H. C. LORD.

TARGET TRAP.

APPLICATION FILED JUNE 6, 1916.

1,292,825.

Patented Jan. 28, 1919.

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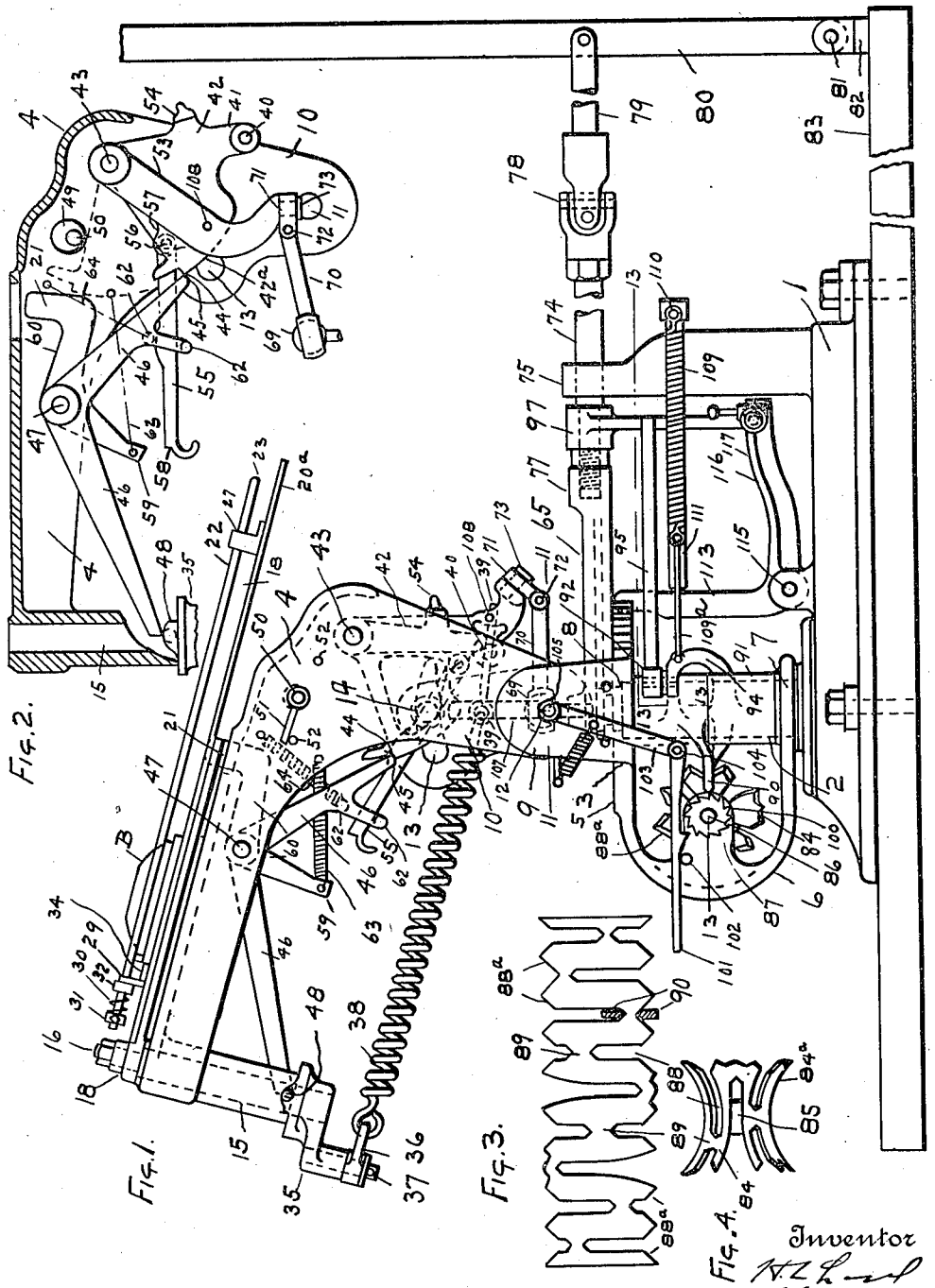


Fig. 2.

Fig. 1.

Fig. 3.

Fig. 4.

