May 30, 1967 C. R. HOAG 3,322,108

AUTOMATIC TARGET THROWING APPARATUS WITH ROTARY MAGAZINE

Filed Feb. 5, 1964 4 Sheets-Sheet 1

Fig. 1.

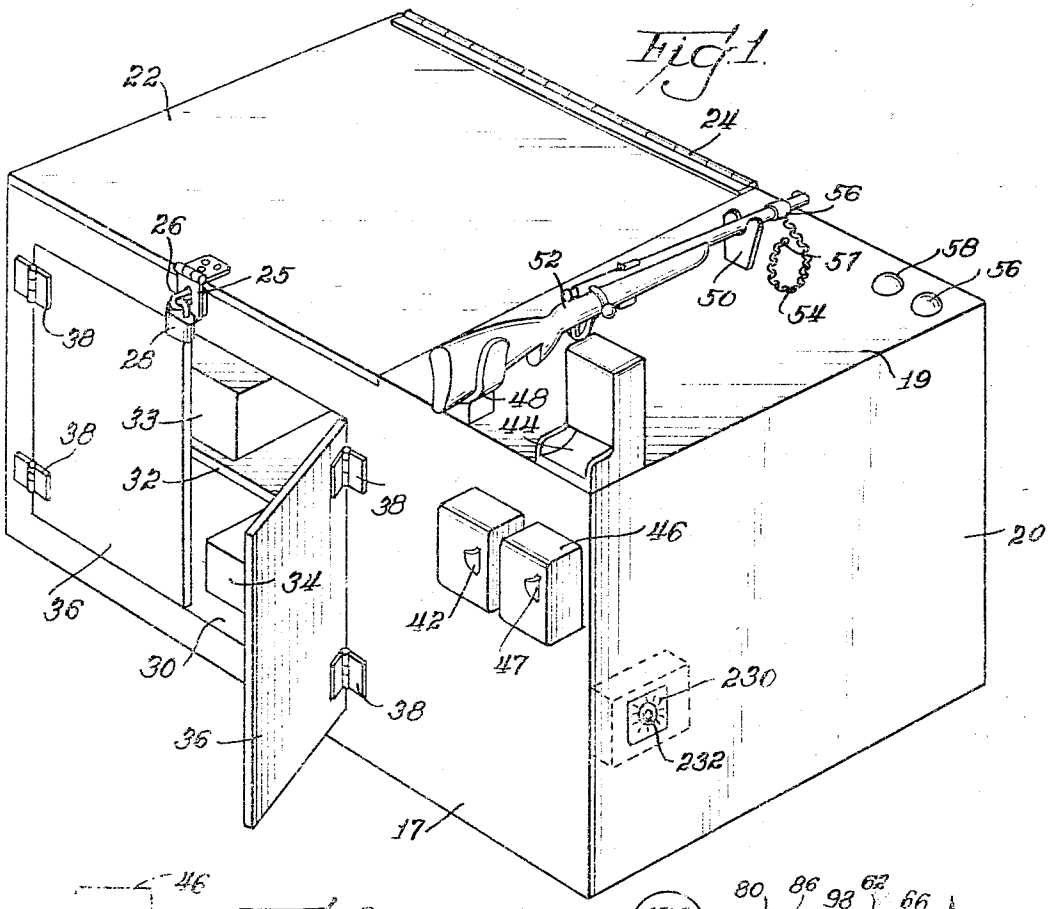
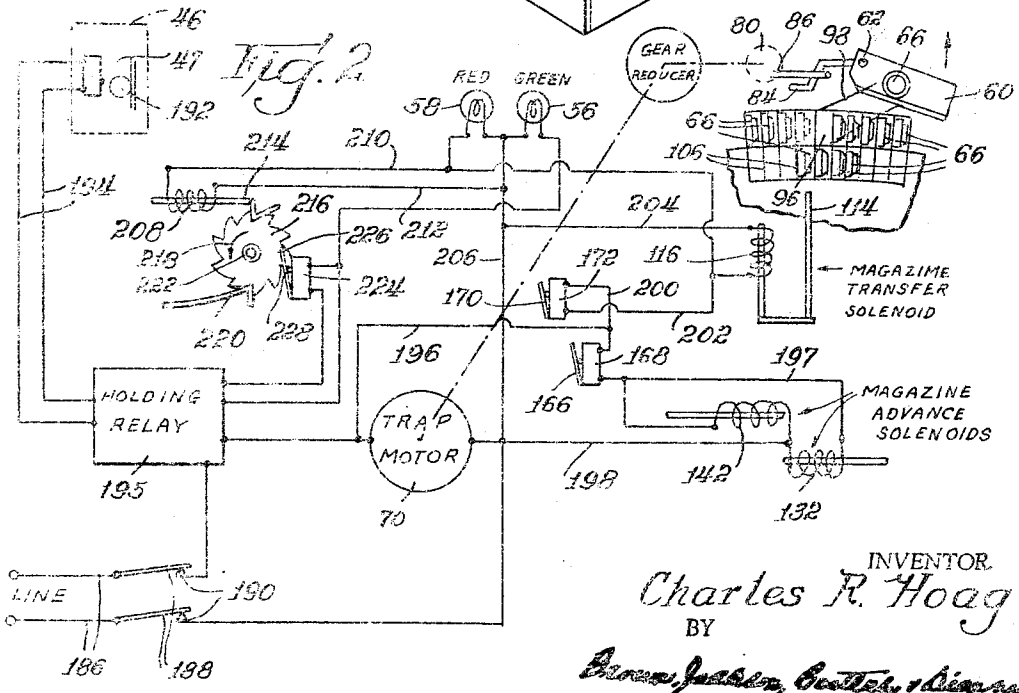


Fig. 2.



