Dec. 9, 1947. P. B. RUTHERFORD ET AL 2,432,446

TARGET THROWING APPARATUS

Filed Jan. 26, 1944 5 Sheets-Sheet 1

Fig. 1

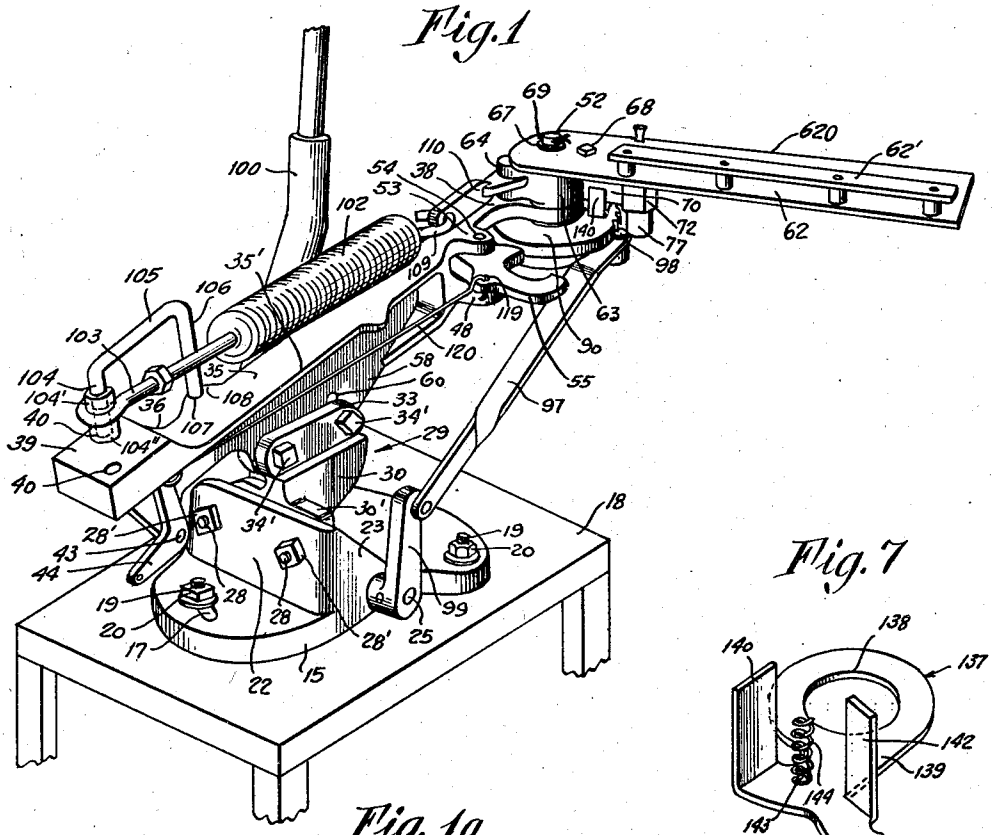


Fig. 7

Fig. 1a

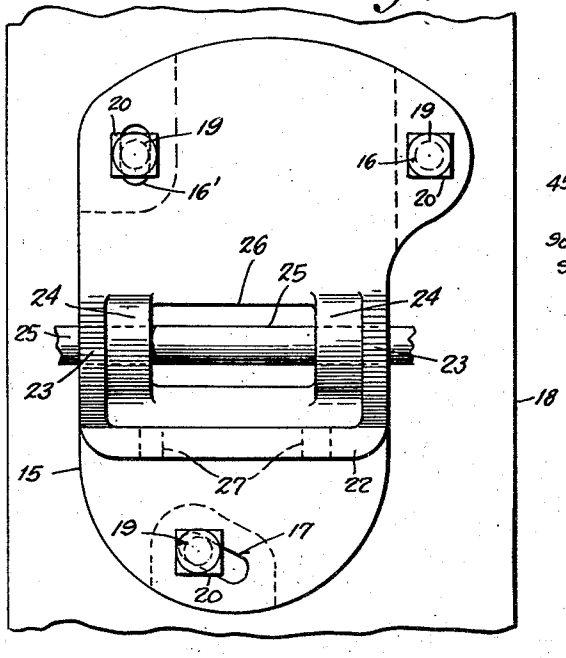
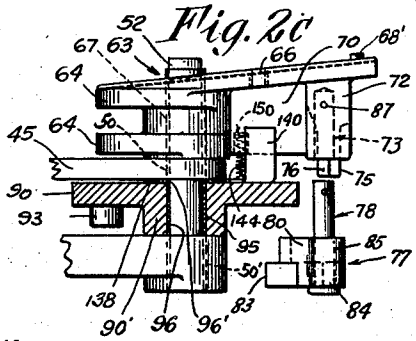


Fig. 2c



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TARGET THROWING APPARATUS

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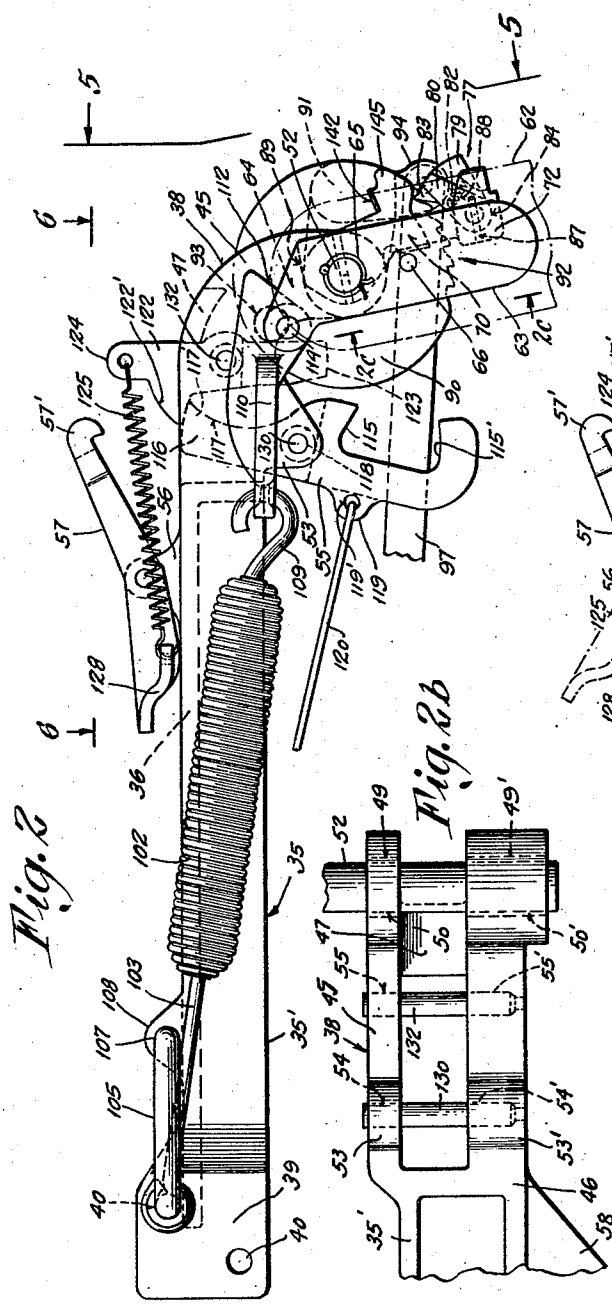


