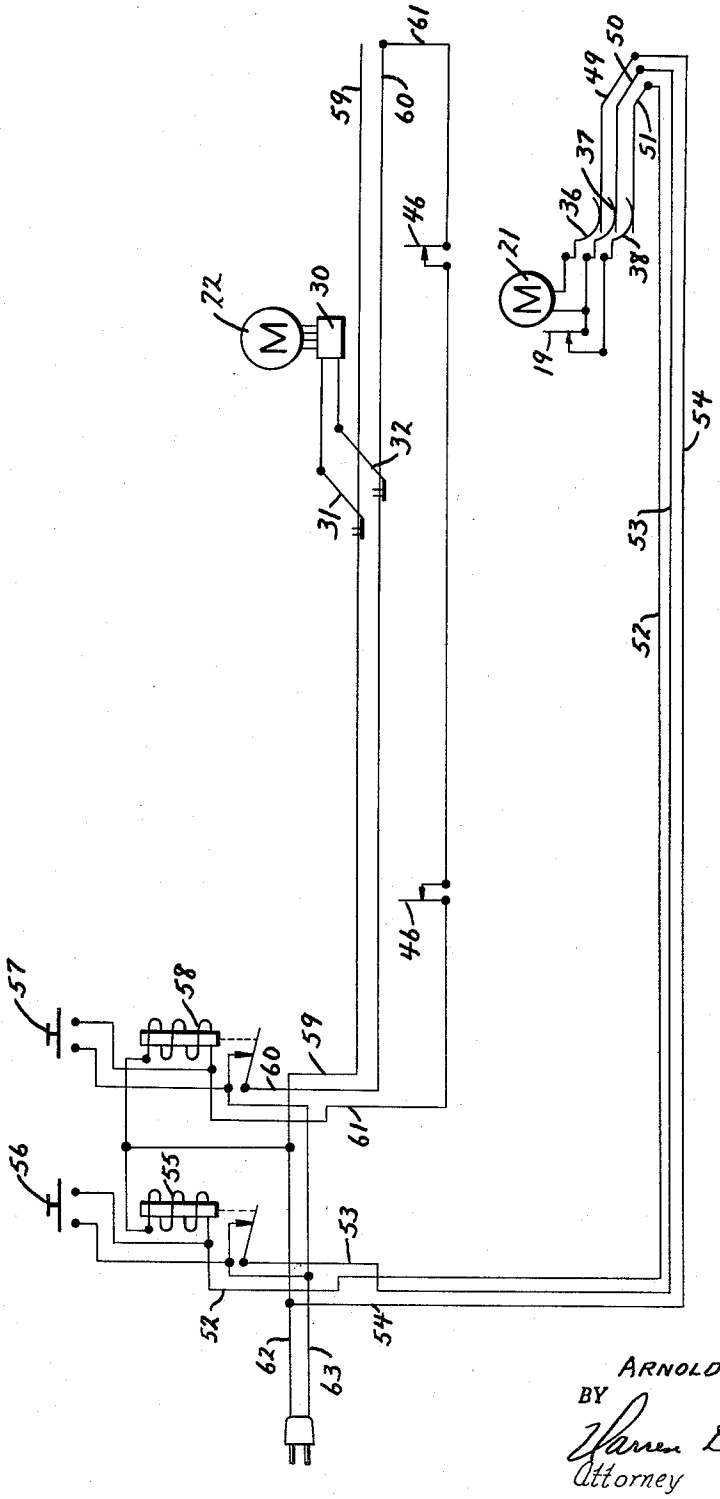


FIG. 7

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TARGET DEVICE

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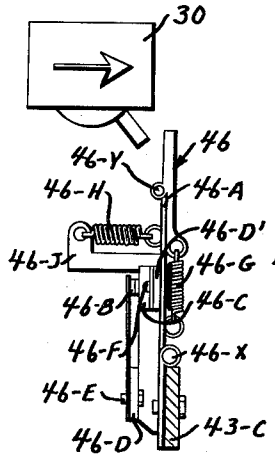