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AUTOMATIC TARGET THROWING APPARATUS WITH ROTARY MAGAZINE

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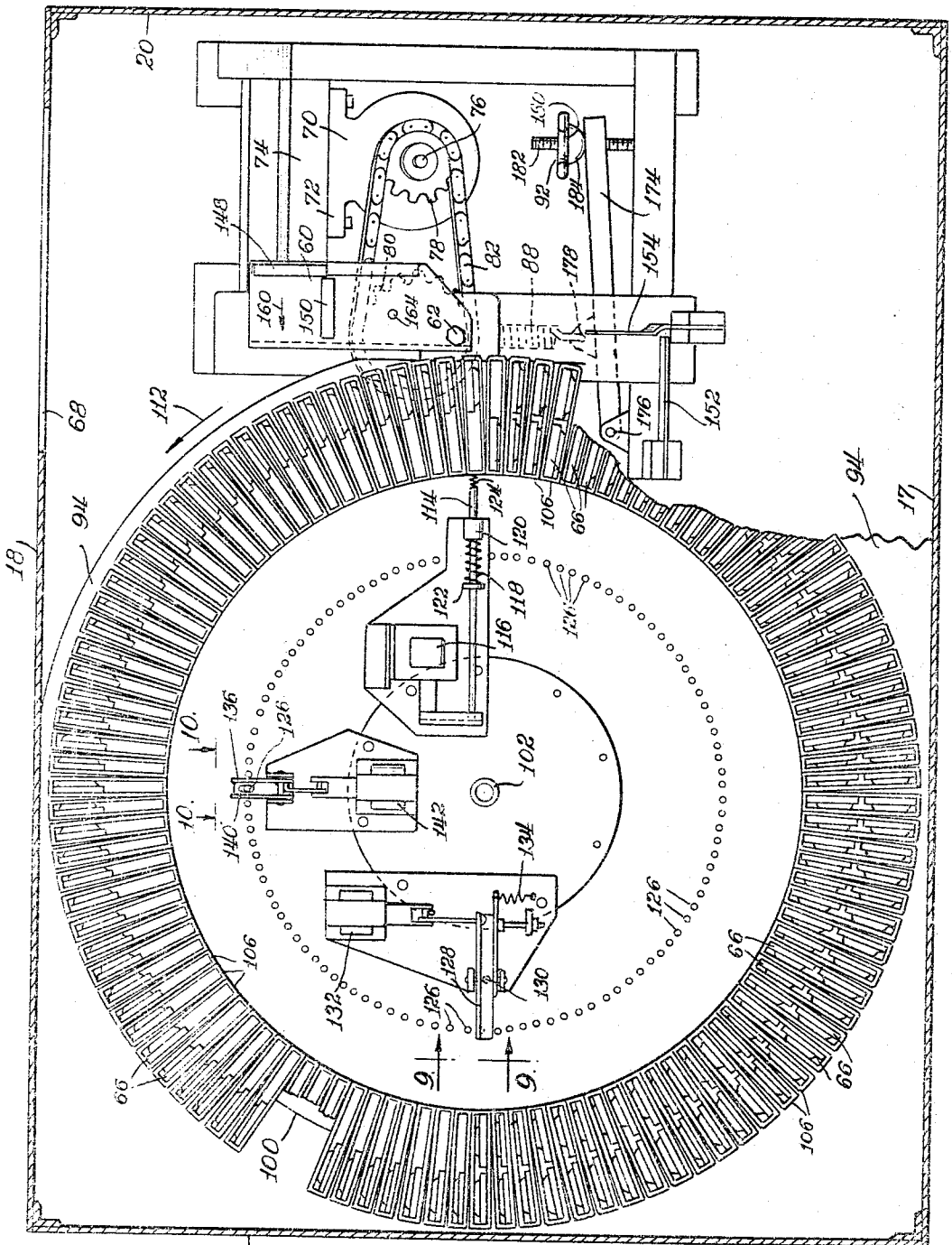


Fig. 3.

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AUTOMATIC TARGET THROWING APPARATUS WITH ROTARY MAGAZINE

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Fig. 4.