Fig. 2

Fig. 2b

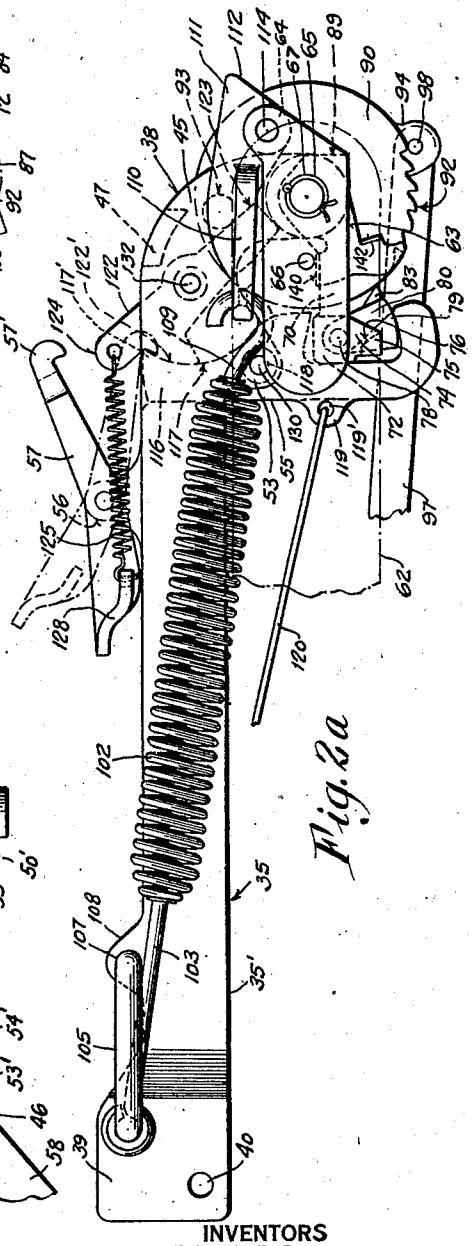


Fig. 2a

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TARGET THROWING APPARATUS

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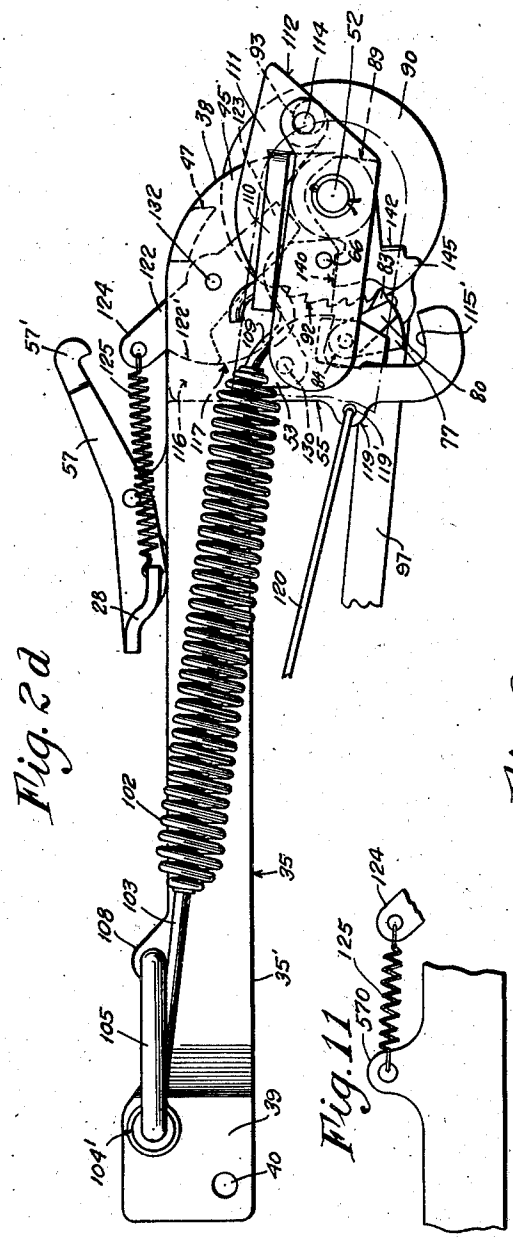


Fig. 2d

Fig. 11

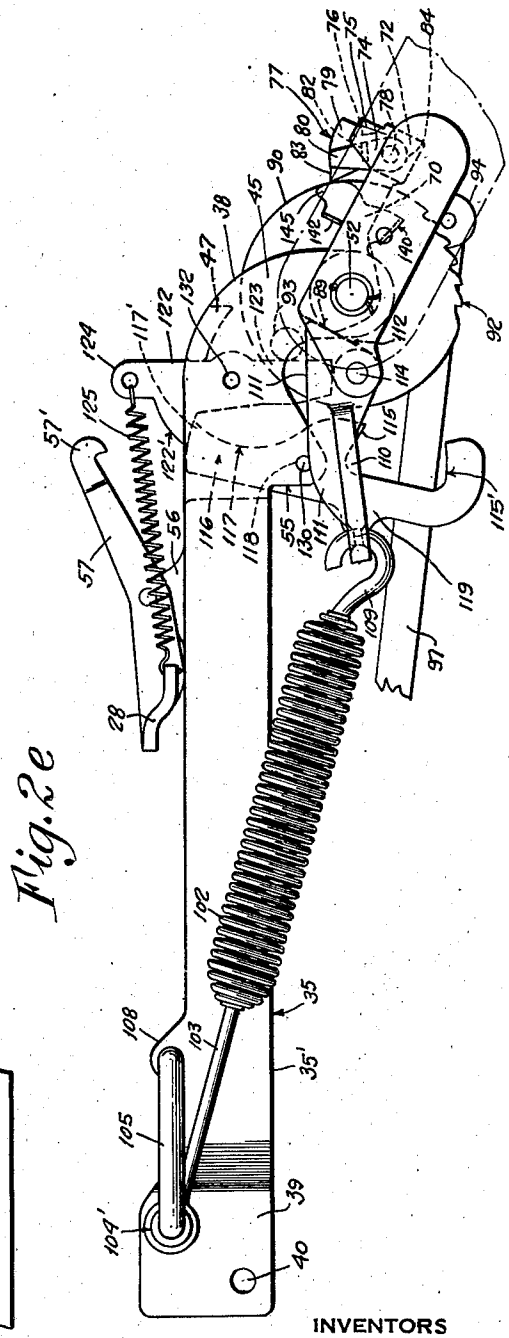


Fig. 2e

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TARGET THROWING APPARATUS

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Fig. 3

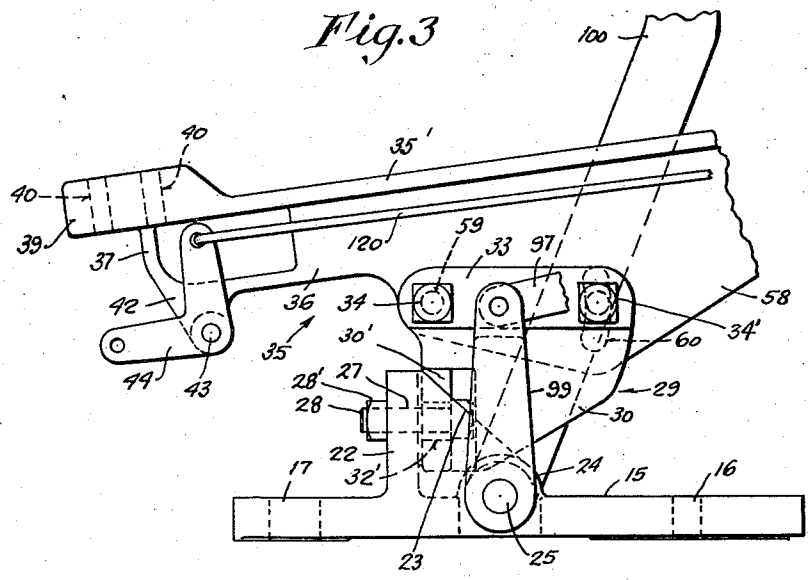


Fig. 4

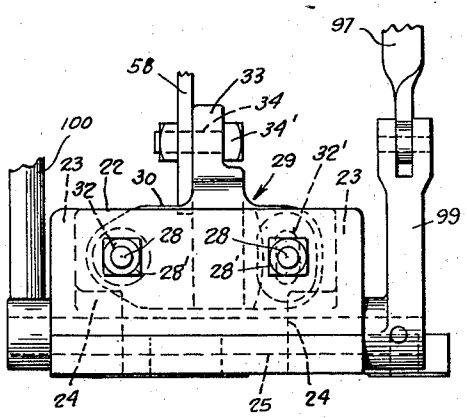


Fig. 5

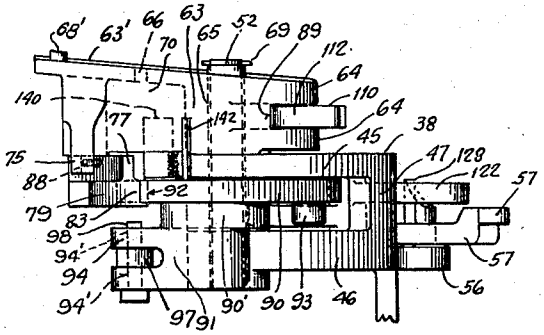
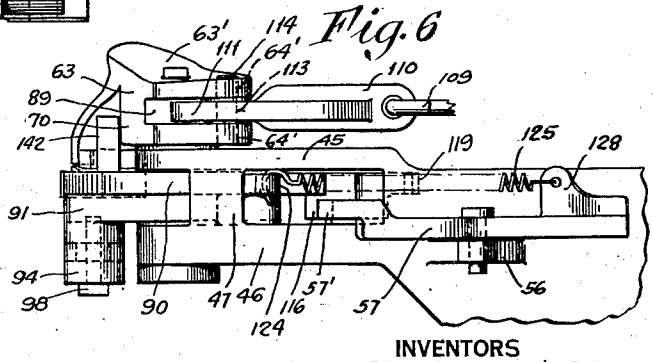


