

Jan. 7, 1969

T. P. RADEMACHER

3,420,218

TRAPSHOOTING TARGET PROJECTOR

Filed Aug. 26, 1965

Sheet 1 of 3

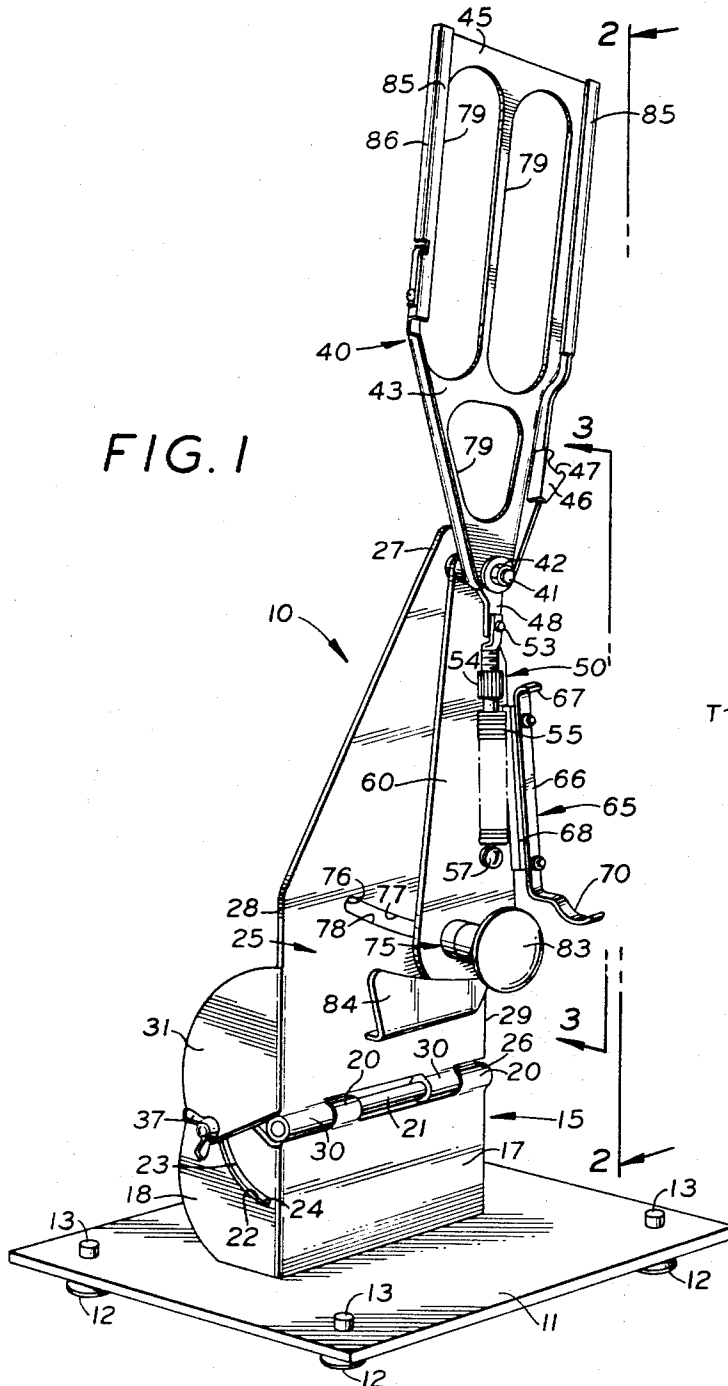


FIG. 1

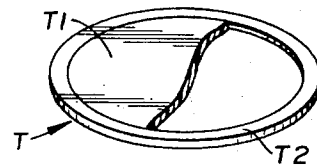


