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TARGET TRAP WITH AUTOMATICALLY VARIED THROWING ANGLE

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9 Claims. (Cl. 124—9)

1 This invention relates to throwing devices for use in target practice where clay targets, which are commonly referred to as blue rocks or clay pigeons, are discharged into the air, and in particular a clay target throwing machine in which the path of the targets being discharged therefrom is continuously changing.

The purpose of this invention is to improve clay target throwing machines by changing the path of the targets so that the targets simulate birds in flight.

Various types of machines have been provided for discharging clay targets or pigeons, however, conventional machines of this type throw the targets in a continuous path and with each target following the same path it is comparatively easy to cover an area through which a target will travel with the sights of a gun. With this thought in mind this invention contemplates a target throwing machine in which the discharging arm swings in both vertical and horizontal planes and swings continuously in the horizontal plane as targets are discharged therefrom.

The object of this invention is, therefore, to provide a target throwing machine in which each target thrown by the machine follows a different path.

Another object of the invention is to provide a target discharging device in which the angle of the throwing element is readily adjustable in a vertical plane.

Another important object of the invention is to provide a target throwing machine in which the discharging arm travels continuously in a horizontal plane and in which the releasing element is actuated by a manually operated button.

A further object of the invention is to provide a target throwing machine in which, after the release of the discharging element, the element is reset or cocked by continuous movement of the machine.

A still further object of the invention is to provide a target throwing machine in which the path of the target changes continuously, in which the machine is of a simple and economical construction.

With these and other objects and advantages in view the invention embodies a target swinging arm pivotally mounted on a frame mounted in a vertical plane or on a turntable that is pivotally mounted to swing in a horizontal plane on a base, and wherein the turntable is reciprocated in the horizontal plane by a motor which also resets or cocks the target swinging or throwing arm.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings, wherein:

Figure 1 is a side elevational view illustrating the design and arrangement of the parts of the target throwing machine.

Figure 2 is a plan view of the machine.

Figure 3 is a sectional plan through the lower part of the machine, taken on line 3—3 of Figure 1.

Figure 4 is an elevational view with the parts shown on an enlarged scale with parts broken away and parts shown in section, and illustrating the operating spindle carried by the frame of the machine.

Figure 5 is a cross section taken on line 5—5 of Figure 1 illustrating the solenoid actuated latch for releasing the target throwing arm.

Figure 6 is a side elevational view of the latch shown in Figure 5 with parts of the frame broken away.

Figure 7 is a plan view of the target throwing arm with the parts shown on an enlarged scale and with parts broken away.

Figure 8 is a section taken on line 8—8 of Figure 7.

Referring now to the drawings wherein like reference characters denote corresponding parts of the improved target throwing machine of this invention includes a base 10, a turntable 12 pivotally mounted on the base, a frame 14 pivotally mounted to swing in a vertical plane on a standard 15 of the turntable, a gear housing 18 carried by the frame 14, a throwing arm 20 pivotally mounted by a shaft 22 in the frame and housing, a spindle 24 journaled in the lower part of the housing, a latch 25 for retaining the arm 20 in a cocked position, and a motor 28 for continuously reciprocating the turntable, frame and arm, and also for actuating the arm to a reset or cocked position after a target is thrown by the arm.

The base 10, as illustrated in Figures 2 and 3, is provided with a circular body portion and an extension 39 in which is a slot 32 in which a pin 34 is adjustably mounted. The base is also provided with a stub shaft 36 which extends into a socket 38 in the center of the turntable 12 where by the turntable is pivotally mounted on the base.

The standard 15 extends upwardly above the socket 38 and the frame 14 is pivotally mounted with a pin 40 on the upper end of the standard, the pin extending through a vertically disposed web 42 of the frame. The web is also provided with an arcuate slot 44 through which a clamp screw 46, which is threaded into the standard 18,
extends whereby the angle of the frame is adjustable in a vertical plane.