Fig. 6



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Fig. 8

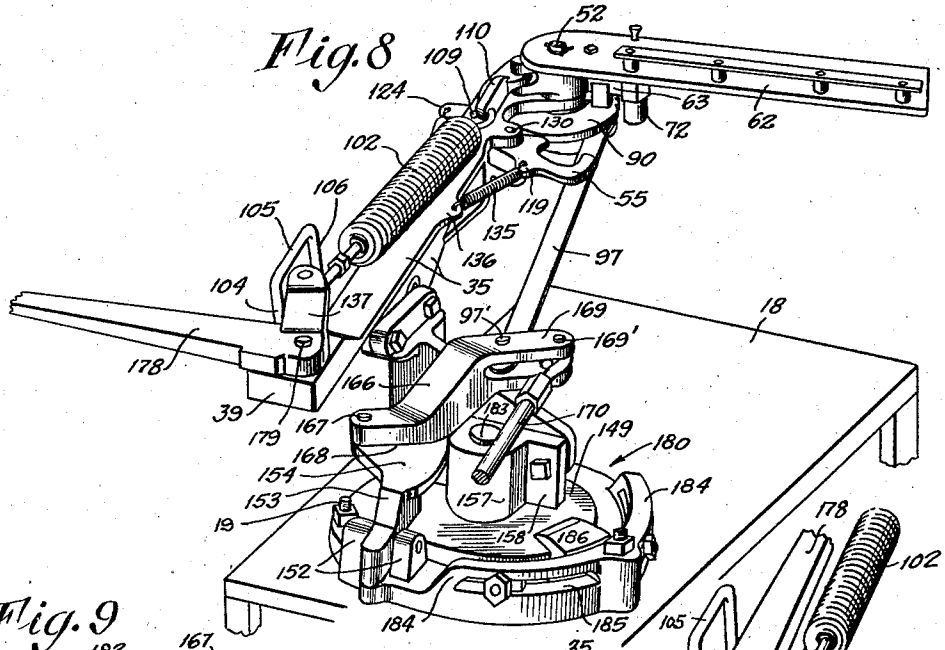


Fig. 8a

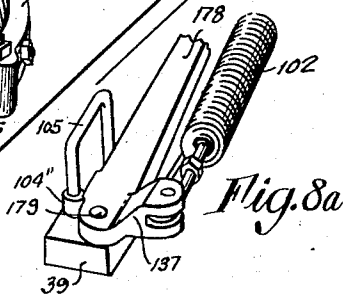


Fig. 9

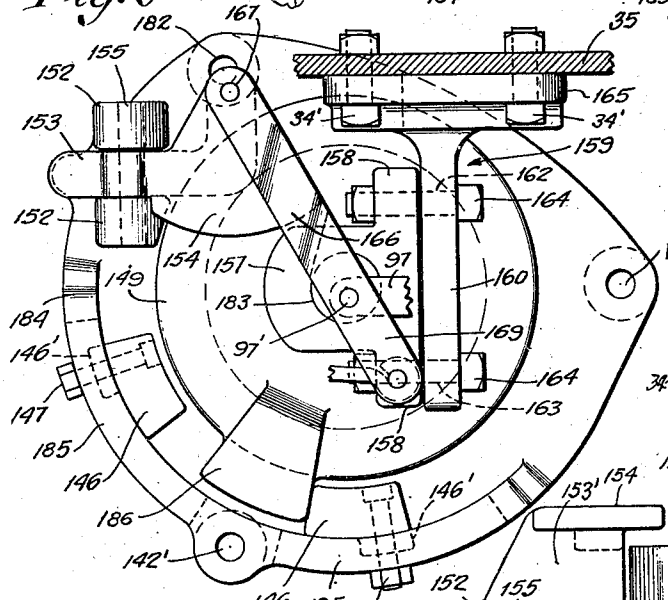
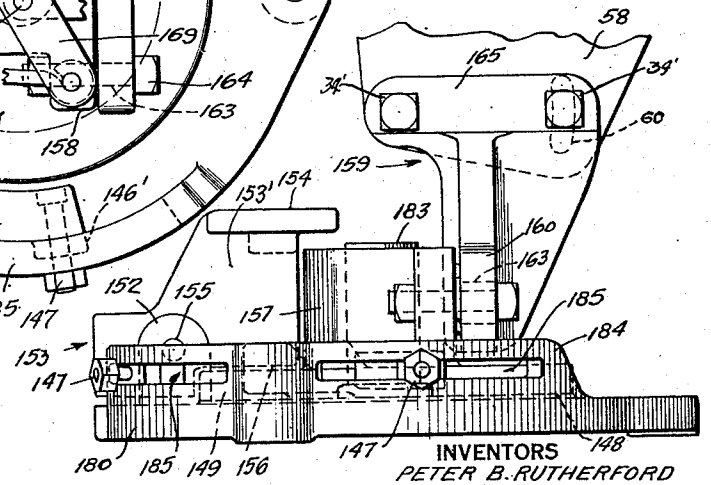


Fig. 10



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UNITED STATES PATENT OFFICE

2,432,446

TARGET THROWING APPARATUS

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Application January 26, 1944, Serial No. 519,722

32 Claims. (Cl. 124—8)

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The present invention relates, in general, to a target throwing device, and, in particular, to improved equipment for throwing disk-shaped targets of frangible material such as compositions of clay or limestone and pitch, commonly known as "clay birds." Moreover, the equipment is readily convertible from a skeet shooting device to one adapted for trap shooting.

It is an object of the invention to provide an improved target throwing device applicable for distributing targets at various angles and at various elevations throughout a target field. A further object is to provide a trap having a main spring and parts associated therewith so that the tension of the main spring and the angle of acceleration of the throwing arm of the trap may be increased for throwing doubles. A further object is to provide for rapid deceleration of the throwing arm and to reduce the spread of the throwing arc. A still further object is to provide means for automatically locking the throwing arm in cocked position and preventing release of the throwing arm until the cocking means is returned to its normal position.

Other objects, features and advantages of the invention will be described in greater detail in the following specification.

In the drawings:

Fig. 1 is a perspective view of the target throwing device of this invention adapted for skeet shooting.

Fig. 1*a* is a plan view of the trap supporting means and trap base mounted thereon.

Fig. 2 is a plan view showing the frame, the carrier head and carrier in the position they assume after a target has been thrown and before cocking for the throwing of a second target.

Fig. 2*a* is a plan view similar to Fig. 2, showing a carrier head held in cocked position by the trigger and the trigger locked due to the incomplete return of the cocking mechanism.

Fig. 2*b* is a fragmentary side elevation of the head of the frame showing the carrier head supporting post and the trigger and release latch supporting pins.

Fig. 2*c* is a fragmentary partial assembly side elevation of the head of the frame on line 2*c*—2*c* of Fig. 2. For greater clearness, the pawl assembly is shown detached.

Fig. 2*d* is a plan view similar to Fig. 2*a*, showing the parts in the over-cocked position which they assume near the end of the cocking movement.

Fig. 2*e* is a plan view showing the trap frame and the position of the carrier head and carrier at the end of their throwing movement.

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Fig. 3 is a side elevation of a fragmentary part of the frame including the base.

Fig. 4 is an end elevation of the base including the frame connecting bracket.

Fig. 5 is a fragmentary side elevation of the head of the frame on line 5—5 of Fig. 2.

Fig. 6 is a fragmentary side elevation of the head of the frame on line 6—6 of Fig. 2.

Fig. 7 is a perspective view of the pawl guard.

Fig. 8 is a perspective view of the target throwing device mounted on a modified base for trap shooting.

Fig. 8*a* is a fragmentary perspective view of the angling handle shown in Fig. 8 in position for throwing doubles.

Fig. 9 is a plan view of the base and turret shown in Fig. 8.

Fig. 10 is a side elevation of the base and turret shown in Fig. 8.

Fig. 11 is a detail of a slight modification of the release latch control.

Referring to the drawings, the target throwing trap, adapted for skeet shooting, is shown in Fig. 1, and comprises an inverted L-shaped base 15 (see Fig. 1*a*) which may be of metal or other suitable material such as plywood, and is provided with three vertical apertures 16, 16′ and 17, as shown in Fig. 1*a*. The apertures 16′ are closed slots of substantially 6° spread and provide means for pivotally adjusting the base on suitable supporting means. The latter, as shown, may comprise a table 18 having three studs 19 fixed therein adapted to project upwardly into the apertures of the base, the base 15 being fixedly secured to the table 18 by tightening suitable nuts 20 threaded on the upper ends of the studs.

The base is provided with a transversely disposed vertical web 22 (see Figs. 1*a*, 3 and 4) having spaced parallel sloping sides 23 which terminate in bosses 24 respectively at the intersection of each side with the base. Each boss is drilled transversely and forms a bearing to accommodate a crankshaft 25 which, as hereinafter described, is provided for cocking the carrier of the trap.

A substantially rectangular aperture 26 is shown in the base 15 between the two bosses 24, the longitudinal axis of the aperture being in alignment with the longitudinal axis of the crankshaft 25.

The vertically disposed web 22 has a pair of drilled holes 27 located adjacent its upper edge to receive a pair of threaded bolts 28 for securing a bracket indicated generally at 29 to the vertical web 22.

The bracket comprises a T-shaped cast mem-

ber consisting of two plates 30 and 30' at substantially right angles to each other, the laterally disposed plate 30' having a bolt hole 32 at one end and an arcuate substantially vertical slot 32' of 10° spread at its opposite end. As mentioned above, the bracket 29 is fastened to the web 22 of the base 15 by a pair of bolts 28, one of which extends through the slot 32' of the laterally extending plate 30' and the other in the drilled hole 32. By loosening the nuts 28' of the bolts 28, the bracket 29 may be tilted through a small arc in a transverse plane substantially vertical to the base. The upper portion 33 of the plate 30 of the bracket extends at substantially right angles to the laterally disposed plate 30' and lies in a horizontal plane above the upper edge of the latter, see Fig. 3, and is provided with a pair of spaced bolt holes 34 for the purpose hereinafter described.

Supported on the bracket 29 is a frame 35 which, as shown, comprises a cast beam, substantially L-shaped in cross section embodying a flanged portion 35' and substantially vertical wall portion 36; and provided with a tail end portion 37 and head end portion 38. The tail end is formed with an enlarged substantially rectangular planar section 39 which is considerably thicker than the flanged portion 35' of the frame and is provided with a pair of diagonally disposed vertically drilled bolt holes 40. The wall 36 of the beam is provided with a vertically depending ear 42 (see Fig. 3), at a point substantially beneath the tail end portion 37 of the frame to provide a bearing for a pivot pin 43 which, in the skeet shooting trap, is adapted to support a bell crank lever 44 as hereinafter described.

The head end 38 of the beam or frame is substantially hook-shaped, as shown in the plan view in Figs. 2 and 2*a*, and constitutes parallel upper and lower substantially horizontal flanges 45 and 46 respectively as shown in Fig. 2*b*, spaced apart vertically by a relatively short interconnecting web 47 along the outer periphery of the hook 38.