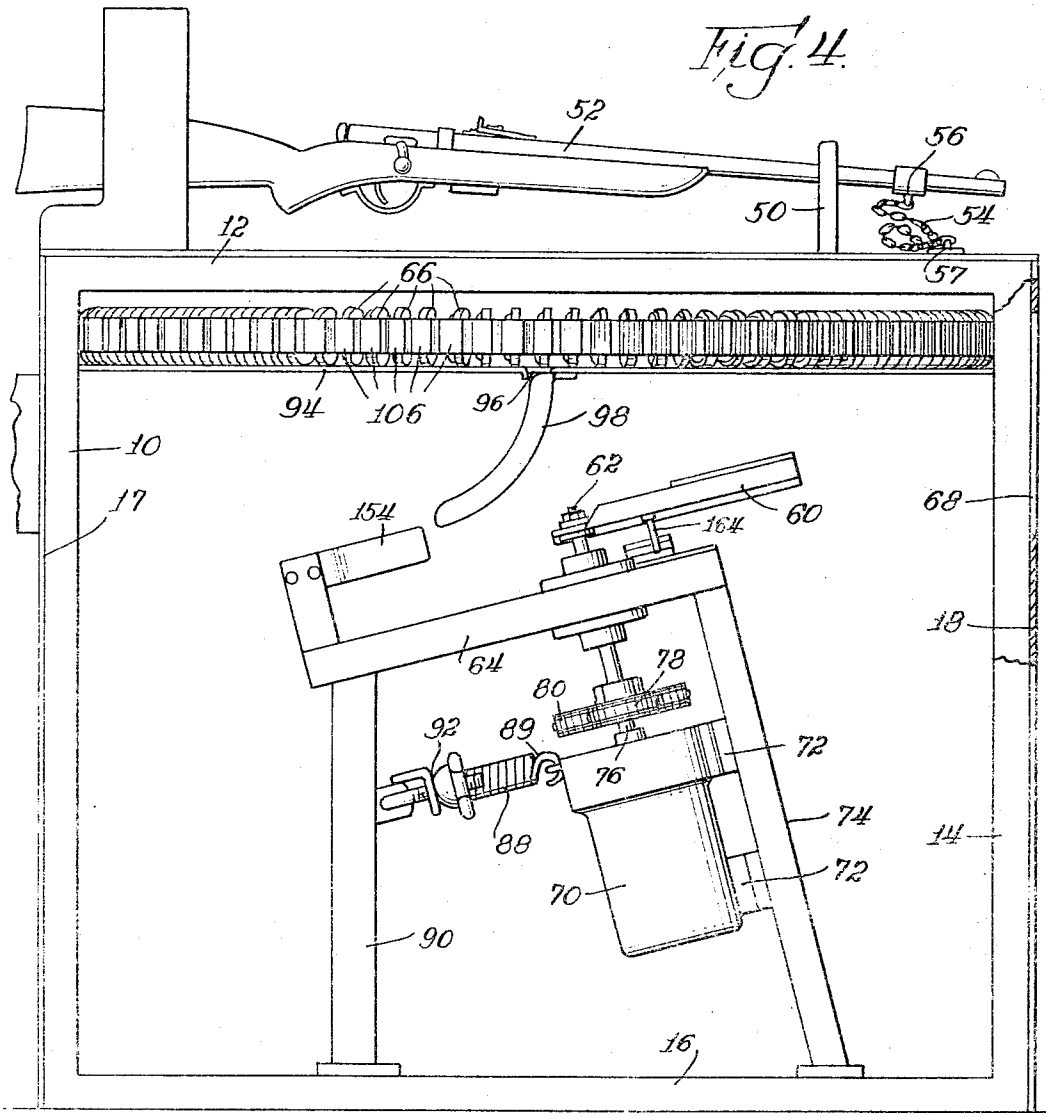


Fig. 5.

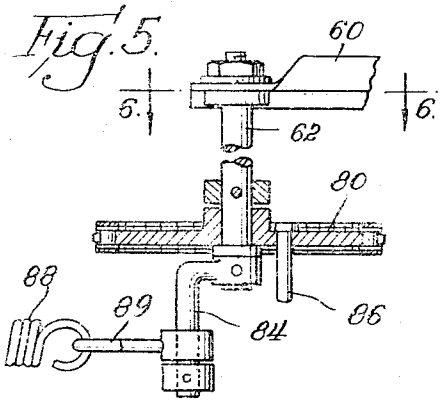
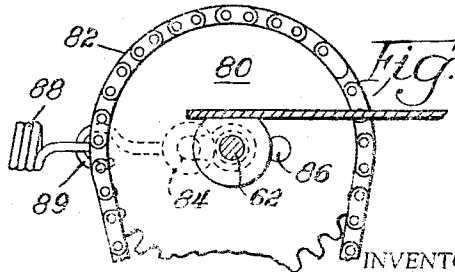


Fig. 6.



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AUTOMATIC TARGET THROWING APPARATUS WITH ROTARY MAGAZINE

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Fig. 7.