FIG. 6

INVENTOR.
THOMAS P. RADEMACHER
BY *Hamilton & Cook*

ATTORNEYS

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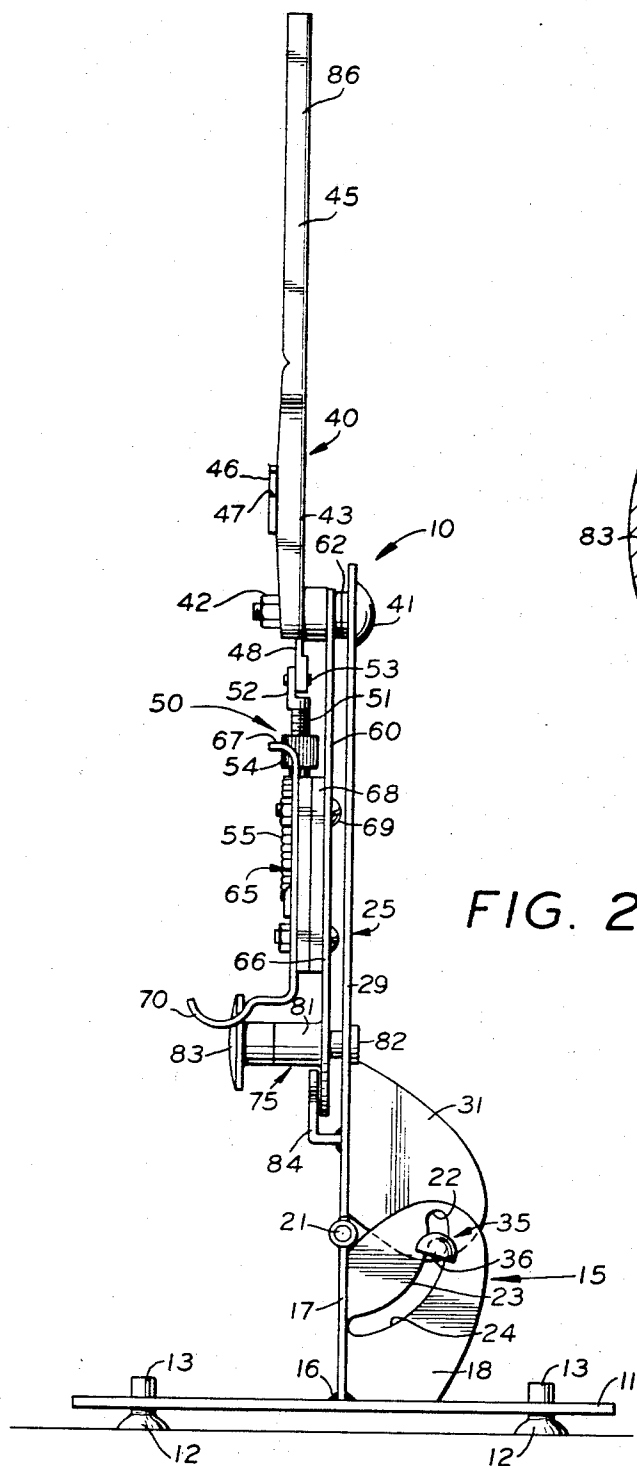