FIG. 9

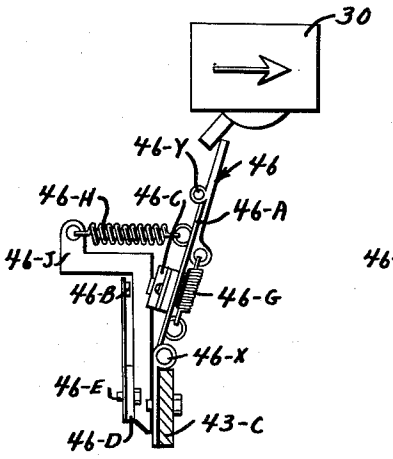


FIG. 10

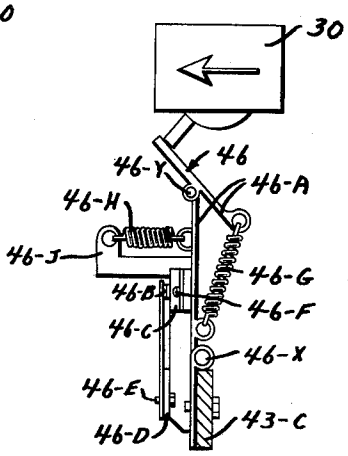


FIG. 11

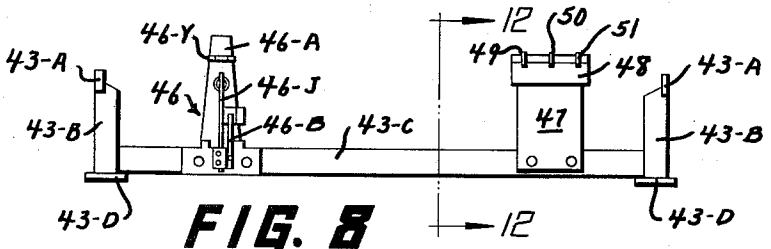


FIG. 8

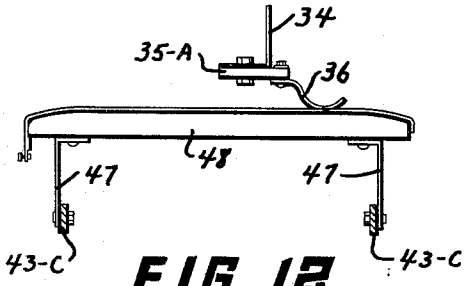


FIG. 12

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TARGET DEVICE

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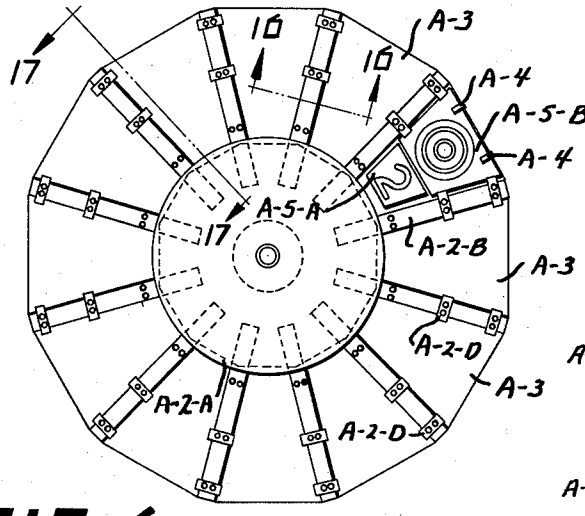