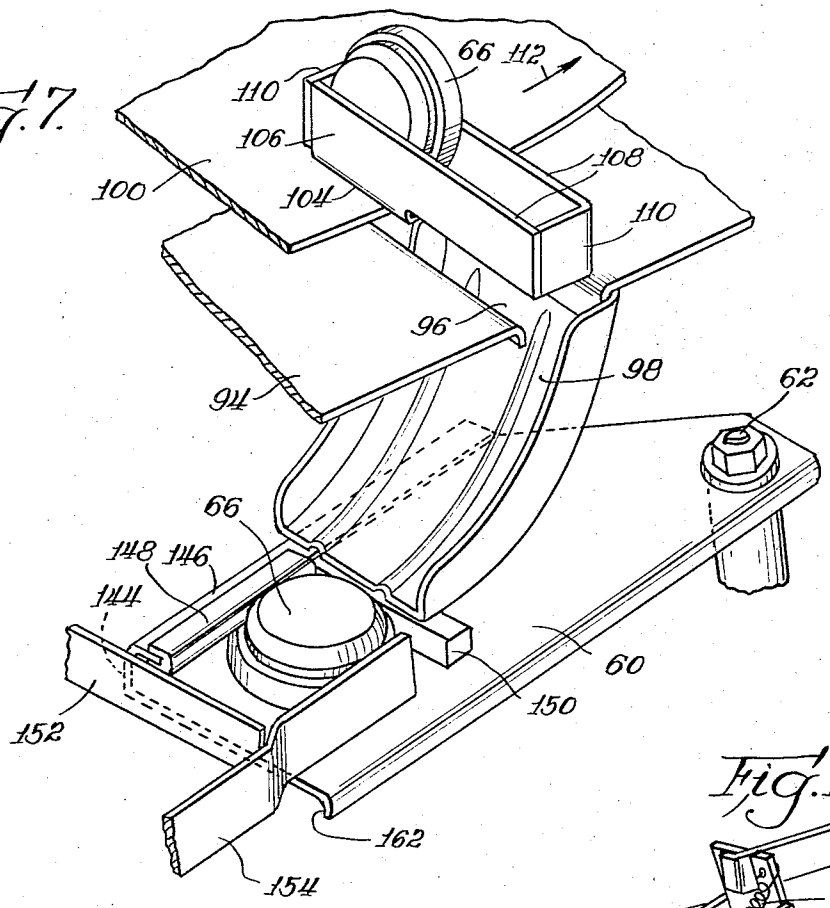


Fig. 11.

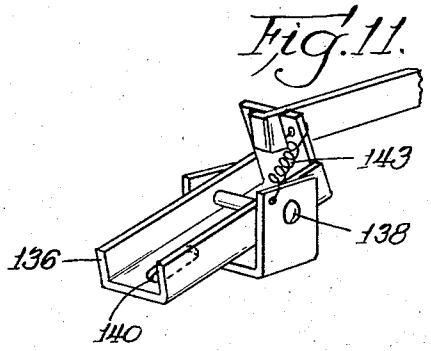


Fig. 8.

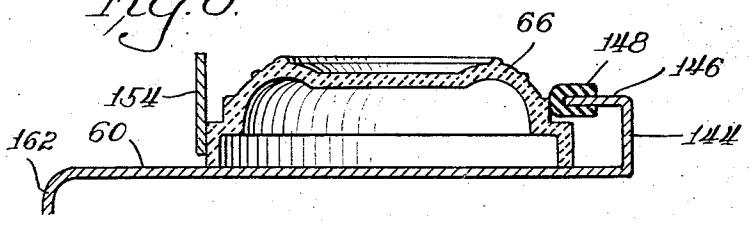


Fig. 10.

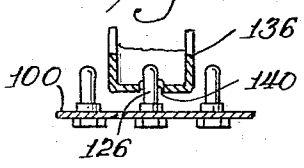
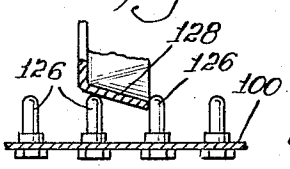


Fig. 9.



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United States Patent Office 3,322,108 Patented May 30, 1967

3,322,108

AUTOMATIC TARGET THROWING APPARATUS WITH ROTARY MAGAZINE

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Filed Feb. 5, 1964, Ser. No. 342,763
3 Claims. (Cl. 124—8)

This invention relates to target traps, and is particularly directed to a completely self contained unit having gun, shells and targets, and which is user operated and eliminates the necessity for an attendant.

The unit of the present invention is adapted for use indoors or outside and may use .22-caliber scatter shot shells and a small clay target. The unit has means for dispensing a clip preloaded with shells upon insertion of a first coin. The clip may contain 7, 8, 9, 10, or any other desired number of shells. The user loads the clip into the gun himself and insertion of a second coin starts the machine in operation.

One of the main objects of the present invention is the provision of an improved target throwing apparatus which will overcome the problems and difficulties with prior forms of target throwing apparatus.

Another object is to provide target throwing apparatus which will operate automatically and without requiring the user of the apparatus to apply the targets to the target throwing member, or to actuate the apparatus to throw the targets therefrom.

Another object is to provide a dial feed for insuring positive delivery of the target with minimum breakage or failure.

Another object is to provide target throwing apparatus wherein the actuating means for actuating the target throwing member to throw a target therefrom comprises a spring and a motor for actuating the target throwing member to tension the spring and to position where the spring is released to throw the target from the target throwing member.

Another object is to provide target throwing apparatus wherein there is a light which is lighted when the apparatus is set in operation by insertion of a coin in the coin receiving means and another light which is lighted when the target is about to be thrown from the target throwing member.