FIG. 2

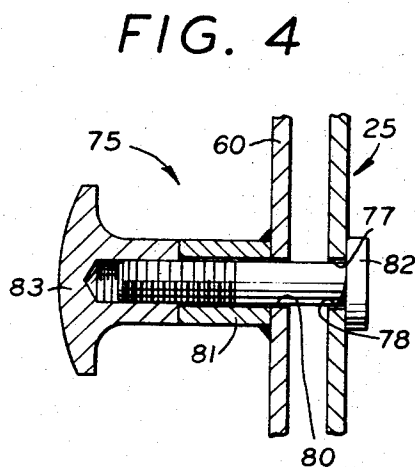


FIG. 4

INVENTOR
THOMAS P. RADEMACHER
BY *Hamilton & Cook*
ATTORNEYS

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T. P. RADEMACHER

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FIG. 3

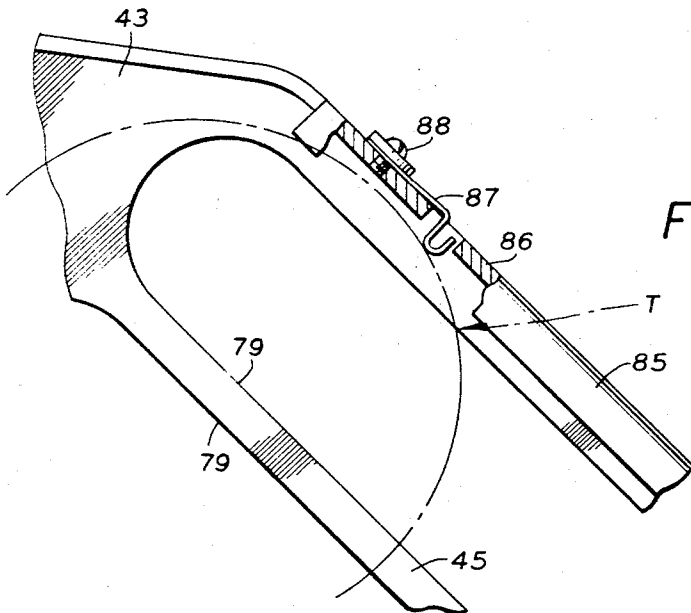
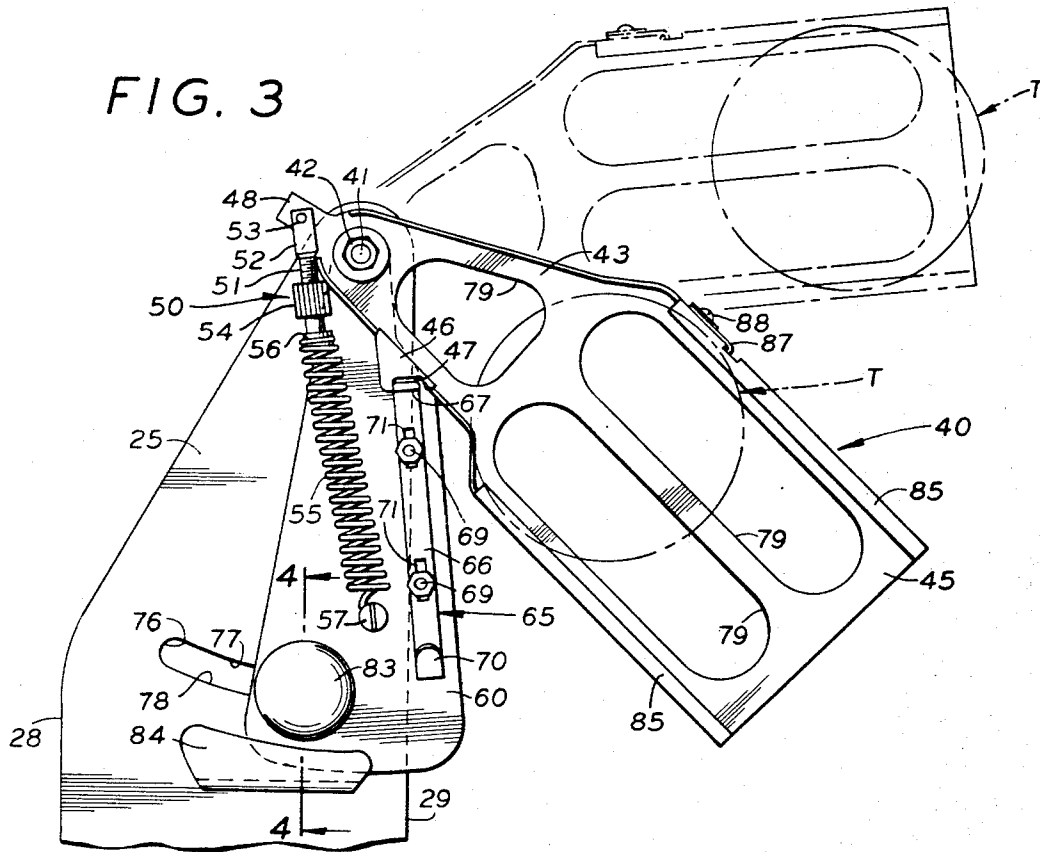