Both the upper and lower flanges 45 and 46 are provided at their outer ends respectively with vertically drilled aligned holes or bearings 49 and 49', which as shown in the present embodiment may be equipped with cylindrical bushings 50 and 50' adapted to rotatably support a substantially vertical carrier supporting post or shaft 52 in a substantially free manner, but it will be understood that the bushings 50 and 50' are not indispensable to the support of the shaft 52, the latter being supportable, satisfactorily, simply in the bearings 49 and 49' of the frame. Rearward of the curved head portion 38 of the frame, the upper flange 45 and lower flange 46 are formed with laterally projecting bosses 53 and 53' respectively, the upper boss 53 having a vertically drilled hole 54 and the lower boss 53' having a counterbored drilled hole 54' which is in axial alignment with the upper hole 54. These holes constitute bearings for supporting a trigger pivot pin 130 as described below. Between the drilled holes 49 and 54 and adjacent the back side of the head end 38 of the frame is a third pair of vertically drilled holes 55 and 55', the hole 55 being drilled through the upper flange 45 in axial alignment with the hole 55' which is counterbored in the lower flange 46. These holes are adapted to form bearings for supporting a latch pivot pin 132, as shown in Fig. 2*b*. On the side of the frame rearwardly of the bosses 53 and 53' is a single vertically drilled boss 56 for pivotally supporting a safety hook 57. Intermediate the tail and head ends of the frame is formed a substantially keel-shaped vertically depending web 58 comprising an extension of the lower edge 36 of the frame. This keel-shaped web 58 is provided with a horizontally drilled hole 59 (see Fig. 3) and an arcuate slot 60, the latter being spaced from the hole a distance corresponding substantially to the distance between the drilled holes 34 in the upper edge 33 of the longitudinally extending plate 30 of the T-shaped bracket 29. The frame 35 may thus be fastened to the bracket 29 by suitable fastening means such as the bolts 34' shown in Figs. 1 and 4. By loosening these bolts, the frame 35 may be adjusted at an angle to the horizontal plane of the base 15.

The carrier is shown at 62 in Fig. 1 and is substantially of conventional construction comprising a long narrow arm of suitable material such as aluminum or a plastic having a rail 62' along one edge. The carrier is adapted to be mounted on the head end 38 of the trap frame 35 by means of a suitable carrier head which is indicated at 63 and comprises a relatively solid rectilinear block, one end of which is substantially rectangular in cross section and bifurcated to form a pair of vertically spaced bosses 64 (see Figs. 5 and 6) which are drilled vertically to provide axially aligned holes 64'. As shown in Figs. 2 and 2*a*, these bosses 64 are disposed at an angle of substantially 30° to the longitudinal axis of the carrier head 63. The top planar surface 63' of the carrier head is inclined to its axis of rotation, both transversely and longitudinally, for the purpose hereinafter described, the rear portion of the carrier head being provided with a pair of drilled holes 65 and 66, the hole 65 being smooth bored and the hole 66 tapped. The carrier head 63 is adapted to be pivotally mounted on the upper flange 45 of the frame (see Fig. 2*c*) by means of the supporting shaft 52, and, to this end, a cylindrical bushing 67, rotatable freely on the shaft 52, is suitably secured in the smooth bored hole 65 of the carrier head 63.

The carrier 62 is shown secured on the upwardly inclined and tilted top surface 63' of the carrier head by means of a single bolt 68 which threadedly engages the drilled and tapped hole 66 of the carrier; and by the upper end of the sleeve bushing 67 which, as shown, extends above the upper surface 63' of the carrier head a distance sufficient to be received in a suitable aperture in the end of the carrier 62. The upper end of the shaft or post 52 is adapted to extend upwardly through the bushing 67 above the upper edge thereof and a cotter pin 69 or other suitable fastening means driven transversely through a hole in the upper end of the post is adapted to rest on the upper edge of the bushing, thus preventing the post 52 from dropping down out of the frame and carrier. A well known type of locating stud 68' is also provided on the upper surface 63' of the carrier head 63 and is adapted to be received in a suitable aperture in carrier 62. The surface of the carrier is parallel to the surface 63' of the carrier head, which is transversely inclined as above noted to place the forward edge 620 of the carrier below a plane perpendicular to the shaft 52 and including the rear edge of the carrier, an arrangement which increases the accuracy of flight of the targets when throwing doubles.

The outer end of the carrier head 63 is substantially L-shaped in cross section as indicated by the dotted lines in Figs. 2 and 2a, having a vertical web 70 extending downwardly from the forward edge thereof. A suitable boss 72 is formed at the outer end of the web 70, the boss being drilled vertically, as shown at 73 in Fig. 2c, and provided with a laterally extending portion 74 (see Figs. 2a and 2e) having a depending lug 75. The latter has a vertical surface 76 which makes an angle of substantially 52° with the longitudinal axis of the carrier and constitutes an abutment for a pawl 77.

The pawl 77 is adapted to be pivotally supported on the boss 72 by a pin 78 which is secured as hereinafter described in the vertically drilled hole 73 of the boss 72 and comprises a sector-shaped block having a counterweight portion 79 and an integrally cast upstanding tapered web portion 80 provided at its vertical wall with a transversely drilled hole 82 (see Figs. 2 and 2e) adapted to be positioned substantially opposite the vertical surface 76 of the lug 75. A tooth 83 is formed at the extreme forward end of the pawl. The apex of the sector-shaped pawl is rounded to provide a smooth cylindrical surface 84 and is drilled vertically, as at 85, to receive the assembly pin 78 which is provided with a head on its lower end, the upper end of the pin being inserted in the vertically drilled hole 73 of the boss 72 and secured therein by a pin 87 adapted to project through transversely drilled holes in the boss 72 and the upper end of the pin 78 respectively. A light coil spring 88 is shown mounted in the transversely drilled aperture 82 in the web portion 80 of the pawl, the free end of the spring being adapted thus to abut the vertical angularly disposed surface 76 of the lug 75 to urge the tooth 83 of the pawl in a counterclockwise direction, as seen in Figs. 2 and 2e.

The rear end of the carrier head is formed on its underside with a shoulder 89 which makes an angle of substantially 90° with the longitudinal axis of the carrier.

Rotatable on the carrier head supporting post or shaft 52 between the spaced flanges 45 and 46 of the frame is a toothed disk 90 which, as shown, comprises a ratchet sector comprising five teeth 92 in the periphery of the disk sub-tending an angle of substantially 65°. At a point on the bottom of the disk substantially diametrically opposite the teeth is a downwardly protruding cylindrical lug 93. A suitable hub 90' is formed integrally on the bottom of the disk 90 having an integrally joined arm 91 (see Fig. 5) provided with a bifurcated end 94, the arm being shaped substantially like a bell crank lever with its bifurcated end 94 extending beneath and in parallel relation to the undersurface of the disk opposite the teeth 90 thereof and provided with vertical axially aligned drilled holes 94'. A hole 95 is also drilled in the center of the disk 90 (see Fig. 2c) in which is secured a cylindrical bushing 96 for rotatably mounting the disk on the shaft 52. It will be noted that the upper end of the bushing 96 extends slightly above the upper surface of the disk 90 so as to form a collar 96'.

The disk is adapted to be rotated in a clockwise and counterclockwise direction on the shaft 52 by means of a cocking bar 97 which is pivotally secured at its forward end in the bifurcated end 94 of the arm 91 of the disk 90 by a pin 98 suitably secured in the drilled holes 94' thereof. The rear end of the cocking bar 97 is,

in the case of the skeet trap (shown in Fig. 1) pivotally connected to the arm of a cocking crank 99 which is fixedly secured at its lower end to one end of the crankshaft 25. The latter, as mentioned above, is rotatably supported in the horizontally aligned bearings 24 of the base. The cocking bar is provided, as shown, with a 90° twist so that its forward end may be inserted between the bifurcations of the arm 91 while its rear end is in substantially the vertical plane of the cocking crank 99. The opposite end of the crankshaft 25 extends through the base of the trap, as shown in Figs. 1a and 4 and is provided with a suitable crank handle 100, of well known construction, which is secured to the crankshaft 25 to provide means for manually operating the cocking bar 97.

The force required to project the targets from the carrier 62 is provided by a main spring 102 which is anchored at its rear end by means of an eye bolt 103 to one leg 104 of a U-shaped bracket 105. The latter, as shown, is secured in one of the drilled holes 40 in the tail end 39 of the frame while the opposite end 106 of the bracket is secured in a drilled hole 107 of a boss 108 which extends laterally from the side of the frame. Suitable collars 104'' and 104' are shown mounted on the leg 104 of the bracket both below and above the eye 103 to support the leg 104 in the hole 40 of the frame and prevent the eye from moving vertically on the leg 104 respectively. Mounted in this manner, the U-shaped bracket 105 constitutes a guard to protect the operator in the event the spring 102 should break.

The forward end of the spring is provided with a hook 109 which is adapted to engage in a drilled hole in the rear end of a link 110, hereinafter termed the spring link, which is a substantially flat piece of metal provided with a 90° twist so that its rear end lies in a substantially vertical plane while its forward end is in the plane of the bifurcations 64 of the carrier head 63. The forward portion 111 of the link (see Figs. 2 and 2a) is substantially spatular shaped and is formed at its forward edge with a shoulder 112 which makes an angle of substantially 60° with the longitudinal axis of the link. A hole 113 (see Fig. 6) is drilled vertically in the forward end of the link 110 substantially on the longitudinal axis thereof. The link 110 is thus adapted to be pivotally assembled on the carrier head 63 by axially aligning the hole 113 of the link with the drilled holes 64' in the bifurcated end 64 of the carrier head 63 and inserting a pin 114 in these aligned holes. When so connected, the shoulder 112 of the spring link 110 is so located as to cooperatively engage the angularly disposed shoulder 89 of the carrier head 63, as shown by the dotted line position of the carrier head 63 in Fig. 2e in the manner and for the purpose hereinafter described.