Another object is to provide target throwing apparatus wherein the target throwing member, the delivery means for delivering the target to the target throwing member and the actuating means for actuating the target throwing member are enclosed within an enclosure with the coin receiving means on the exterior of the enclosure, and with the enclosure having an opening through which the targets are thrown, and means for supporting a firearm on the exterior of the enclosure and flexibly connected with the enclosure.

Another object is to provide target throwing apparatus having delivery means for delivering the targets to the target throwing member which includes a target supporting member, a movable member having means for advancing the targets over the target supporting member, means for advancing the movable member step by step, solenoid means controlling the advancing means, switch means in circuit with the solenoid means, and means on the target throwing member controlling the switch means by movement of the target throwing member.

Another object is to provide target throwing apparatus wherein the delivery means for delivering the targets to the target throwing member includes a target supporting member having an opening through which targets are successively discharged to the target throwing member, a movable member for supporting the targets and having means for advancing the targets over the target supporting

member to the opening, means for moving the targets from the movable member to the target supporting member, solenoid means controlling the movement of the targets from the movable member to the target supporting member, switch means in circuit with the solenoid means, and means on the target throwing member controlling the switch means by movement of the target throwing member.

Another object is to provide target throwing apparatus wherein the delivery means for delivering targets to the target throwing member includes a target supporting member having an opening through which targets are successively discharged to the target throwing member, a movable member for supporting targets and having means for advancing targets over the target supporting member to the opening, means for advancing the movable member step by step, means for moving the targets from the movable member to said target supporting member, first solenoid means controlling the advancing means, first switch means in circuit with the first solenoid means, second solenoid means controlling the movement of the targets from the rotatable member to the target supporting member, second switch means in circuit with the second solenoid means, and means on the target throwing member controlling the first and second switch means by movement of the target throwing member.

Another object is to provide target throwing apparatus wherein the means on the target throwing member controlling the first and second switch means is positioned to operate the first solenoid means first and to operate the second solenoid means after the movable member is advanced by the first solenoid means.

Another object is to provide target throwing apparatus wherein there is a notched wheel having teeth corresponding in number with the number of targets permitted for the coin inserted into receiving means; and also solenoid means having means for advancing the notched wheel with switch means for the solenoid means, and means on the target throwing member controlling the switch means by movement of the target throwing member.

Another object is to provide target throwing apparatus having a counter box for advancing the notched wheel to provide one or more additional targets where one or more targets are broken prior to being thrown from the target throwing means.

Another object is to provide target throwing apparatus wherein there is spring means operated by actuation of the target throwing member for positioning the target in the desired position on the target throwing member.

Another object is to provide target throwing apparatus wherein there is a target supporting member of annular form having an opening through which targets are successively discharged to the target throwing member, and a rotatable member having means for advancing the targets over the supporting member to said opening.

Further features, advantages and adaptations of the invention will be apparent from the following detailed description taken in connection with the accompanying drawings, it being understood that the invention is limited only within the scope of the appended claims and not to the particular embodiment selected for illustration.

In the drawings:

FIGURE 1 is a prospective view of the enclosure of one form of target throwing apparatus embodying the present invention;

FIGURE 2 is a diagrammatic view showing the various elements of the target throwing apparatus of the present invention and one form of circuit therefor;

FIGURE 3 is a top plan view of the target throwing member, the delivery means for delivering targets to the target throwing member, the drive motor and spring ar-

rangement for the target throwing member and other aspects of the present invention;

FIGURE 4 is an end view of the framework of the enclosure showing the firearm supported thereon, the target throwing member, the means for delivering the target to the target throwing member and the drive motor and adjustable spring means for the target throwing member;

FIGURE 5 is a fragmentary view partially in section showing the shaft on which the target throwing member is fixed to turn with the shaft; and also the sprocket wheel for turning the shaft and the target throwing member, the driven crank on the shaft with the spring connected to the crank and the drive pin for the crank;

FIGURE 6 is a view taken along the line **6—6** of FIGURE 5;

FIGURE 7 is a fragmentary prospective view showing the target throwing member with a target thereon, the target supporting member with the opening and the chute for delivering the targets to the target throwing member and the movable member for supporting targets and having means for advancing the targets over the target supporting member to the opening;

FIGURE 8 is a transverse sectional view through the target supporting member and target and through one of the spring arms for positioning the target in the desired position on the target throwing member;

FIGURE 9 is an end view along the line **9—9** of FIGURE 3 showing the solenoid actuated arm which cooperates with the pins on the rotatable target supporting and target advancing member for advancing said member step by step;

FIGURE 10 is a sectional view taken along the lines **10—10** of FIGURE 3 showing the solenoid actuated arm for cooperation with successive pins on the rotatable target supporting and target advancing member for accurately determining the amount of advance of the rotatable supporting and advancing member for each step by step advance of said member; and

FIGURE 11 is a prospective view of the solenoid actuated arm shown in FIGURE 10.

The form of enclosure as shown more or less schematically in FIGURES 1, 3 and 4 comprises a framework indicated at **10**, **12**, **14** and **16** in FIGURE 4 having a front wall **17**, a rear wall **18**, a top wall **19** and end walls **20**.