FIG. 6

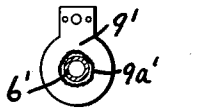


FIG. 14

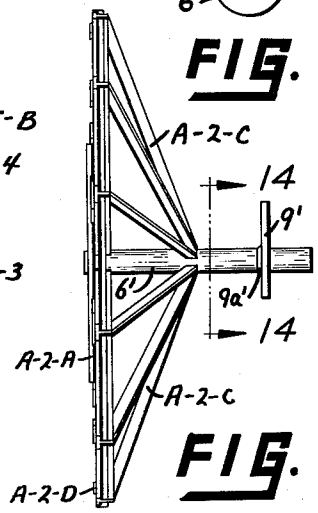


FIG. 13

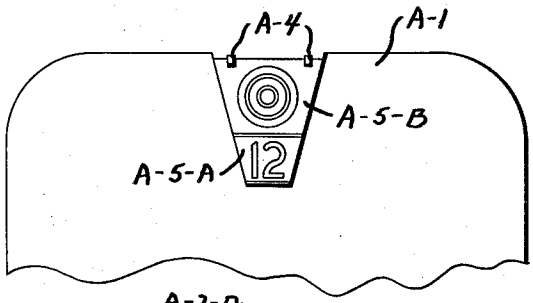


FIG. 15

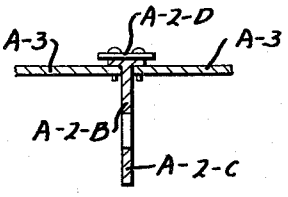


FIG. 16

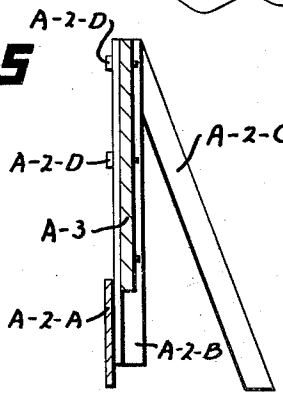


FIG. 17

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United States Patent Office 3,014,725
Patented Dec. 26, 1961

3,014,725

TARGET DEVICE

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Filed June 16, 1958, Ser. No. 742,309
3 Claims. (Cl. 273—105.6)

The present invention relates to gun targets and more particularly to a motorized target structure which is readily controllable and effective for use with either rifles and/or shotguns.

The types of targets in use heretofore generally require considerable time and effort on the part of the party practice shooting in walking to and from the target after firing to inspect the results and to replace the target. Oftentimes, as in the military service, for example, an individual was stationed in the area behind the target to accurately record the results of each round of target practice, which activity was not without difficulty in view of the generally large number of participants practicing.

By virtue of the applicant's novel invention, a motorized target structure is provided which may be operated to position the target at any desired firing distance or range, which permits the ready rotation of the target from a remote point, and which affords accurate identification of the target and hence the results of the practice round. The applicant's novel target structure is adaptable for use for either rifle and/or shotgun practice and may be effectively installed for either on indoor or outdoor target range.

A principal object of the present invention, therefore, is to provide a motorized target structure which is operable at a point remote from the target.

Another object of the present invention is to provide a motorized target structure which is readily positionable to any preselected target distance and which is simply and effectively rotated, as desired, to reveal new targets.

Another object of the present invention is to provide a motorized target structure having targets forming a part thereof which are adaptable for use with either rifle and/or shotgun practice, with the individual targets being readily positioned and removed.

A further and more general object of the invention is to provide a motorized target structure which promotes safety as well as accuracy on the target range.

Other objects and a better understanding of the invention will become more apparent from the following description, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a view in front elevation of the applicant's novel motorized target structure employing a target devised for use with a shotgun;

FIG. 2 is a view in side elevation, partly broken away, of the motorized target structure of FIG. 1;

FIG. 3 is a view in vertical section of the motorized target structure of FIG. 1, taken at line 3—3 of FIG. 2 and looking in the direction of the arrows;

FIG. 4 is a view in vertical section of the equalizer structure for the frame section of the motorized target structure of FIG. 1, taken at line 4—4 of FIG. 2 and looking in the direction of the arrows;

FIG. 5 is a detailed view of the target dial of the applicant's novel motorized target structure, corresponding to the view of FIG. 1, with the front shield disclosed therein removed;

FIG. 6 is a view of a modified target dial for use with a rifle and/or shotgun, also with the front shield thereof removed;

FIG. 7 is a schematic diagram of the electrical circuit for the applicant's novel motorized target structure;

FIG. 8 is a view in side elevation of the reversible switch structure and electrical power contact arrangement for the carriage structure of the motorized target;

FIG. 9 is a detailed side view of the reversing switch structure for the target control, showing the position of the reversing switch before contact, with the movement of the target structure being indicated by the arrow;