FIG. 5

INVENTOR.
THOMAS P. RADEMACHER
BY *Hamilton & Cook*
ATTORNEYS

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3,420,218

TRAPSHOOTING TARGET PROJECTOR

Thomas P. Rademacher, Medina, Ohio, assignor to
Hamlin Products, Incorporated, Akron, Ohio, a
corporation of Ohio

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4 Claims

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ABSTRACT OF THE DISCLOSURE

A trapshooting target projector having a fixed upright frame, an elevation arm vertically pivotable about the frame and a directional arm pivotally mounted on the elevation arm, each selectively positioned to control the trajectory of a projected target in elevation and azimuth, a throwing arm having a target holder pivotally attached to the elevation arm, an actuation device tending to resiliently maintain the throwing arm aligned with the directional arm, and a latching device retaining the throwing arm in a displaced position and selectively releasing it therefrom.

The present invention relates generally to a target and trap device for developing or perfecting marksmanship on moving targets. More particularly, the invention relates to a trap apparatus for selectively projecting a disk shaped target into the air in such a manner that the flat surface of the disk provides a circular target for the marksman.

In recent years, there has been a marked increase in the use of artificial targets to develop proficiency in hitting moving targets. For the most part, standard clay pigeons which have been known for many years are employed for these purposes. The standard clay pigeon has a circumferential edge or rim surrounding a slightly dished or indented center portion and is constructed of a frangible clay or composition material. These clay pigeons are projected or thrown from a trap in such a manner that they assume a path substantially parallel to the ground with the narrow edge pointed in the direction of travel to minimize air resistance. A slight rotation about an axis perpendicular to the indented center portion gives the clay pigeon sufficient stability to maintain a substantially uniform flight trajectory.

Since the standard clay pigeon in flight presents substantially an edge view to the shooter under most skeet and trap shooting conditions, these targets are practical only for use with shotguns and by marksmen with reasonable proficiency. Thus, the employment of these devices is limited to large open areas where a shotgun may be safely discharged. An additional disadvantage of the conventional traps and clay pigeons is the appreciable expense involved in expending a shotgun shell and a clay pigeon on each firing round.

Accordingly, a principal object of the present invention is to provide a trap device which can be safely used in limited confines in conjunction with an air rifle.

Another object of the invention is to provide a trap device which can be employed to gain extensive experience by firing a great number of rounds at minimal expense.

A further object of the invention is to provide a trap device which projects a flat circular disk target generally vertically upwardly so that the shooter views a substantially circular target.

Another object of the invention is to provide a trap device which discharges targets at preselected angles to the vertical and in various lateral directions according to predetermined settings.

Still another object of the invention is to provide a

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trap device which discharges a flat circular disk target and imparts a slight axial rotation to the target for stability over the flight trajectory.

Another object of the invention is to provide a trap device which can be used to launch conventional frangible clay or composition targets of the small two and one-half inch diameter variety.

Various other objects and advantages will appear from the following description taken in conjunction with the attached drawings, and the novel features will be particularly pointed out in conjunction with the appended claims.

In the drawings:

FIG. 1 is a view in linear perspective of a trap device in accordance with the present invention showing the holder arm in the release position after discharge of a target.

FIG. 2 is a side elevation of the trap device, taken substantially on line 2—2 of FIG. 1.

FIG. 3 is a fragmentary front elevation of the holder arm portion of the trap device in its loaded or cocked position, taken substantially on line 3—3 of FIG. 1, showing the holder arm and the travel of the target in phantom lines at an intermediate position before discharge of the target.

FIG. 4 is an enlarged fragmentary section of the azimuth selector knob and mating portion of the directional arm, taken substantially on line 4—4 of FIG. 3.

FIG. 5 is an enlarged, fragmentary front elevation of the guide or holder portion of the holder arm showing the means retaining a target which is depicted in chain lines.

FIG. 6 is a perspective view of a flat circular disk capable of fitting in the trap device holder.