The trigger 55 is pivotally supported on the frame by the pin 130 as described above and comprises a member which is U-shaped at one end to provide a cam surface 115 and a hook portion 115' respectively. The opposite end of the trigger is formed as a relatively thick block 116, one edge of which comprises a smooth curve 117 of substantially one and three-quarters inches radius terminating in a rear edge 117'. A hole 118 is drilled vertically in the trigger intermediate its ends to accommodate the pin 130 for pivotally supporting the trigger between the laterally extending bosses 53 and 53' of the frame. A suitable lip 119 is formed on the edge of the

trigger adjacent the U-shaped section thereof and is drilled to provide a hole 119' for attaching suitable trigger actuating means.

In the skeet trap shown in the drawings, the trigger actuating means comprises a rod 120 having a hook adapted to be engaged in the hole 119' of the trigger lip and suitably secured at its opposite end to the bell crank lever 44 (see Figs. 1 and 3) which is pivotally supported on a suitable shaft 43 at the rear end 42 of the frame, the bell crank lever 44 being actuated by a pull string or cable, not shown.

The curvilinear portion 117 of the trigger is adapted to be engaged by a corresponding curvilinear portion 122' of a trigger lock and release latch 122 which is pivotally supported by the vertical pin 132 between the flanges 45 and 46 of the frame (see Figs. 2, 2a, 2d and 2e). The end portions of this latch on opposite sides of its pivot are identified by numerals 123 and 124. Part 124 is provided with a hole for receiving one end of a coil spring 125, the opposite end of the spring 125 being suitably anchored to the rear end of the pivoted safety hook 57. In the alternative construction illustrated in Fig. 11 and commonly used in the "skeet" trap, the safety hook 57 is omitted, since the trap can be made safe by pulling lever 100 rearwardly to take lug 93 out of contact with part 123 of release latch 122, and the spring 125 is anchored to a stud 570 which replaces the safety hook pivot pin.

It will be clear that the release latch 122 will be constantly urged by the coil spring 125 to rotate in a counterclockwise direction (see Figs. 2 and 2a) and is thus adapted to slide its curved periphery 122' into locking engagement with the correspondingly curved recess 117 in the rear end 116 of the trigger 55. In fact, the spring 125 causes the latch 122 to lock the trigger as soon as the latter is cammed into engagement with the pawl 77 as hereinafter described to hold the throwing arm or carrier in cocked position. The carrier cannot then be released until the lug 93 carries the latch 122 out of engagement with the trigger, as shown in Fig. 2.

The safety hock 57, which is pivotally supported on the laterally extending boss 56 on the side of the frame, is adapted to be manually operated to lock the trigger 55 in cocked position as shown by the dotted lines in Fig. 2a. To this end the safety hook has an upstanding rib 128 at its rear end provided with a hole in which the rear end of the release latch spring 125 is anchored. When the operator desires to positively lock the trigger 55, he engages his left thumb against the rib 128 of the safety lever 57 and pushes the lever clockwise thereby engaging the hooked end 57' of the lever over the rear edge 117' of the trigger. In this position, the rear end of the release latch spring 125 will have been swung past dead center, and, consequently, acts to hold the hook 57' of the safety lever 57 in engagement with the trigger. It will thus be clear that in the present embodiment, the safety hook 57 has two functions, namely to positively lock the trigger and to provide an anchor for the rear end of the release latch spring 125. The hook 57 is a safety feature which is especially suited to the remote cocking as well as remote release (see Fig. 8) which is characteristic of a "trap" or "straight trap" installation as distinguished from a "skeet" installation.

From the foregoing description, it will be clear that the pawl 77, which is pivotally mounted on the boss 72 of the carrier head 63, is constantly urged by the spring 88 to pivot counterclockwise, as shown in Fig. 2, and hence to engage its tooth 83 in the teeth 92 of the ratchet disk 90, the latter being so disposed with respect to the boss 72 of the carrier head that its teeth lie substantially opposite the pawl in position for engagement thereby when required.

Moreover, it will be evident from the foregoing description that the pawl 77 is of unusually heavy construction, comprising a solid block having a counterweight portion 79 so disposed that the center of mass of the pawl lies well to the rear of the pawl tooth 83 and adjacent the outside edge of the pawl, as seen in Fig. 2. In accordance with this construction in its normal position as shown in Fig. 2, the pawl tooth 83 is held resiliently in engagement with a tooth of the ratchet disk 90 by the light spring 88 and remains in engagement therewith as the carrier 62 and carrier head 63 are drawn back into cocked position, as shown in Fig. 2 and hereinafter described. On subsequent release of the carrier head 63, the latter swings counterclockwise with great rapidity carrying with it a pivoted pawl 77 and due both to the inertia of the counterweighted pawl and to the centrifugal force acting at its center of mass, the pawl pivots slightly clockwise or outwardly, overcoming the resistance of the light spring 88 so that the tooth 83 of the pawl readily clears the teeth 92 of the disk 90 as the pawl passes thereby. Thereafter, when the carrier head 63 is brought to a sudden halt at the end of its throwing arc, in the manner hereinafter described, the inertia of the pawl pivots it counterclockwise thus moving its tooth 83 inwardly into engagement with the periphery of the disk 90, as shown in Fig. 2e. On return of the carrier head 63, the pawl 77 is again centrifugally moved and held outward out of contact with the teeth of the disk 90, and, as the carrier head comes to rest in partially cocked position (see Fig. 2), the pawl tooth is moved against the periphery of the disk by the spring 88 ready to again contact a tooth of the disk 90 and stop further forward movement of the carrier.

Although the counterweighted pawl has been found to work satisfactorily, it may be considered desirable to provide suitable means to guard the ratchet teeth 92 so as to doubly insure against engagement of the tooth 83 of the pawl therewith during relative movement of the toothed disk 90 and pawl 77.

A suitable ratchet teeth guard means is shown in Fig. 7 and comprises a relatively thin flat sheet metal member 137 having a collar portion 138 apertured to rotatably fit over the collar 96' formed by the upstanding end of the disk bushing 96, as shown in Fig. 2c. The reach 139 of the guard member is formed with two substantially vertical stops 140 and 142 disposed in planes at substantially right angles to each other and suitably spaced apart for the purpose hereinafter described so as to accommodate loosely therebetween the web portion 70 of the carrier head 63, the reach 139 having a guard finger 145 at its outer end. Intermediate the stops is an upwardly projecting teat 143 constituting a pilot for a coil spring 144 which is mounted substantially vertically on the guard, the upper end of the spring being suitably located on web 70. One means for this purpose comprises an aperture 150 in the web portion 70 of the carrier head as shown in Fig. 2c. The guard 137 is thus pressed down in frictional engagement with the upper surface of the ratchet disk 90. The outer end or guard finger 145 of the reach 139 overlies the teeth 92 of the disk, as

shown in Figs. 2, 2a, 2d and 2e, forming a tooth guard adapted to lie in the path of the pawl.

In accordance with the above construction, the guard member 137 will be pivoted clockwise or counterclockwise relative to the ratchet disk 90 corresponding to movement of the carrier head 63 relative thereto. However, due to the spacing of the vertical stops 140 and 142 and the frictional engagement of the guard with the surface of the ratchet disk, a lost motion occurs between the guard and carrier head whenever the latter changes its direction of rotation. Thus, the position of the guard finger 145 relative to the tooth 83 of the pawl is automatically changed to prevent the pawl 77 from engaging the teeth 92 of the ratchet disk 90 when the carrier 62 is released from its cocked position, as shown in Fig. 2a, and swings around to the limit of its throwing arc as shown in Fig. 2e. Moreover, the guard is adapted to enable the pawl to engage in the teeth of the disk when the carrier is returned to its normal position, as shown in Fig. 2, and hereinafter described.

The operation of the target throwing trap for skeet shooting is as follows: Assuming the carrier 62 is in its normal position, shown in Fig. 2, the tooth 83 of the pawl 77 is spring urged into engagement with one of the teeth 92 of the ratchet disk 90, thereby connecting the carrier head to the ratchet disk. When the operator pulls the operating handle 100 rearwardly, the cocking bar 97 is drawn rearwardly thereby rotating the ratchet disk 90 clockwise on the post 52. Since the pawl is engaged in a tooth of the ratchet disk, the pawl and carrier head 53 are pivoted clockwise thereby tensioning the main spring 102 until the rounded peripheral apex 84 of the pawl 77 engages the cam surface 115 of the trigger as shown in Fig. 2d. The engagement of these surfaces positively cams the trigger 55 counterclockwise about its pivot pin 130 so that the hooked end 115' of the trigger is rotated into a position in front of the forward edge of the pawl. During this clockwise rotation of the ratchet disk 90, its lug 93 is moved out of engagement with the rear end 123 of the release latch 122 thereby releasing the latch whereupon its curved periphery 122' is drawn into cooperative engagement with the corresponding curved surface 117 of the trigger 55 by the coil spring 125. The release latch 122 thus locks the trigger 55. Thereafter the operator moves the handle 100 forwardly thereby rotating the ratchet disk 90 counterclockwise and returning the disk 90 to its normal position. As the ratchet disk begins its return motion, the carrier head 63 and pawl 77 tend to follow the ratchet disk 90 due to the force of the tensioned main spring 102 acting on the carrier head 63 and actually do move back slightly until the forward end of the pawl 77 engages in the hook 115' of the locked trigger, as shown in Fig. 2a. Thereupon the pawl 77 and carrier head are securely held in cocked position, the pawl 77 being moved further into the encompassment of the trigger hook 115' as a result of the camming action of the engaging surfaces of the pawl and ratchet disk as a tooth 92 of the ratchet disk moves out of engagement with the pawl tooth 83.