FIG. 10 is another view of the reversing switch structure of FIG. 8, with the position of the switch being indicated after further movement of the target structure in the direction of the arrow;

FIG. 11 is still another view of the reversing switch of FIGS. 9 and 10, with the arrow indicating the reversed direction of the target structure after the switching of FIG. 10;

FIG. 12 is a view of the electrical contact arrangement of FIG. 8, taken at line 12—12 of FIG. 8 and looking in the direction of the arrows;

FIG. 13 is a view in side elevation of bracing members for the modified target dial of FIG. 6;

FIG. 14 is a detailed view through the axis of rotation of the target dial of FIG. 6, taken at line 14—14 of FIG. 13 and looking in the direction of the arrows;

FIG. 15 is a fragmentary view in front elevation of the overall target structure for use with the modified target dial of FIG. 6;

FIG. 16 is a view in cross-section of an individual target positioning member for the modified target structure, taken at line 16—16 of FIG. 6 and looking in the direction of the arrows; and,

FIG. 17 is another view of the target positioning member of FIG. 16, taken at line 17—17 of FIG. 6 and looking in the direction of the arrows.

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now to FIGS. 1, 2, 3, 4 and 5, the applicant's novel motorized target structure having a target dial designed for shotgun practicing comprises a frame assembly 17 including an upstanding H-section 17*a*, a box-like base portion 17*b* and angled brace members 17*c*. In the typical embodiment described herein, the frame assembly 17 is made from angle and channel iron. One end of the box-like base portion 17*b* has double-flanged wheels 28 conventionally mounted thereon, while the other end thereof is supported by wheels 41 mounting through equalizer assemblies 40.

An equalizer bar 40*a* of each equalizer assembly 40 is supported at points 44 by an arm 17*d* extending downwardly from the box-like base portion 17*b* of the frame assembly 17 and by a U-member 39 which extends over and around an element forming the box-like base portion 17*b* of the frame assembly 17. A spring 45 extends between the element forming the box-like base portion 17*b* and the inner top wall of the U-member 39 of the equalizer assembly 40 (see FIG. 4). As will be apparent from the following, the equalizer assembly 40 is provided to compensate for any unevenness in rails 43 of the track on which the applicant's novel motorized target structure moves.

Disposed horizontally from the upstanding H-section 17*a* of the frame assembly 17 is a header bar assembly 15 having angled brace members 16 at either end thereof which serve to support a shield 1 extending in front of a target dial 2 of the target structure. The lower end of the shield 1 is conventionally secured to the front of the box-like base portion 17*b* of the frame assembly 17.

Extending upwardly from the header bar assembly is a collar 15*a* which supports one end of an inner spindle 7, the other end of which is rotatably supported through a flange 7*a* to the shield 1. An outer spindle 6 fits over the inner spindle 7 and connects the target dial 2 through flange 6*a*, a collar 13 having a set-screw 13*a* thereon being provided to maintain clearance between the target dial 2 and the shield 1. A sprocket wheel 11 on a hub 8 is freely rotatable on the outer spindle 6 adjacent the collar 15*a*, with a spacer collar 14 having a set-screw 14*a* thereon being provided therebetween. As should be apparent, the set-screws 13*a* and 14*a* on spacer collars 13 and 14, respectively, serve to adjust the end clearance of the outer spindle 6 on the inner spindle 7.

The sprocket wheel 11 is rotated through a chain 12 driven from a conventional sprocket-type take-off 20 on a typical ratio motor 21, the latter being mounted on the H-section 17*a* of the frame assembly 17. The sprocket-type take-off 20 has a striker 18 attached to the rotating shaft thereof which intermittently engages a normally closed kick-out switch 19, to be discussed herebelow.

A disengaging device 10 extends from an irregularly shaped flange 9 which surrounds and is secured to the outer spindle 6, as by welding at 9*a*, for example. When the disengaging device 10 engages the sprocket wheel 11 through member 10A thereof, movement of the sprocket wheel 11 effects rotation of the target dial 2. When the disengaging device 10 disengages the sprocket wheel 11 by being moved outwardly and rotated slightly, for example, the target dial 2 may be rotated independently of the operation of the ratio motor 21. The latter feature is particularly useful when placing new targets on the target dial 2.