Referring now to the drawings and to FIG. 1 particularly, the trap device, generally indicated by the numeral 10, is depicted in a substantially upright position. All components of trap device 10 rest on a substantially rectangular plate or base 11 which remains fixed throughout the operating cycle. If desired, retaining means such as suction cups 12 having short attachment shafts 13 may be employed to more securely affix base 11 to a surface from which it is to be operated. Alternatively, when a stronger, semi-permanent attachment is desired, conventional screws or bolts may be employed in lieu of the suction cups 12.

Rising upwardly from a position substantially centrally of the base 11 is a U-shaped channel or frame, generally indicated by the numeral 15, which is the primary support for the entire vertical structure. The frame 15 is preferably substantially perpendicular to the base 11 and rigidly attached thereto, as by suitable welds 16. The U-shaped frame 15 has a web member 17 with substantially parallel legs or flanges 18 projecting from the lateral extremities. The upper surface of the web 17 is provided with a series of spaced cylindrical guides 20 which rotatably support a hinge shaft 21 running laterally of web 17. The flanges 18 of web member 17 have an arcuate slot 22 with a radially inner edge 23 and radially outer edge 24, both lying on the arc of concentric circles centered on the shaft 21.

Located above and pivoting about the lateral dimension of the web 17 is an elevation arm 25, which is generally trapezoidal, having non-parallel sides 26, 27 and parallel sides 28, 29. The lower non-parallel side 26 has cylindrical guides 30 which are similar to the guides 20 of frame 15 and rotatably support the shaft 21. The guides 30 are spaced to non-interferingly abut with the guides 20 of frame 15 to form a hinge joint. Extending perpendicular to directional arm 25 from the lower portion of the

parallel sides 28, 29 are a pair of flanges 31 which lie in planes parallel and overlappingly adjacent to the flanges 18 of frame 15.

The angular position of the elevation arm 25 with reference to the web 17 of frame 15 is determined by the vertical inclination control, generally indicated by the numeral 35. The inclination control 35 consists of a bolt 36 extending through the flanges 31 of elevation arm 25 and the arcuate slots 22 in flanges 18 of frame 15 and a wing nut or similar threaded fastener 37. To effectuate adjustment, the wing nut 37 is loosened, the elevation arm 25 is rotated to its desired position, and the wing nut is again secured. If it is desired to achieve rapid, accurate placement at predetermined positions, suitable calibration (not shown) may be provided, as for instance on the outer surface of flange 18 near the arcuate slot 22.

Pivoted about the upper surface of the elevation arm 25 is the motive component which imparts velocity and rotation to the target, the throwing arm, generally indicated by the numeral 40. The pivot point of throwing arm 40 is the shaft of a bolt 41 which is mounted at the upper extremity of elevation arm 25, near the juncture of parallel side 29 and non-parallel side 27. The bolt 41 is provided with a threaded nut 42 which retains the throwing arm 40 on the bolt 41 during operation. On one side of the pivot about the bolt 41, the throwing arm 40 broadens into a triangular extension 43 which merges into a substantially rectangular target holder 45. Triangular extension 43 provides adequate radial spacing between the pivot at bolt 41 and the holder 45 plus an adequately broad extremity to merge with and support the holder 45. The extension 43 has a small triangular catch 46 with a notch 47 therein projecting outwardly from a position substantially medially of one side, for a purpose to be hereinafter described.

On the opposite side of the pivot about bolt 41 from the triangular extension 43, the throwing arm 40 has a relatively short attachment leg 48 which provides a pivotal connection for the actuating mechanism, generally indicated by the numeral 50. The actuating mechanism 50 consists of a medially threaded bolt 51 having a connector finger 52 at one end which overlaps the attachment leg 48 and is pivotally connected thereto by a small shaft or pin 53. Threaded bolt 51 also supports an internally threaded collar 54 which is longitudinally fixed but freely rotatably mounted in one end of a coil spring 55 by means of a groove or recess 56. The opposite end of coil spring 55 is securely attached by means of a bolt 57, or other fastener, to the directional arm 60, which is an elongated substantially triangular plate having rounded corners and being pivotally mounted on the bolt 41 and laterally displaced from elevation arm 25 by suitable spacers or washers 62. The position of bolt 57 and the resilience of spring 55 normally maintains the throwing arm 40, attachment leg 48, and threaded bolt 51 substantially in alignment, as seen in FIGS. 1 and 2. The tension in spring 55 is selectively adjustable by rotating the collar 54 to position it along the threaded bolt 51.