As the operator continues to move the ratchet disk 90 counterclockwise, a point is finally reached at which the lug 93 on the sector engages the rear end 123 of the release latch 122 and pivots the release latch clockwise, thereby withdrawing the latch from locking engagement with the trigger 55. Since the trigger pivot pin 130 is as shown substantially in direct alignment with the line of force acting through the pivot pin 78 of the pawl and the point of engagement of the forward end of the pawl with the hook 115' of the trigger, the force moments are in equilibrium and the trigger holds the carrier head 63 in cocked position.

In the target throwing trap for skeet shooting, the trigger 55 is adapted to be positively actuated by a trigger operating rod 120. By drawing this rod rearwardly, the hooked end 115' of the trigger will be disengaged from the pawl, thereby releasing the carrier head 63 whereupon the carrier 62 is swung counterclockwise with great rapidity due to the force of the tensioned main spring 102.

If the construction includes a pawl guard as above described, the pawl guard finger 145 will function at this time to prevent the pawl tooth 83 from engaging the teeth 92 of the ratchet disk. Due both to the friction between the guard and the top surface of the disk 90 and the spacing of the guard stop 142 with respect to the leading edge of the carrier head web 70 on release of the carrier head 63 from its cocked position, shown in Fig. 2a, the tooth 83 of the pawl is enabled to overtake the guard finger 145 as the carrier head starts its swing counter-clockwise. If haply the counterweighted pawl has not been swung outwardly by centrifugal force sufficiently to clear the teeth of the ratchet disk 90, then the pawl tooth 83 will ride up on the guard and thus pass safely over the ratchet teeth. Thereafter the pawl guard stop 142 is engaged by the leading edge of the web 70 and positively swung around with the carrier head.

As the carrier head arrives at the limit of its throwing arc which, in the present embodiment, is at a point in its swing slightly beyond dead center, as shown in Fig. 2e, its angularly disposed shoulder 89 abuts the shoulder 112 of the spring link 110. It will be evident, therefore, that whereas the length of the lever arm connecting the spring 102 to the carrier head 63 corresponded formerly to the distance from the carrier head post 52 to the pivoted connection 114 of the spring link with the carrier head 63, the carrier head shoulder 89 and link shoulder 112 now cooperate to form a lever equivalent in length to this distance plus the length of the spring link 110. And since any movement of the carrier head 63 a material distance past dead center begins to tension the throwing spring 102 through a lever arm of this increased length, further counterclockwise rotation of the carrier 62 is very rapidly decelerated. The carrier head and carrier thereupon recoil clockwise following a relatively short target throwing swing. On reversal in the direction of swing of the carrier head 63, the frictional engagement of the guard member 137 with the upper surface of the ratchet disk 90 and the spacing of the stop 140 with respect to the returning edge of the web 70 of the carrier head causes the guard to remain momentarily stationary whereupon the pawl tooth 83 moves back in advance of the guard finger 145 and is free to engage the teeth of the ratchet disk as the carrier head 63 returns to its initial position. The guard is subsequently picked up by the returning edge of the web 70 and carried back to its normal position shown in Fig. 2. Continued oscillation of the carrier 62 is prevented due primarily to engagement of the pawl in the teeth of the ratchet. When this occurs the counterclockwise rotation of the latter from its normal

position, shown in Fig. 2, is prevented by engagement of its lug 93 with the rear end 123 of the release latch 122, the latter being restrained from clockwise movement by abutting the fixed web 47 or other portion of the frame. The carrier can now be recocked as above described to repeat the cycle.

The device heretofore described is, as above noted, especially adapted for "skeet" shooting in which one target at a time is projected in one direction only and various shooting angles are secured by movement of the shooter from one to another of several shooting posts. While release of the trap is from a remote point, cocking of the trap is effected at the trap itself by manipulation of the lever 100 as above described.

In "trap" or "straight trap" shooting, it is necessary to provide an appliance in which the direction of target flight can be varied and also to provide for the simultaneous projection of two targets. Likewise, both cocking and release are effected by remote control.

An appliance for this purpose will hereinafter be identified as a "straight trap" installation as distinguished from a "skeet" installation. The present invention readily lends itself to adaptation to a "straight trap" installation, as illustrated in Figs. 8, 8a, 9 and 10.

The trigger 55 is urged to carrier releasing position by a spring 135 joined to the trigger at 119 and anchored to the frame at 136. Thus, the carrier head and carrier are released from cocked position to execute their throwing movement whenever the ratchet disk 99 is fully restored to its normal position causing lug 93 to rock the release latch 122. To provide for increasing the tension on main spring 102 for the throwing of "doubles," said main spring is anchored to short arm 137 of an elbow lever pivoted to the frame at 179 and provided with a long arm 178 by manipulation of which the trap frame is oscillated to vary the angle of projection of single targets in the manner hereinafter described. For the throwing of singles, lever 137—178 is in the position illustrated in Fig. 8. The bracket 105 heretofore mentioned serves as a guard to prevent injury to the operator's hand in the event of breakage of the spring 102 and the leg 104 of this guard likewise serves as an abutment to locate lever or handle 178 with respect to the trap frame. Increased tension necessary for throwing doubles is secured by moving the lever 137—178 to the position shown in Fig. 8a, in which position it is again retained by leg 104 of guard 105.

To provide for projecting targets in varying directions, the base is designed to provide a turn table and an axis of rotation and the trap frame is provided with parts cooperating therewith. The base, identified by numeral 180, is provided with bolt receiving apertures 141, 142' and 182, two of which are for convenient interchangeability placed in the same relative positions as the corresponding bolt holes of the skeet installation.

The base 180 is a substantially disk-shaped casting having a center post 183 and an upstanding rim 184. The latter is cast on the periphery of the base throughout an arc of substantially 130° and provided with a pair of horizontally extending cored slots 185. The latter are adapted to provide guides for a pair of adjustable stops 146 which, as shown, comprise arcuate-shaped blocks each having a protuberance 146' thereon adapted to slide in the cored slots of the rim. A hole is drilled through each stop longitudinally of the protuberance thereof for receiving a bolt 147 or other fastening means by which the stop may be fixed at any point on the rim of the base.

Concentric with the rim and center post is an annular track 148 slightly raised above the surface of the base and provided with a finished surface for supporting a turret or swivel base 149 which is adapted to be rotatably mounted on the fixed base. The diameter of the swivel base is less than the diameter of the fixed base 180, thereby forming an annular space, see Fig. 9, between the periphery of the turret and the arcuate rim of the base. An annular projection (not shown) having a finished surface is formed on the underside of the turret and is adapted to ride on the finished track 148 of the fixed base.

Cast integral on the periphery of the turret disk is a radially disposed lug 186 which extends beyond the edge of the disk 149 into the annular space between the turret and the rim of the base. The lug is adapted to abut the ends of the stops 146 and constitutes means for limiting the rotation of the turret through an arc, the spread of which is determined by the position of the adjustable stops in the rim 184 of the base.

Located on the base adjacent one end of the rim are a pair of vertical ears 152 cast integral with the base and provided with horizontally aligned drilled holes. The ears constitute means for pivotally supporting a brake member for holding the frame in a predetermined position on the base. The brake, as shown in Fig. 10, comprises a casting 153 having an upright web portion 153' provided with a laterally extending sector shaped plate 154 integral with its upper edge. A drilled hole is formed in the lower left-hand corner of the brake casting 153 so that the latter may be pivotally mounted between the ears 152 by a pin 155 driven axially through aligned holes of the ears and web. The lower edge of the brake web is recessed to form a shoe 156 adapted to frictionally engage the upper surface of the turret disk 149. It will be clear that by pivoting the brake 153 downwardly, the friction force developed between the turret disk 149 and brake shoe 156 will be sufficient to hold the turret from turning on the base 180.

The turret is rotatably supported on the upstanding shaft 183 of the base by means of a vertically drilled hub 157 which may be cast integral with the turret disk 149 and is provided with laterally extending ears 158 each having a horizontally drilled bolt hole. Supported on the ears of the hub is a bracket 159, see Fig. 9, which comprises a T-shaped casting, the leg 160 of which is provided adjacent its lower edge with a horizontally spaced pair of apertures, one of which is a drilled hole 162 and the other an arcuate slot 163 of substantially 10° spread as indicated in Fig. 10. The leg 160 of the bracket is adapted to be secured to the ears 158 of the turret by suitable bolts 164.

As in the skeet shooting trap, the arcuate slot 163 in the leg 160 of the bracket enables tilting adjustment of the trap frame 35 which is secured to the bracket 159 as described below. The cross piece 165 of the T-shaped bracket is provided adjacent its upper edge with a pair of drilled holes which are suitably spaced apart so as to be axially aligned with the drilled hole 59 and arcuate slot 60 of the frame 35 described above whereby the latter may be fastened to the bracket by suitable bolts 34'. It will thus be evident that the frame 35 carrying the target throwing mechanism may be used interchangeably with the skeet base or

trap base. It will also be apparent that, the frame 35 being rigidly connected to the turret 149—157, said frame and the target carrier thereon can be moved about the vertical axis 183 to any desired angular position, within the limits established by the setting of stops 146. As above mentioned, the lever arm or handle 178 affords a convenient manipu'ative device for thus varying the direction in which targets are projected.