The applicant's novel motorized target structure is movable along the rails 43 of the track through the operation of another ratio motor 22 mounted on the base portion 17*b* of the frame assembly 17 which drives a sprocket 25 through a sprocket 24 and a sprocket chain 23 arrangement. Rotation of the sprocket 25 effects rotation of a shaft 26 and hence the double-flanged wheels 28 secured at each end thereof. Thus, the entire target structure is movable at will of the operator.

The target dial 2, preferably made from metal, is generally circular in shape and has a plurality of target positioning devices positioned adjacent the periphery thereof, each comprising a clamp member 4 cooperating with a block member 3 through bolts 4–A at two sides thereof having a spring 4–B therearound between the back of the target dial 2 and a bolt 4–C. In use, the clamp member 4 is lifted upwardly or away from the block member 3 so that the target 5–B may be placed thereunder and retained in position by the spring-urged action thereof.

The target dial 2 also includes on the face thereof a series of numbers 5–A which are provided as a means of identification for the respective targets. The numbers 5–A may be secured to the face of the target dial 2 in any desired manner, such as through screws 5–C and spacers 5–D, for example. As should be apparent from FIG. 1, when the target structure is assembled, only one target and the respective number 5–A therefor is visible through an opening provided in the shield 1.

Referring now to FIGS. 6, 13, 14, 15, 16 and 17, a modified target dial A–3 is disclosed for use for rifle and/or shotgun practicing. The modified structure, which is an open back type target permitting passage of bullets therethrough, is used in conjunction with the motorized target structure discussed above, actually, however, being substituted for the target dial 2 and the outer spindle 6 therefor. FIG. 13 discloses the substituted structure extending from a spindle 6', the modified target dial having supporting braces A–2–C between the spindle 6' and radially disposed spokes A–2–B, the latter being secured to a disc A–2–A affixed to a central hub of the target dial.

Disposed between the spokes A–2–B are target panels A–3, preferably formed of wood, for example, and positioned by screw means extending through the spokes A–2–B. Lugs A–2–D provided on the spokes A–2–B extend beyond the plane of the side edges of the spokes A–2–B and serve to retain a target A–5–B in position for practice shooting. Each of the targets A–5–B have a characteristic shape in plan view (see FIG. 15) which assists in the positioning thereof, with the top edge of each target being secured to the target panels A–3 by a spring clip A–4 (see FIGS. 6 and 15). An identification number A–5–A is positioned between the target A–5–B and the disc A–2–A so that any particular target A–5–B may be readily located after the conclusion of the round of firing. It should be apparent from FIG. 15 that only one target A–5–B and the corresponding identification number A–5–A therefor is visible in an opening provided in the shield A–1 of the novel target structure disclosed herein.

FIGS. 7, 8, 9, 10, 11 and 12 are each pertinent to the electrical circuitry and the mechanical features associated therewith for the control of the movement of the motorized target structure as well as the rotation of the target dial. Referring first to FIGS. 1, 2, 7, 8 and 12, a bracket 34 is shown disposed on the box-like base portion 17*b* of the frame assembly 17, the bracket 34 having an insulating block 35–A secured thereto. Electrical contacts 36, 37 and 38, preferably of the sliding copper reed type, are secured to the insulating block 35–A and serve as part of the electrical circuit for controlling the rotation of the target dial. Electrical contacts 36, 37 and 38 are provided for contact with a neutral line 49, a hot line 50 and a hot line 51 for feed back to a relay 55, respectively, to be discussed herebelow.

Referring particularly to FIG. 8, a portion of the track structure at a remote target position is disclosed including track 43–A on standard 43–B having a base 43–D between which ties 43–C extend. Extending upwardly from the ties 43–C are brackets 47 which position a body member 48 on which the neutral line 49, the hot line 50 and the hot line 51 are located, the latter being in the form of elongated contact rails. It should be noted that the bracket 34 is vertically adjustable on the frame assembly 17 to permit good electrical contact between the electrical contacts 36, 37 and 38 and the lines 49, 50 and 51, respectively.