The throwing arm 20, which is mounted on the upper end of the shaft 22, is actuated by a spring 48, one end of which is connected to a post 50 on the frame 14, and the other end being connected to an eccentrically positioned pin 52 on the arm. The targets, as indicated by the numeral 54, are temporarily held on the arm 20 with a strip 86 of rubber or the like, which is secured between strips 58 and 50, and the strips 58 and 60 are held by screws 62 that are threaded in spacing lugs 64 on the upper surface of the arm 20, as shown in Figure 8.

A disc 66, mounted on the under surface of the arm 20 and positioned around the shaft 22, is provided with a substantially semi-circular bar 68 having arcuate ends 70, and a roller 72 on one end of a lever 74 is positioned to travel on the under surface of the bar, as shown in Figure 4. The lever 74 is pivotally mounted by a pin 76 on a hub 78 on the upper end of the housing, and a rod 80 pivotally connected to the lever extends downwardly through an opening 82 in the housing and through a yoke 84 which is pivotally mounted by a pin 86 in the housing. The lower end of the rod 80 is provided with a head 88 and a spring 90 is positioned between the head and yoke. The roller 72 is journaled by a pin 92 in a hub on the lever 74 and the arms of the yoke are provided with studs 94 that extend between flanges 96 of a clutch collar 98 that is slidable mounted on a stub shaft 100 which is positioned between the spindle 24 and shaft 22.

The lower end of the stub shaft 100 is journaled in a socket 102 in the spindle 24 and a pin 104 extended from a hub 106 on the upper end is journaled in a socket 108 in an enlarged section 110 on the lower end of the shaft 22. A spring 112 positioned on the section 110 is mounted with the lower end held on an arm 116 on the hub 106. The clutch collar 98 is provided with a hub 118 from the lower side of which ratchet teeth 120 extend and the teeth 120 are positioned to coact with teeth 122 on a gear 124 which is mounted on the upper end of the spindle 24. The clutch collar is urged downwardly by a spring 126 on the shaft 100 and as the roller 72 travels off of the end of the bar 68 the rod 80 drops downwardly whereby the spring 126 moves the ratchet teeth 120 into engagement with the teeth 122 and the shaft 22 is rotated through a frictional engagement as the spring 112 tightens about the member 110.

The gear 124 meshes with a pinion 128 on a shaft 130 which is journaled in the lower section 132 of the housing 18 and the shaft 130 is rotated by a motor 20 through a belt 134 and pulleys 136 and 138. The pulley 136 is positioned on the end of the shaft 130 and the pulley 138 is on the motor shaft.

The spindle 24 is journaled in a bearing 140 in the lower end of the section 132 of the housing 18 and an arm 142, which is secured to the lower end of the spindle with a clamp 144, is connected to a rod 146 with a universal joint 148, and the opposite end of the rod is secured to an arm 150 of a bell-crank 152 with a universal joint 154. The rod 146 is provided with a turnbuckle 156 for adjusting the stroke of the frame and the joint 148 is connected by a bolt 160 that extends through a slot 162 in the arm. The bell-crank is pivotally mounted on an ear 162 on one side of the turntable with a pin 164 as shown in Figure 3, and the other arm of the bell-crank is provided with an elongated slot 166 through which the pin 34 in the slot 32 of the extension 30 extends.

The latch 26 which holds the arm 20 in the cocked position is pivotally mounted by a pin 168 in a bearing 170 on the frame 14 and with the latch in the holding position, as shown in Figure 5, a roller 172 in arms 174 engages the under surface of a bar 176 extending from the latch. The arms 174 are pivotally mounted by a pin 178 in a bracket 180 on the web 42 of the frame 14, and a lever 182, which extends from the pin 186, is connected by a chain 184 to a core 186 of a solenoid 188. The lever 182 is urged upwardly by a spring 190 on a pin 192 of a yoke 194, the upper end of the yoke being attached to the lever 182 with a pin 196.

The frame 14 is provided with a slot 198 in which the latch 26 is positioned, and with the latch as shown in Figure 5, it is engaged by a roller 200 on a support 202 extended from the under side of the throwing arm 20.