Pivotally supported on the flat top 154 of the brake is a yoke member 166 which is offset as shown. The rear end of the yoke is drilled vertically to receive a fastening means 167 for pivotally assembling the yoke on the brake at the apex portion thereof. The opposite end of the yoke is bifurcated, as shown at 169, and provided with a pair of vertically drilled holes for pivotally connecting the cocking bar 97 and an operating rod 170 thereto by means of pins 97' and 169' respectively.

When pull rod 170 is drawn to the rear, the brake shoe portion of member 153 is pressed downwardly into braking engagement with the upper surface of disk 149 in the following manner. Rotation of the offset lever or yoke 166 about its pivot 167 is resisted by main spring 102 acting through link 97 and associated parts. This effects a forward pull on pivot 167 and its support 154, but, since these parts can move only in rotation about pivot pin 155, their movement under the force applied to them is forwardly and downwardly in an arc about pivot 155. This movement brings the underside of member 153 into firm engagement with the upper surface of disk 149. Braking of the rotation of the turret is particularly important when the frame is swung near its extreme right position for it will be seen that in this position the pivotal connection 97' between the cocking bar 97 and yoke 166 will be moved to a position of substantially maximum disalignment with the center of rotation 183 of the turret, thereby setting up a moment force tending to turn the turret and frame 35 from their predetermined position whenever the operating rod 170 is actuated.

The target throwing trap is cocked in substantially the same manner as the skeet trap simply by drawing the cocking bar 97 rearwardly which, in this instance, is done by drawing the operating rod 170 rearwardly until the carrier head 63 is locked in cocked position by the trigger 55. Thereafter the operator moves the operating rod 170 forwardly to return the ratchet disk 99 to its normal position. At a predetermined point in the forward movement of the operating rod, the trigger will be disengaged by the latch 122 in the manner described above whereupon the trigger spring 135 will automatically pull the trigger out of engagement with the pawl 77 and thus release the carrier head 63 and carrier 62. To prevent automatic release of the trigger and as a safety feature, the hook 57', described above, may be moved manually into engagement with the rear edge 117' of the trigger.

The angle of flight of the target is adjusted to any predetermined position by the operator by means of the angling handle 178. The latter also embodies a second function, namely that of setting up the trap for throwing doubles. It has been found that, for satisfactory performance in throwing doubles, it is desirable not only to increase the tension force of the main spring 102 but also to accelerate the carrier 62 through a greater angle.

In the present embodiment, both of these functions are accomplished by swinging the angling handle clockwise, see Fig. 8a, after first removing the U-shaped bracket 105, until the handle 178 is substantially parallel to the frame 35. The U-shaped bracket is then replaced and effectively locks the handle 178 in the doubles position. Since the trap is not "angled" when throwing doubles, the use of the handle for this purpose can very well be dispensed with.

It will be evident that, in this position, the short arm 137 of the handle has been turned clockwise so that its connection to the hooked end of the main spring 102 is displaced further from the axis of rotation 52 of the carrier 62, thereby effectively lengthening the main spring. Moreover, it will be clear that the angle between the carrier 62 and the main spring, through which the force of the spring acts in accelerating the carrier after release, has been materially increased.

What is claimed is:

1. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head having a bevelled shoulder and target carrier and supported on said shaft; a main spring for rotating said carrier; means for cocking said carrier head in position for rotation by said main spring; manually operated means for releasing said cocked carrier head whereby said carrier head and carrier are accelerated by said main spring through a throwing arc; and a link connecting said main spring to said carrier head, said link having a bevelled shoulder adapted to cooperatively engage the bevelled shoulder of said carrier head when said carrier is at approximately the end of its throwing arc to rapidly decelerate the carrier.

2. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head supported on said shaft, said head having a pawl pivotally mounted thereon provided with a weighted portion eccentric to the pawl pivot and a target carrier on said head; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the counterweighted pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; trigger means for securing said carrier head in cocked position; and means for releasing said trigger means whereby said carrier head and carrier are accelerated by said main spring through a throwing arc, said carrier head pawl being automatically held out of engagement with said toothed disk by the centrifugal force of the eccentrically pivoted weighted portion of said pawl while said carrier is swinging through said throwing arc.

3. A device for throwing targets comprising a base; a frame supported on said base; a carrier; means for rotatingly supporting said carrier on said frame; means for cocking said carrier comprising a resilient member, a ratchet and a counterweighted pawl pivotally mounted on said carrier; and means to release said cocked carrier whereby said carrier is swung by said resilient member through a throwing arc and returned to its uncocked position by said resilient member, said counterweighted pawl comprising a weighted portion eccentric to the pawl pivot and adapted to hold said pawl out of engagement with said ratchet by centrifugal force while said carrier

is swinging through said throwing arc and is returning to its uncocked position.

4. A device for throwing targets comprising a base; a frame supported on said base; a carrier; means for rotatingly supporting said carrier on said frame; means for cocking said carrier comprising a resilient member, a ratchet and a counterweighted pawl pivotally mounted on said carrier; means to release said cocked carrier whereby said carrier is swung by said resilient member through a throwing arc; and means associated with said resilient member to rapidly decelerate said carrier at the end of its throwing arc and to return said carrier to its uncocked position, said counterweighted pawl comprising a weighted portion eccentric to the pawl pivot and adapted to hold said pawl out of engagement with said ratchet by centrifugal force while said carrier is swinging through said throwing arc and is returning to its uncocked position.

5. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; trigger means for securing said carrier head in cocked position; means for releasing said trigger means whereby said carrier head and carrier are accelerated by said main spring through a throwing arc; and means associated with said toothed disk and carrier head to guard the teeth of said disk from engagement by said pawl during the acceleration of said carrier head and carrier.

6. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported for rotation in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; trigger means for securing said carrier head in cocked position; means for automatically locking said trigger means; and means for releasing said trigger means whereby said carrier head and carrier are accelerated by said main spring through a throwing arc.

7. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; means for securing said carrier head in cocked position comprising a trigger pivoted to said frame having a cam surface and a hook, said cam surface being adapted to be engaged by said pawl to pivot said trigger hook into engagement with said pawl; and manually operated means for withdrawing said trigger hook from engagement with said pawl whereby said carrier head and carrier are released and accelerated by said main spring through a throwing arc.

8. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; means for securing said carrier head in cocked position comprising a trigger pivoted to said frame having a cam surface and a hook, said cam surface being adapted to be engaged by said pawl to pviot said trigger hook into position for engagement by said pawl; manually operated means for withdrawing said trigger hook from engagement with said pawl whereby said carrier head and carrier are released and accelerated by said main spring through a throwing arc; and means for locking the trigger hook in engagement with said pawl.

9. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; means for securing said carrier head in cocked position comprising a trigger pivoted to said frame having a cam surface and a hook, said cam surface being adapted to be engaged by said pawl to pivot said trigger hook into position for engagement by said pawl; manually operated means for withdrawing said trigger hook from engagement with said pawl whereby said carrier head and carrier are released and accelerated by said main spring through a throwing arc; and means associated with said toothed disk and carrier head to guard the teeth of said disk from engagement by said pawl during the acceleration of said carrier head by said main spring.

10. A device for throwing targets comprising a base; a frame supported on said base; a substantially vertical shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; means for cocking said carrier head; means for securing said carrier head in cocked position comprising a trigger pivoted to said frame having a cam surface and a hook, said cam surface being adapted to be engaged by said pawl to pivot said trigger hook into position for engagement by said pawl; and manually operated means for withdrawing said trigger hock from engagement with said pawl whereby said carrier head and carrier are released and accelerated by said main spring through a throwing arc.

11. A device for throwing targets comprising a base; a frame supported on said base; a substantially vertical shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; means for cocking said

carrier head; means for securing said carrier head in cocked position comprising a trigger pivoted to said frame having a cam surface and a hook, said cam surface being adapted to be engaged by said pawl to pivot said trigger hook into position for engagement by said pawl; manually operated means for withdrawing said trigger hook from engagement with said pawl whereby said carrier head and carrier are released and accelerated by said main spring through a throwing arc; and a trigger locking latch pivotally mounted on said frame constructed and arranged to move into locking engagement with said trigger when the latter is in engagement with said pawl.

12. A device for throwing targets comprising a base; a frame supported on said base; a substantially vertical shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; means for cocking said carrier head; means for securing said carrier head in cocked position comprising a trigger pivoted to said frame having a cam surface at its rear end and a cam surface and hook at its forward end, the cam surface at its forward end being adapted to be engaged by the pawl to pivot the trigger hook into position for enagement by said pawl; a trigger locking latch pivotally mounted on said frame; resilient means to automatically move said latch into engagement with the cam surface on the rear end of said trigger when the trigger hook is in engagement with said pawl; means for withdrawing said trigger latch from engagement with said trigger; and manually operated means for withdrawing said trigger hook from engagement with said pawl whereby said carrier head and carrier are released and accelerated by said main spring through a throwing arc.

13. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; trigger means for securing said carrier head in cocked position; means for releasing said trigger means whereby said carrier head and carrier are accelerated by said main spring through a throwing arc; means to guard the teeth of said disk from engagement by said pawl during the acceleration of said carrier head comprising a collar rotatable about said shaft having a guard finger overlying the teeth of said disk; and means on said collar constructed and arranged to be engaged by said carrier head whereby movement of said carrier head relative to said toothed disk displaces said finger with respect to said teeth.

14. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; trigger means for securing said carrier head in cocked position; means for releasing said trigger means whereby said carrier head and carrier are accelerated by said main spring through a throwing arc; means to guard the teeth of said disk from engagement by said pawl during the acceleration of said carrier head and carrier comprising a collar rotatable about said shaft having a guard finger overlying the teeth of said disk; means on said collar constructed and arranged to be engaged by said carrier head whereby movement of said carrier head relative to said toothed disk displaces said finger with respect to said teeth; and means associated with said carrier head and tooth guard constructed and arranged to provide lost motion between said carrier head and guard on the reversal of movement of said carrier head.

15. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; trigger means for securing said carrier head in cocked position; means for releasing said trigger means whereby said carrier head and carrier are accelerated by said main spring through a throwing arc; means to guard the teeth of said disk from engagement by said pawl during the acceleration of said carrier head and carrier comprising a collar rotatable about said shaft having a guard finger overlying the teeth of said disk; stops of said tooth guard constructed and arranged to be engaged by said carrier head; and resilient means associated with said carrier head and tooth guard constructed and arranged to hold said guard in frictional engagement with said toothed disk.

16. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head having a target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head securing means; means for rotating said carrier head into engagement with said securing means; a latch pivotally mounted on said frame and actuated by said carrier head rotating means for automatically locking said carrier head securing means; means carried by the carrier head rotating means adapted to displace said latch and thereby to unlock said carrier head securing means; and manually operated means for releasing said cocked carrier head from the unlocked securing means whereby said carrier head and carrier are accelerated by said main spring through a throwing arc.

17. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for actuating said carrier head; carrier head cocking means comprising a toothed disk rotatingly mounted on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; trigger means for securing said carrier head in cocked position; means for automatically locking said trigger means comprising a latch pivotally supported on said frame

and a spring to draw said latch into engagement with said trigger means; and means on said toothed disk for positively moving said latch out of engagement with said trigger means.

18. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; trigger means for securing said carrier head in cocked position; means for automatically locking said trigger means comprising a latch pivotally supported on said frame and a spring to draw said latch into engagement with said trigger means; a lug on said toothed disk adapted to engage said latch and pivot said latch out of engagement with said trigger means; and manually operated means for releasing said trigger means.

19. A device for throwing targets comprising a base; a turret rotatably mounted on said base; a frame supported on said turret; a target carrier pivotally supported on said frame; a main spring for rotating the carrier; manually operated means for cocking and releasing said carrier; and means actuated by said manually operated means to prevent rotation of said turret on said base when cocking said carrier.

20. A device for throwing targets comprising a base having adjustable stops supported thereon; a turret rotatably mounted on said base; means on said turret to engage said stops to limit the rotation of said turret on said base; a frame supported on said turret; a target carrier pivotally supported on said frame; a main spring for rotating the carrier; manually operated means for cocking and releasing said carrier; and means actuated by said manually operated means to prevent rotation of said turret with respect to said stops when cocking said carrier.

21. A device for throwing targets comprising a base; a turret rotatably mounted on said base; a frame supported on said turret; a target carrier pivotally supported on said frame; a main spring for rotating the carrier; manually operated means for cocking and releasing said carrier; a bracket pivotally supported on said base having a shoe engageable with said turret; and means connecting said bracket and said manually operated means whereby said bracket is pivoted downwardly by manipulation of said manually operated means to frictionally engage the bracket shoe with said turret.

22. A device for throwing targets comprising a base; a turret rotatably mounted on said base; a frame supported on said turret; a target carrier pivotally supported on said frame; a main spring for rotating the carrier; manually operated means for cocking and releasing said carrier; means actuated by said manually operated means to prevent rotation of said turret on said base when cocking the said carrier; and means for rotating said turret on said base.

23. A target throwing trap comprising a base; a turret rotatably mounted on said base; a frame supported on said turret; manually operated means supported on said frame for rotating said turret; a carrier head having a target carrier and pivotally supported on said frame; a main spring for rotating said carrier head and carrier; and a main spring guard secured to said frame and constructed and arranged to locate said manually operated means with respect to said frame.

24. A target throwing trap comprising a base; a turret rotatably mounted on said base; a frame supported on said turret; a manually operated angling handle mounted on said frame for rotating said turret, said angling handle comprising means to adapt said trap for throwing singles and doubles; a carrier head having a carrier and pivotally supported on said frame; a main spring for rotating said carrier head and carrier; means for securing one end of said main spring to said carrier head, said spring being connected at its opposite end to said angling handle; and means for securing said angling handle in either of two positions on said frame whereby the tension of said main spring and the angle of acceleration of said carrier are varied for throwing singles and doubles.

25. A target throwing trap comprising a base; a turret rotatably mounted on said base; a frame supported on said turret; an angling handle supported on said frame for rotating said turret, said angling handle having a tongue adapted to be swung from a normal position for throwing singles to an angularly displaced position for throwing doubles; a carrier head having a carrier and pivotally mounted on said frame; a main spring for rotating said carrier head and carrier; means for securing one end of said main spring to said carrier head, said spring being connected at its opposite end to said angling handle tongue; and spring guard means mountable on said frame for securing said tongue in its normal and angularly displaced positions.

26. A device for throwing targets comprising a base; a frame supported on said base; a shaft supported in said frame; a carrier head supported on said shaft, said carrier head having a top planar surface inclined to said shaft both transversely and longitudinally; a carrier fastened to the upper planar surface of said carrier head, the entire leading edge of said carrier being in the plane of the transverse inclination of said planar surface; a main spring for rotating said carrier head; means for cocking said carrier head in position for rotation by said main spring; and manually operated means for releasing said carrier head and carrier.

27. In a device of the character described, means for throwing targets at various angles and at various elevations throughout a target field comprising means for cocking a target carrier; means actuated by said carrier cocking means for locking the carrier in cocked position; means carried by said carrier cocking means to engage the locking means to unlock the carrier; and means constructed and arranged to limit the spread of the throwing arc by rapidly decelerating the carrier.

28. A device for throwing targets comprising a base; a frame; a carrier; means for rotatably supporting said carrier on said frame; means for cocking said carrier comprising a ratchet and a counterweighted pawl pivotally mounted on said carrier; a resilient member associated with said carrier; means to release said cocked carrier to enable said carrier to be swung by said resilient member through a throwing arc, said counterweighted pawl comprising a weighted portion eccentric to the pawl pivot and adapted to automatically hold said pawl out of engage-

ment with said ratchet by centrifugal force while said carrier is swung through said throwing arc; and means adjustably mounted on said base for supporting said frame, said mounting means having adjustable members for adjusting said frame with respect to said base.

29. A device for throwing targets comprising a base; a frame; means for supporting said frame on said base comprising a turret rotatably mounted on said base; a shaft freely supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is rotated into cocked position for rotation by said main spring; means actuated by said manually operated means to prevent rotation of said turret on said base when cocking said carrier; trigger means for securing said carrier head in cocked position; means actuated by said toothed disk to automatically engage and lock said trigger means; and means for releasing said trigger means whereby said carrier head and carrier are accelerated by said main spring through a throwing arc.

30. A device for throwing targets comprising a base; a frame; means for supporting said frame on said base comprising a turret rotatably mounted on said base; a shaft freely supported in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; means for securing one end of said main spring to said carrier head; a guard member fixedly mounted in said frame and fastened to the opposite end of said main spring; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is rotated into cocked position for rotation by said main spring; means actuated by said manually operated means to prevent rotation of said turret on said base when cocking said carrier; trigger means for securing said carrier head in cocked position; means actuated by said toothed disk to automatically engage and lock said trigger means; and means for releasing said trigger means whereby said carrier head and carrier are accelerated by said main spring through a throwing arc.

31. A device for throwing targets comprising a base; a frame; an element mounted on said base for movement with respect thereto to support said frame; means to limit the movement of said element with respect to said base; means carried by said element arranged to secure said

frame thereto; a shaft supported for rotation in said frame; a carrier head having a pawl and target carrier and supported on said shaft; a main spring for rotating said carrier head; carrier head cocking means comprising a toothed disk rotatable on said shaft, a tooth of said disk being adapted to engage the pawl of said carrier head; manually operated means for rotating said disk whereby said carrier head is carried into cocked position for rotation by said main spring; a trigger for securing said carrier head in cocked position; means for automatically locking said trigger; and means carried by said frame and releasable on the return of said toothed disk to its normal position to release said trigger whereby said carrier head and carrier are accelerated by said main spring through a throwing arc.

32. A device for throwing targets comprising a base; a frame; an element mounted on said base for movement with respect thereto to support said frame; means to limit the movement of said element with respect to said base; means carried by said element arranged to secure said frame thereto; a carrier; means to rotatably support said carrier on said frame; means for cocking said carrier comprising a ratchet and a counterweighted pawl pivotally mounted on said carrier and a link connected at one end to said ratchet and at its opposite end to a crank member pivotally mounted on said base; a resilient member associated with said carrier; and means carried by said frame and releasable on the return of said ratchet to its normal position to release said cocked carrier to enable said carrier to be swung by said resilient member through a throwing arc, said counterweighted pawl comprising a weighted portion eccentric to the pawl pivot and adapted to automatically hold said pawl out of engagement with said ratchet by centrifugal force while said carrier is swung through said throwing arc.

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