The top of the enclosure has a cover **22** hinged at **24** to the enclosure. The cover **22** carries a hinged member **25** which passes over a staple **26** and a padlock **28**, for example, locks the cover **22** in closed position.

The front wall **17** has an opening **30** into the interior of the enclosure which may be provided with a shelf **32**. A container **33** for targets and a container **34** for clips preloaded with shells or bullets are shown within the interior of the enclosure. The opening **30** has doors **36** hinged at **38** and preferably provided with means, not shown, for locking the doors **36** closed.

On the top wall **19**, for example, and exposed externally of the enclosure is a dispenser **44** for clips preloaded with shells having associated coin receiving means **42** on the front wall **17**. Merely by way of an example a quarter inserted in the coin receiving means **42** will discharge a clip containing 7, 8, 9 or 10 shells at **44** for use by the user of the apparatus. The number of bullets or shells thus discharged and the amount of the inserted coin may vary widely within the scope of the present invention.

Also on the exterior of the enclosure, for example, on the front wall **17** is a coin receiving means, or coin box **46** in which a coin may be inserted at **47** to set the target throwing apparatus in operation. Merely by way of illustration, a quarter inserted at **47** will set the apparatus in operation to throw the targets in the air. The number of targets thrown into the air and the amount of the coin inserted at **47** may vary widely within the scope of the present invention.

The top of the enclosure, for example, the top wall **19** has supports **48** and **50** fixed thereto for supporting the desired gun or firearm **52**. A chain or other flexible member **54** is connected to the gun or firearm **52** at **56**. The opposite end of the member **54** is attached to the enclosure, for example, to the top wall **19** at **57**. The chain or flexible member **54** permits the firearm to be lifted from the supports **48** and **50** and to be used by the user of the apparatus in shooting at the targets as they are thrown into the air. At the same time the chain or member **54** connects the firearm to the enclosure so that it may not be carried away.

The top of the enclosure, for example, the top wall **19** has a green light at **56** and a red light at **58**. As will hereinafter appear the green light lights when the apparatus is set in operation by insertion of a coin in the coin box **46**. As will also hereinafter appear the red light **58** is lighted when a target is about to be thrown from the apparatus.

Within the enclosure, as shown in FIGURES 3, 4 5, 6 and 7 is a target throwing member **60** fixed to turn with a shaft **62** which shaft **62** is journaled to turn, for example, in an inclined member **64**. The axis of the shaft **62** and the axis of turning movement of the target throwing member **60** are arranged at an angle to the vertical so that the target shown at **66** will be thrown outwardly and upwardly at the desired angle through an opening **68** in the rear wall **18** of the enclosure. One suitable angle will project the target to about ten feet above the ground at a distance of about fifty feet from the enclosure, but this may vary.

An electric motor **70** is mounted at **72** on an inclined member **74** and has a driven shaft **76** inclined from the vertical to correspond with the inclination of the shaft **62** and the throwing member **60**. The motor shaft **76** has a sprocket wheel **78** and the throwing member shaft **62** has a sprocket wheel **80** spaced from the sprocket wheel **78** as shown in FIGURE 3. A chain **82** trained about the sprocket wheels **78** and **80** turns the sprocket wheel **80** by the motor **70**.

Fixed to turn with the shaft **62** is a driven crank **84**. The sprocket **80** turns on the shaft **62** and carries a drive pin **86** which upon rotation of the sprocket wheel **80** by the motor **70** engages the driven crank **84** and rotates the same about the axis of the shaft **62**. A coiled spring **88** is connected to a lug **89** on the driven crank **84** and at its opposite end the spring **88** is connected to a pivoted arm **174** as shown in FIGURE 3. Means is provided at **92** for adjusting the tension of the spring **88** to vary or control the throwing force imparted to the target throwing member **60** by the spring **88**.

Within the enclosure and beneath or partially beneath the cover **22** is means for delivering targets to the target throwing member **60**. As shown in FIGURES 3 and 7 the target delivery means comprises an annular target supporting member **94** having an opening **96** through which the targets **66** are successively discharged into a chute **98** which delivers the targets **66** onto the target throwing member **60** in its movement beneath the chute **98**.

Above the supporting member **94** is a member **100** of disc form which is rotatable about its axis. The member **102** at the axis of the member **100** may be tubular to permit passing conductors therethrough. As shown in FIGURE 7 the outer periphery of the rotatable member **100** is spaced inwardly from the outer periphery of the member **94** an amount about equal to the diameter of the target or clay bird **66**.

Fixed at their inner ends at **104** to the rotatable member **100** for rotation with said member **100** are a multiplicity of vertically opening frames **106** having parallel sides **108** and ends **110**. The frames **106** are of a radial length to receive two targets **66** with the outer target supported on the member **94** and the inner target **66** supported on the rotatable member **100**. Step by step advancement of the member **100** in the direction of the arrows **112** in FIGURES 3 and 7 advances the target **66** over the supporting member **94** successively to the opening **96**. As target **66** reaches the opening **96** it is

discharged through the opening **96** to position on the target throwing member **60**.