With the parts arranged in this manner an operator actuates a button to close the circuit to the solenoid 188 and the solenoid draws the lever 182 downwardly, drawing the roller 172 from the bar 176 whereby the latch 26 is released and the spring 46 actuates the throwing arm with a quick action for throwing the targets. The tension of the spring 46 may be adjusted by a nut 204 threaded on a stem 206 extended from one end of the spring.

The motor runs continuously while the machine is in use whereby the spindle also rotates continuously turning the arcuate arm on the lower end thereof and the arm through the rod 146 and bell-crank impart a reciprocating action to the turntable so that when the button is pressed to release the throwing arm the path of a missile or target discharged by the machine is unpredictable.

As a target is discharged by the throwing arm 20 the roller 72 rides over the arcuate surface 70 of the bar 68 and the clutch collar drops the upper ratchet teeth into the teeth on the gear 124 which, operating continuously, turns the stub shaft 100 and the hub 106 of the shaft turns the upper shaft 22 which brings the throwing arm back to the cocked position, at which time the roller 72 is moved downwardly by the bar 68 thereby drawing the clutch collar upwardly and releasing the ratchet teeth from the teeth of the gear. The machine is then reset or cocked and the button may be pressed again to discharge another target.

From the foregoing description it is thought to be obvious that a blue rock trap constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof, and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice, except as claimed.

What is claimed is:
1. A target throwing machine comprising a turntable, a throwing arm pivotally mounted on the turntable, a base on which the turntable is mounted, power means carried by the turntable and coacting with the base for continuously re-
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5 reciprocating the turntable in a horizontal plane and about a center, a latch for retaining said arm in acocked position, manually actuated means for actuating the latch to release the arm, means for actuating the arm with a snap action for discharging a target, and means for resetting the arm.

2. A target throwing machine comprising a turntable, a throwing arm pivotally mounted on the turntable, means for adjusting said arm in a vertical plane, on a base on which the turntable is mounted, power means carried by the turntable and cooperating with the base for continuously reciprocating the turntable in a horizontal plane and from a center, a latch for retaining said arm in a cocked position, manually actuated means for actuating the latch to release the arm, means for actuating the arm with a snap action for discharging a target, and means for resetting the arm.

3. A target throwing machine comprising a turntable, a base upon which the turntable is pivotally mounted, a throwing arm pivotally mounted on the turntable, power means carried by the turntable and cooperating with the base for continuously reciprocating the turntable on the base and from the pivot mounting thereof, a latch for retaining the arm in a cocked position, a solenoid for actuating the latch to release the arm, a spring for actuating said arm to discharge a target, and means forcocking the arm.

4. A target throwing machine comprising a base, a turntable pivotally mounted on the base, a frame carried by the turntable, a throwing arm pivotally mounted on the frame, a spindle carried by the frame, a motor on the frame, means operatively connecting the spindle to the motor, means connecting the spindle to the turntable and base whereby the turntable is reciprocated as the spindle rotates, a latch for retaining said arm in a cocked position, a solenoid, means actuating the latch by the solenoid for releasing the arm, a spring connected to the frame and arm for actuating the arm to discharge a target, and means resetting the arm by the spindle.

5. In a target throwing machine, the combination which comprises a base having a vertically disposed stub shaft extended upwardly therefrom, a turntable having a socket in which the stub shaft of the base is positioned whereby the turntable is pivotally mounted on the base, a standard extended upwardly from the turntable, a frame positioned above the base and pivotally mounted on said standard, a housing carried by the frame, a shaft journaled in the upper end of the housing, a throwing arm mounted on said shaft, resilient means connected to the frame and arm for actuating the arm to discharge targets from the arm, a spindle journaled in the lower part of the housing and positioned in alignment with said shaft, a motor carried by the frame and operatively connected to said spindle, adjustable means connecting the spindle to the frame for reciprocating the turntable, frame and arm about the stub shaft on the base, a clutch for connecting the shaft to the spindle, means whereby the clutch is actuated by the throwing arm upon completion of a throwing action to rotate the housing to return the throwing arm to the cocked position, a latch for retaining said arm in a cocked position, and means for releasing said latch.