Referring now to FIGS. 2, 3, 8, 9, 10 and 11, the applicant's novel motorized target structure includes electromechanical components for controlling the movement of the target assembly along the rails 43–A of the track. Extending downwardly from the box-like base portion 17*b* of the frame assembly 17 is a bracket 29, adjustable vertically, on which is positioned a reversing switch 30 for controlling operation of the ratio motor 22. The reversing switch 30 coacts with a breaker-striker 46, the base portion of which is secured by screw means to one of the ties 43–C extending between the rails 43–A.

Referring particularly to FIGS. 9, 10 and 11, the breaker-striker 46, which acts dually to break a circuit and to reverse the reversing switch 30, comprises a main body 46–A having portions thereof oppositely pivotable at lower pivot 46–X and at upper pivot 46–Y, with a spring 46–G being provided with the upper pivot 46–Y. Extending upwardly and outwardly from the base portion of the breaker-striker 46 is an arm 46–J, having a spring 46–H at the upper end thereof connecting to the main body 46–A and urging the entire assembly into a vertical position at lower pivot 46–X. When in a vertical position, electrical contact is made between switch points 46–B and 46–C, switch point 46–B extending upwardly from an insulator 46–D into which it is attached through suitable screw means. Contact with the other electrical circuitry (FIG. 7) is made through connector contacts 46–E and 46–F, with insulator 46–D' being behind the latter.

In the typical embodiment described herein, two breaker-strikers 46 are used, each being positioned on the track ties 43–C at locations representing the desired distance of travel of the motorized target structure from

the operator, i.e. the position of the breaker-strikers **46** define the points between which the target structure moves. Noting particularly the sequence of operation of one of the breaker-strikers **46**, as represented in FIGS. 9, 10 and 11, the direction of the arrow indicates the movement of the target structure which, as discussed hereabove, has the reversing switch **30** secured to bracket **29** extending therefrom.

FIG. 9 shows the breaker-striker **46** in a normal position, i.e. with electrical contact being made between contacts **46**–B and **46**–C thereon. As the reversing switch **30** contacts the breaker-striker **46**, the body portion **46**–A thereof pivots at point **46**–X, breaking electrical contact between contacts **46**–B and **46**–C, and causing the ratio motor **22** controlling target movement to stop operating, to be discussed below with reference to FIG. 7. The target structure continues to move by reason of momentum for a short distance after the ratio motor **22** stops operating, increasing the tension of the spring **46**–H between the bracket **46**–J and the main body portion **46**–A, which ultimately causes the toggling or reversing of the reversing switch **30** (see FIG. 10). The breaker-striker **46** then returns to its normal vertical position, but the re-closing of the electrical contacts **46**–B and **46**–C thereby does not affect operation of the ratio motor **22**, for reasons to be discussed herebelow.

FIG. 11 discloses the manner in which the reversing switch **30** may pass over the breaker-striker **46** by permitting the upper part of the main body portion **46**–A to pivot at the upper pivot **46**–Y, without disturbing the closed condition between contacts **46**–B and **46**–C. When the ratio motor **22** again operates, the target structure moves down the rails to the position of the other breaker-striker **46**, which is in reversed physical position, where action similar to the preceding takes place and the target structure stops.

Referring now to FIG. 7, various of the components discussed above are schematically shown in respect to the over-all electrical circuit for controlling movement of the target structure and for controlling the rotation of the target dial. The circuit includes a relay **55** having a pushbutton **56** associated therewith for target dial rotation control; a relay **58** having a pushbutton **57** associated therewith for target structure movement control; a conductor **52** for feeding current back to the relay **55**; a conductor **53** which feeds current to the ratio motor **21** when the relay **55** is energized; a neutral conductor **54** for the ratio motor **21**; a neutral conductor **59** for the ratio motor **22**; a conductor **60** which feeds current when the relay **58** is energized; and, a conductor **61** which feeds current back to the relay **58** after the relay **58** is energized by moving the pushbutton **57** and releasing, the latter conductor continuing to feed current until the circuit is broken by the target structure striking the breaker-striker **46** through the reversing switch **30**. It should be understood that **62** represents a neutral line while **63** represents a current carrying line.