With the next step by step advancement of the rotary member **100** following discharge of the outer target **66** through the opening **96** the frame **106** from which the outer target has been discharged through the opening **96** moves the inner target **66** within said frame **106** into register with pin **114** which is actuated outwardly by a solenoid **116** to move the inner target outwardly to the supporting member **94** for step-by-step advancement to the opening **96** for discharge to the target throwing member **60**. The pin **114** is retracted to the position shown in FIGURE 3 by a spring **118** confined endwise between a fixed abutment **120** and an abutment **122** on the pin **114**. The outer end of the pin **114** may have a spring or resilient portion **124** so as not to injure the target or clay bird **66**.

For the purpose of advancing the member **100** step by step the member **100** has a plurality of circularly spaced pins **126** radially inwardly of the frames **106** and with one pin **126** aligned radially with each frame **106**. As shown in FIGURES 3 and 9 an arm **128** is pivoted on a stationary pin **130** and has a solenoid **132** for actuating the arm **128** counterclockwise about its pivot **130** as shown in FIGURE 3. As the arm **128** is thus actuated by the solenoid **132** it engages pin **126** and advances the member **100** in amount to move the next outer target **66** to position over the opening **96** for discharge to the target throwing member **60**. The arm **128** is returned to position for engagement with the next pin **126** when the solenoid **132** is again energized by a spring **134**.

For the purpose of accurately determining the amount of step by step rotary advancement of the member **100** a channel shaped arm **136** is pivoted at **138** for vertical swinging movement as shown in FIGURES 10 and 11. The arm **136** has an opening **140** which fits over one of the pins **126** accurately to determine the amount of step by step advancement of the member **100**. The arm **136** is lifted clear of the pin **126** by a solenoid **142** and is actuated to engage the opening **140** over successive pins **126** by a spring **143**.

As shown in FIGURE 7 the target throwing member **60** is of generally plate-like form fixed at one end to turn with the shaft **62**. The arm or member **60** has along one side an upstanding flange **144** for throwing or propelling the target or clay bird **66** from the member **60** as will hereinafter appear. The upstanding flange **144** has an inturned flange **146** along its upper edge. The flange **146** is preferably covered with rubber or rubber-like, or elastomer material at **148** for engagement with the disc-like target **66** without injuring the target. In throwing the target **66** from the member **60** the material at **148** also serves to impart a spinning or rotation motion to the target **66** about the axis of its disc-like form.

Fixed on the upper surface of the throwing member **60** is a laterally extending member **150**. As shown in FIGURES 3 and 7 a pair of relatively weak leaf springs **152** and **154** are anchored to the member **156** at **158**. In the turning movement of the arm **60** about the axis of the shaft **62** in the direction of the arrows **160** in FIGURES 3 and 7 the springs **152** and **154** successively engage the periphery of the target **66** and properly position the target **66** in the corner between the material **148** and the laterally extending member **150**. The opposite edge of the throwing member **60** is turned downwardly at **162**.

The throwing member **60** carries a pin **164** for movement with the throwing member. In the rotation of the throwing member **60** in the direction of the arrow as shown in FIGURE 2 the pin **164** successively engages the member **166** of a microswitch **168** for the solenoids **132** and **142** as shown in FIGURE 2 and the member **170** of a micro-switch **172** for the solenoid **116** as also shown in FIGURE 2.

As shown in FIGURE 3 the adjustment means **92** for the spring **88** comprises a member **174** pivoted at **176**. The spring **88** is connected to the member **174** at **178**. The member **174** is actuated about its pivot **176** to adjust the tension of the spring **88** by member **180** screwed upon a threaded pin **182** and cooperating at **184** with the free end of the pivoted member **174**. The speed at which the target **66** is thrown from the throwing member **60** may thus be adjusted by adjusting the tension of the spring **88**.

As shown diagrammatically in FIGURE 2 the target throwing apparatus of the present invention has an electric circuit supplied with electric current from a line **186** having contact arms **188** movable into engagement with the contacts **190** in the circuit.

Insertion of a coin **192** in the coin receiving means **47** closes through conductors **194** a holding relay **195** and sets the motor **70** and the target throwing apparatus in operation. The motor **70** starts turning the target throwing member **60** in a counterclockwise direction as indicated by the arrow **160**, from the position shown in FIGURE 3. In the turning movement of the target throwing member **60** the pin **164** carried by the target throwing member **60** engages the member **166** of the micro-switch **168** and closes the micro-switch **168** and the circuit **196**, **197** and **198** for the solenoids **132** and **142**. The arms **128** and **136** are thus operated, as previously described, to advance the member **100** one step. This moves an outer target **66** over the opening **96** through which it is delivered to the target throwing member **60** in the movement of the member **60** beneath the chute **98**.

As the member **100** thus advances one step the pin **164** engages the member **170** of the micro-switch **172** and closes the micro-switch **172** and the circuit **196**, **200**, **202**, **204** and **206** for the solenoid **116**. The pin **114** is thus operated to move the inner target in the frame **106** from which the outer target **66** has been discharged to the throwing arm **60** outwardly in the frame **106** to position upon the supporting member **94** for step by step advancement to the opening **96**.