6. In a target throwing machine, the combination which comprises a base, a turntable pivotally mounted on the base, said turntable having a standard extended upwardly therefrom, a frame pivotally mounted, for movement in a vertical plane, on said standard, a housing carried by the frame, a shaft journaled in the upper end of the housing and extended upwardly from the housing, a target throwing arm carried by said shaft and positioned above the frame, a spring connected to the arm and frame for actuating the arm to discharge a target, means for positioning the target throwing arm on the base, a spindle journaled in the lower end of the housing, a stub shaft in the housing and positioned between the spindle and shaft in the upper end of the housing, an arcuate arm extended from the lower end of the spindle, a bell-crank pivotally mounted on the turntable, means connecting the bell-crank to the arcuate arm of the spindle and base whereby rotation of the spindle reciprocates the turntable, means for rotating the spindle, a latch for retaining the target throwing arm in a cocked position, and means for releasing said latch.

7. In a target throwing machine, the combination which comprises a base, a turntable pivotally mounted on the base, said turntable having a standard extended upwardly therefrom, a frame pivotally mounted on the standard, means for adjusting the position of the frame in a vertical plane, a cylindrical housing depending from one end of the frame, a shaft journaled in the upper end of the housing, a target throwing arm carried by said shaft, a spring connected to the arm and frame for actuating the arm to discharge a target, a spindle journaled in the housing, means resiliently connecting the spindle to the shaft, a clutch in the connection between the spindle and shaft, a gear on the spindle, a motor carried by the frame, means driving the gear and spindle by the motor, an arm extended from the lower end of the spindle, a bell-crank pivotally mounted on the turntable, a rod connecting the arm of the spindle to one side of the bell-crank, a guide pin adjustably mounted on the base and extended through the side of the bell-crank opposite to the side to which said rod is connected whereby upon rotation of the spindle the bell-crank reciprocates the turntable about the pivot mounting thereof, a latch carried by the frame and positioned to retain the target throwing arm in a cocked position, a solenoid, and means actuating the latch by said solenoid.

8. In a target throwing machine, the combination which comprises a base, a turntable pivotally mounted on the base, said turntable having a standard extended upwardly therefrom, a frame pivotally mounted on the standard, means for adjusting the position of the frame in a vertical plane, a cylindrical housing depending from one end of the frame, a shaft journaled in the upper end of the housing, a target throwing arm carried by said shaft, a spring connected to the arm and frame for actuating the arm to discharge a target, a spindle journaled in the housing, means resiliently connecting the spindle to the shaft, a clutch in the connection between the spindle and shaft, a gear on the spindle, a pinion positioned on a shaft journaled in the housing, a motor, means driving the shaft with the pinion thereon by the motor, an arm extended from the lower end of the spindle, a bell-crank pivotally mounted on the turntable and having a short arm and a long arm, a rod having a turnbuckle therein connecting the short arm of the bell-crank to the arm of the spindle, a guide pin mounted in the base and extended through the long arm of the bell-crank whereby rotation of the spindle causes the turntable to reciprocate.
about the pivotal mounting thereof on the base, 

a latch carried by the frame and positioned to 

retain the target throwing arm in a cocked posi- 

tion, a solenoid carried by said frame, means for 

actuating the latch to release the target throw- 

ing arm by the solenoid, and means actuated by 

the target discharge movement of the target 

discharge movement of the target throwing arm 

for moving the clutch whereby the target throw- 

ing arm is reset by said gear in the housing.

9. In a target throwing machine, the combina- 
tion which comprises a base, a turntable 

mounted to rotate in a horizontal plane on said 

base, a frame pivotally mounted on the turntable, 

means for adjusting the frame in a vertical plane, 

a vertically disposed shaft journaled in one end 
of the frame, a throwing arm having means 

thereon for temporarily retaining targets mount- 
ed on said shaft, a motor carried by the frame, 

means actuated by the motor and coacting with 

the base for reciprocating the turntable and 
frame on the base, a latch for retaining the 

throwing arm in a cocked position, means for ac- 
tuating the latch to release the arm, and means 
operatively connecting the shaft on which the 

throwing arm is mounted to the motor actuated 
means whereby the throwing arm is returned to 
a cocked position after a throwing action of the 

arm.

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