To move the throwing arm 40 to the loaded or cocked position, it is rotated to the solid line position of FIG. 3. A latch mechanism, generally indicated by the numeral 65, maintains throwing arm 40 in the cocked position until discharge is desired. The principal component of latch mechanism 65 is a latch bar 66 having a curved end flange 67 which engages the notch 47 of triangular catch 46 attached to throwing arm 40. The latch bar 66 is slidably mounted on a latch block 68 which is rigidly attached to directional arm 60 by bolts 69, or other suitable means. The selective engagement of the catch 46 by the latch mechanism 65 is made possible by longitudinal slots 71 provided in latch bar 66 to allow it to slide longitudinally of the latch block 68. The latch bar 66 may be provided with a trigger 70, or other similar attachment, to facilitate manual control.

Since the throwing arm 40 tends to align itself with the

spring 55 when released, the orientation is dependent upon the directional arm 60 to which the spring 55 is attached. To control this orientation, an azimuth selector 75 is provided to rotationally position directional arm 60 with respect to the surface of elevation arm 25. A slot 76 is provided in elevation arm 25 with an inner edge 77 and an outer edge 78, both lying on the arc of concentric circles centered on the bolt 41. The directional arm 60 has an aperture 80 and an outwardly projecting housing 81 which receives a bolt 82 that is extended through the slot 76 (FIG. 4). An internally threaded knob 83 engages bolt 82 and draws directional arm 60 against elevation arm 25 at any desired position along the slot 76. Any tendency of the directional arm 60 to become excessively laterally displaced from the elevation arm 25 is eliminated by the angular shield 84 which is attached as by welding to elevation arm 25.

The target holder 45 on throwing arm 40 is designed to accommodate a target T (FIGS. 3 and 6) which may be a flat circular disk to achieve one of the objects of the invention. The preferred form of the target, as best seen in FIG. 6, consists of a central disk T₁ which is separably enclosed within a rim or hoop T₂. In order to maintain drag at an acceptable value, the axial dimensions of the disk T₁ and the hoop T₂ may be made substantially equal. The diameter of the disk T₁ is slightly greater than the interior diameter of the hoop T₂ to provide a low interference force fit. This allows disk T₁ to be inserted by hand in hoop T₂, the target T to remain as an integral unit when discharged from the trap device 10, and the separation or breaking away of hoop T₂ from disk T₁ when either is contacted by a single shot while in flight. Thus, positive proof of hits is afforded by the separation of the components of target T.

The target T is preferably made of polyvinyl chloride which has been found to be impervious to shot fired from an air rifle, yet of sufficient resilience to absorb the energy and harmlessly drop the shot without rebound or ricochet. Alternatively, the target could be constructed as an integral unit of aluminum which would withstand the shot, but would be likely to produce rebound in certain instances. A further alternative would be to use targets made of conventional frangible clay or compositions which would shatter on contact by a shot.

Target holder 45 has guide rails 85 running the length of either side with webs 86 which are displaced from each other a distance slightly greater than the diameter of target T. The channel rails 85 are displaced from the surface of holder 45 a distance sufficiently greater than the thickness of target T to allow free but controlled passage of the target. When throwing arm 40 is in the cocked position of FIG. 3, the target T would tend to roll down the web 86 of the lower guide rail 85. A spring clip 87 is attached to the web 86 of upper guide rail 85 by means of a screw fastener 88 providing suitable restraint. To reduce the weight of throwing arm 40 so that its momentum is minimized during rotation, sizable apertures 79 may be made in extension 43 and holder 45.