When the target movement control pushbutton **57** is closed and released, the relay **58** is energized and the ratio motor **22** for driving the target operates through conductors **59** and **60**, which current is supplied to the ratio motor **22** through sliding contacts **31** and **32** and the reversing switch **30**. It should be noted that the contacts **31** and **32** are positioned on a bracket **33** extending from a side of the base portion **17***b* of the frame assembly **17** (see FIG. 1). As the target structure moves from one end of the track to the other, current is also fed back to the relay **58** through the conductor **61** which includes the breaker-strikers **46** therein. Relay **58** remains energized.

When the target structure moves past one of the breaker-strikers **46**, the reversing switch **30** thereon contacts the breaker-striker **46**, as discussed hereabove, breaking the contacts **46**–B and **46**–C and thereby the feed-back circuit through conductor **61** to the relay **58**.

Relay **58** is then de-energized. Inasmuch as the reversing switch **30** is reversed, when the circuit is re-energized again through use of the pushbutton **57**, the target structure assembly will then move along the track in an opposite direction.

It should be understood that the electrical contacts **49**, **50** and **51** for the dial target rotation control circuit are positioned at a location between the rails **43**–A of the track so that when the target structure stops moving in one direction, as discussed above, the sliding contacts **36**, **37** and **38** on the structure will be in electrical contact therewith. When pushbutton **56** is then used, current can flow to the ratio motor **21** for rotating the target dial. The relay **55** is energized and current is fed back thereto through the conductor **52** and through the normally closed kick-out switch **19**, thereby maintaining the relay **55** in energized condition.

As the ratio motor **21** for the target dial rotation operates, the shaft of the sprocket-type take-off **20** rotates and the striker **18** which is secured thereto also rotates. The mechanism is assembled so that each time the shaft makes one rotation, the striker **18** strikes the kick-out switch **19** mounted on the frame assembly **17**, breaking the target dial control circuit through the ratio motor **21** and de-energizing the relay **55**, thereby causing the target dial to stop in the opening provided in the shield each time the pushbutton **56** is used. After all the targets are used, the target structure may be returned, as described above, to a position close to the operator, and new targets placed on the target dial.

Thus, it should be apparent from the preceding that the applicant has provided a novel motorized target structure which is readily adaptable for use for either shotgun and/or rifle practicing with different target dials, which is operable remote from the target structure to move the target to the desired range and to rotate the target dial from one target to another, and which promotes safety as well as accuracy on the firing range.

The motorized target structure disclosed herein is susceptible to various changes within the spirit of the invention. For example, the current feeding arrangement may be modified to include provision for a different type of electrical pick-up. Thus, the above description should be considered as illustrative and not as limiting the scope of the following claims.

I claim:

1. A target structure comprising a housing having a target dial rotatably mounted thereon, a shield positioned on said housing adjacent a face of said target dial, said target dial having a plurality of targets disposed on said face and said shield having an opening therein through which at least one of said targets is visible, a motor mounted on said housing operable to rotate said target dial, a control member rotating in response to the operation of said motor, and electric means responsive to the rotation of said control member, said electric means stopping the operation of said motor at pre-selected intervals to control the rotation of said target dial and selectively position a target in said opening in said shield.

2. A target structure comprising a movable carriage having a target dial rotatably mounted thereon, a motor mounted on said carriage operable to move said carriage, said motor having an electrical circuit associated therewith, and an electro-mechanical device adapted to be engaged by said carriage at a predetermined position to break said electrical circuit associated with said motor and to reverse the direction of subsequent movement of said carriage, said electro-mechanical device having pivoted upper and lower sections, said upper section being adapted to permit the passage of said carriage thereover at the same time said lower section maintains electrical contacts in operable position.

3. In a target structure having a rotatable target dial mounted on a movable carriage, in combination, a motor mounted on said carriage operable to rotate said target

dial, a control member rotating in response to the operation of said motor, and electric means engaged by the rotation of said control member to stop the operation of said motor at a preselected interval.

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