The closing of the micro-switch **172** also closes a circuit through a solenoid **208** through conductors **210**, **212** and **206**. Energization of the solenoid **208** actuates the sprocket wheel advancing member **214** to the left as shown in FIGURE 2. This advances the sprocket wheel **216** in the direction of the arrow **218** in the amount of one tooth. A stop member **220** cooperates with the teeth of the sprocket wheel **216** for stopping the sprocket wheel at each one tooth advancement of the same.

The sprocket wheel **216** turns about or with the shaft **222** and the sprocket wheel **216** is shown as having ten teeth for the purpose of delivering ten successive targets to the target throwing member **60** for the coin **192** inserted in the coin receiving means **47**. The number of targets supplied for the coin which is inserted may be varied widely within the scope of the present invention by increasing or decreasing the number of teeth on the sprocket wheel **216**.

Adjacent to the sprocket wheel **216** is a normally closed switch **224** which takes over after the apparatus is set in operation by the holding relay **195** which may trip open after the switch **224** takes over and the pin **226** moves out of engagement with the arm **228** of the switch **224**. The pin **226** is carried by and moves with the sprocket wheel **216**. Upon a complete revolution of the sprocket wheel **216** and after all targets for the inserted coin have been supplied the pin **226** engages the arm **228** and opens the switch **224** to shut off the apparatus.

Manually operable means **230** is provided on the end wall **20** of the enclosure for turning the sprocket wheel **216** in a direction for providing one or more additional targets in case one or more targets are broken before being thrown from the apparatus. The means **230** may

be turned manually, for example, by a member having a polygonal end which can be inserted in a corresponding opening **232** in the means **230** and turned to turn the sprocket wheel.

As the target throwing member **60** is rotated by the motor **70** through engagement of the pin **86** with the crank **84** the spring **88** is tensioned. As the target throwing member moves in the direction of the arrow **160** through 180° from the position shown in FIGURE 3 the tensioned spring **88** takes over and propels the target **66** from the target throwing member **60** and out through the opening **68** at the desired upward angle so that the person using the apparatus may shoot at the target with the firearm **52** and the bullets or shells supplied by the bullet dispenser **40** upon insertion of the desired coin.

The embodiment of the invention disclosed in the drawings and the specification is for illustrative purposes only and it is to be expressly understood that said drawings and the specification are not to be construed as a definition of the limits or scope of the invention, reference being had to the appended claims for that purpose.

I claim:

1. In target throwing apparatus, a target throwing member fixed to turn with a shaft, an annular target supporting member having an opening through which targets are successively discharged to said target throwing member, a rotatable member having means for advancing said targets over said target supporting member to said opening, means for advancing said rotatable member step by step, spring means for actuating said target throwing member to propel the target received from the target supporting member into the air, a motor for turning said target throwing member to tension said spring means and to position where said spring means is released to turn said target throwing member and to propel the target therefrom, said rotatable member supporting additional targets, means for moving the targets from said rotatable member to said annular target supporting member following the movements of the targets on said annular target supporting member to said opening for discharge to said target throwing member, first solenoid means controlling said advancing means, first switch means in circuit with said first solenoid means, second solenoid means controlling the movement of targets from said rotatable member to said target supporting member, second switch means in circuit with said second solenoid means, and means on said target throwing member controlling said first and second switch means by movement of said target throwing member.

2. In target throwing apparatus, a target throwing member fixed to turn with a shaft, an annular target supporting member having an opening through which targets are successively discharged to said target throwing member, a rotatable member having means for advancing said targets over said target supporting member to said opening, means for advancing said rotatable member step by step, spring means for actuating said target throwing member to propel the target received from the target supporting member into the air, a motor for turning said target throwing member to tension said spring means and to position where said spring means is released to turn said target throwing member and to propel the target therefrom, said rotatable member supporting additional targets, means for moving the targets from said rotatable member to said annular target supporting member following the movements of the targets on said annular target supporting member to said opening for discharge to said target throwing member, first solenoid means controlling said advancing means, first switch means in circuit with said first solenoid means, second solenoid means controlling the movement of targets from said rotatable member to said target supporting member, second switch means in circuit with said second solenoid means, and means on said target throwing member controlling said first and second switch means and positioned to operate said first solenoid first and to operate said second solenoid after said rotatable member is advanced by said first solenoid means.

3. In target throwing apparatus, a target throwing member fixed to turn with a shaft, an annular target supporting member having an opening through which targets are successively discharged to said target throwing member, a rotatable member having means for advancing said targets over said target supporting member to said opening, means for advancing said rotatable member step by step, spring means for actuating said target throwing member to propel the target received from the target supporting member into the air, a motor for turning said target throwing member to tension said spring means and to position where said spring means is released to turn said target throwing member and to propel the target therefrom, said rotatable member supporting additional targets, means for moving the targets from said rotatable member to said annular target supporting member following the movement of the targets on said annular target supporting member to said opening for discharge to said target throwing member, first solenoid means controlling said advancing means, first switch means in circuit with said first solenoid means, second solenoid means controlling the movement of targets from said rotatable member to said target supporting member, second switch means in circuit with said second solenoid means, means on said target throwing member controlling said first and second switch means and positioned to operate said first solenoid first and to operate said second solenoid after said rotatable member is advanced by said first solenoid means, and a light lighted by said second switch means as the target is about to be thrown into the air.

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