The operation of the trap device is best understood by reference to FIG. 3. Initially, throwing arm 40 is rotated from the upright position shown in FIGS. 1 and 2 to the cocked position shown in FIG. 3, where the latch bar 66 engages the notch 47 of catch 46. A target T is then inserted in the holder 45 until it is engaged by the retaining clip 87. The position of throwing arm 40 is then adjusted as desired by means of the vertical inclination control 35 and the azimuth selector 75. At any desired time thereafter, as upon a signal, the target T is projected or thrown by pulling downwardly on the trigger 70 to move the latch bar 66 out of engagement with the catch 46.

The actuating mechanism 50 rapidly rotates the throwing arm 40 from the cocked position of FIG. 3 to the discharge position of FIGS. 1 and 2. The rate of angular rotation of throwing arm 40 which determines the initial velocity and range of target T is dependent upon the

elongation of spring 55 which is set by rotating the collar 54 of actuating mechanism 50. As the throwing arm 40 rotates, the centrifugal force imparted to target T overcomes the retaining force supplied by the spring clip 87 and the target T begins to rotate along the web 86 of lower guide rail 85, thereby displacing it outwardly of the holder 45. An intermediate position after the target T has broken the restraint of spring clip 87 is shown in phantom lines in FIG. 3. When the throwing arm 40 reaches the FIGS. 1 and 2 position, it is abruptly stopped by the spring 55 and the target is discharged with a substantial radial velocity with respect to the pivot bolt 41 of throwing arm 40 and a slight rotation about its axis to provide stability during flight.

The trap device 10 is particularly adapted to throw a flat circular disk, such as the target T, at various angles in selected planes relative to the trap device 10. If the holder 45 and other elements are made for a target of approximately four inches in diameter, conventional small clay pigeons may be employed. The guide rail 85 is adapted to receive the circumferential edge or rim surrounding the dished or indented portion of a standard clay pigeon; and, by adjusting the vertical inclination control 35 to a position near the horizontal, the clay pigeon is discharged with a normal trajectory for that type of target. If desired, the throwing arm 40 may be made readily removable by loosening the nut 42 to provide for the substitution of a plurality of throwing arms having either larger or smaller holders for targets T of different diameters. Alternatively, throwing arm 40 may be made in such a manner that smaller holders may be attached within the holder 45 to accommodate smaller targets.

A preferred form of the invention has been shown and described in sufficient detail to enable one skilled in the art to practice the invention. Since various modifications in details, materials, and arrangements of parts are within the spirit of the invention herein disclosed and described, the scope of the invention should be limited solely by the scope of the attached claims.

What is claimed is:

1. A trap shooting apparatus for the controlled discharge of targets comprising, an upright frame, an elevation arm vertically pivotable about said upright frame, vertical inclination control means maintaining said eleva-

tion arm in predetermined angular relation to said upright frame, a throwing arm pivotally attached to said elevation arm, a target holder on said throwing arm, resilient means on said target holder for selectively retaining a target, a directional arm pivotally mounted on said elevation arm, azimuth selector means maintaining said directional arm in predetermined alignment with said elevation arm, actuating means attached to said throwing arm and said directional arm and tending to resiliently maintain said throwing arm in an extended position substantially aligned with said directional arm, and latch means providing controlled retention and release of said throwing arm from a displaced position.

2. Apparatus according to claim 1, wherein said actuating means is a coil spring of adjustable tension attached to said directional arm and attached to said throwing arm on the opposite side of the pivotal attachment to said elevation arm from said target holder.

3. Apparatus according to claim 2, wherein said throwing arm and said directional arm are coincidentally pivotally mounted on said elevation arm.

4. Apparatus according to claim 3, wherein said latch means comprises a catch means on said throwing arm and a latch bar means on said directional arm adapted to releasably engage said catch means, wherein said upright frame has at least one projecting flange and said elevational arm has at least one projecting flange overlying a flange of said upright frame, and wherein said vertical inclination control means comprises fastening means selectively positioning a flange of said upright frame relative to a flange of said elevational arm.

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RICHARD C. PINKHAM, *Primary Examiner*.

W. R. BROWNE, *Assistant Examiner*.

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