Inventor

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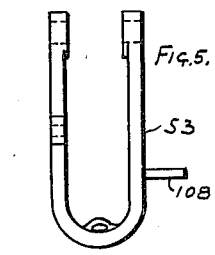
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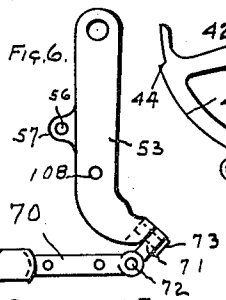
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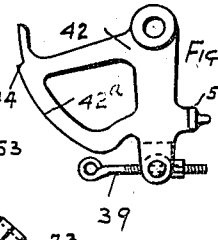
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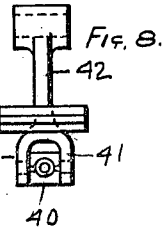
Patented Jan. 28, 1919.

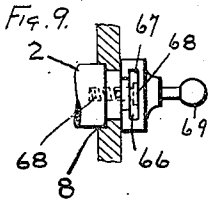
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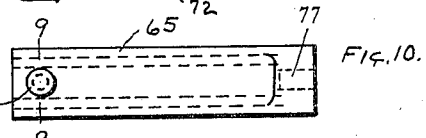


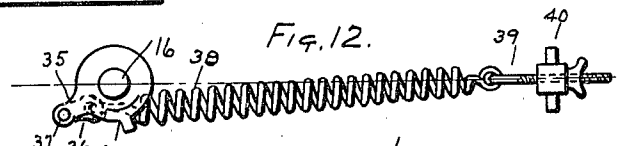


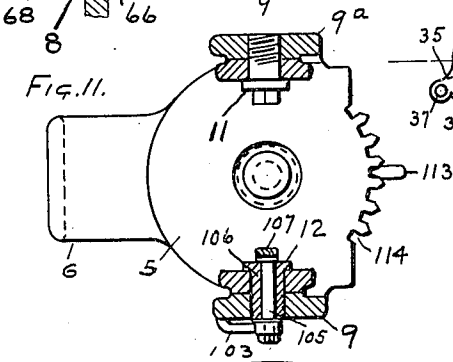


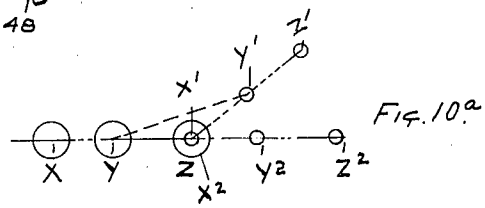












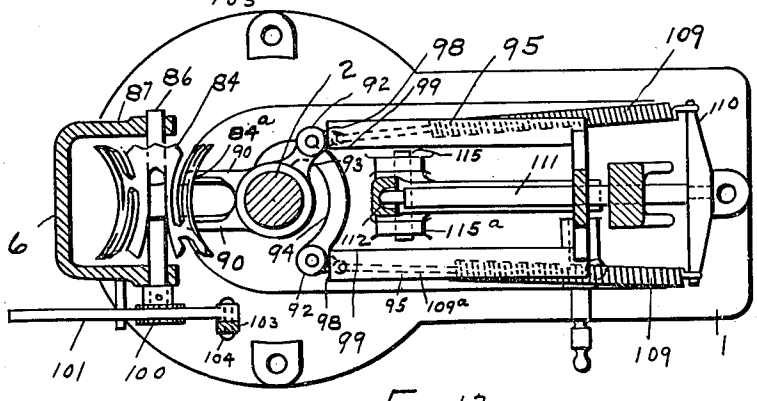
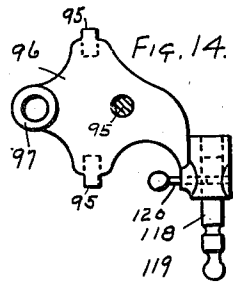


Fig. 13.



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3 SHEETS—SHEET 3.

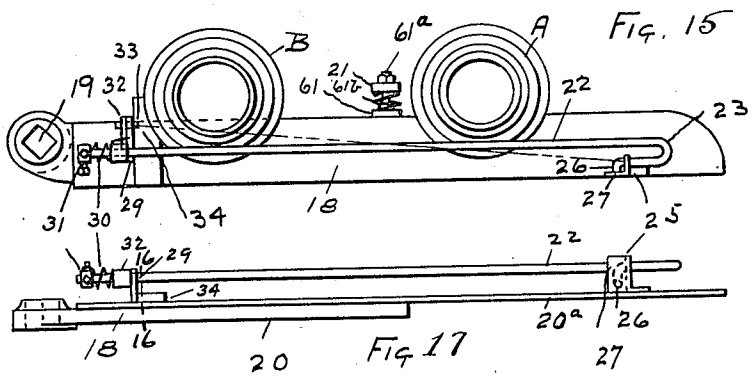


Fig. 15

Fig. 17

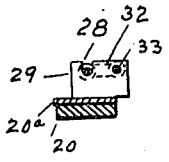


Fig. 16

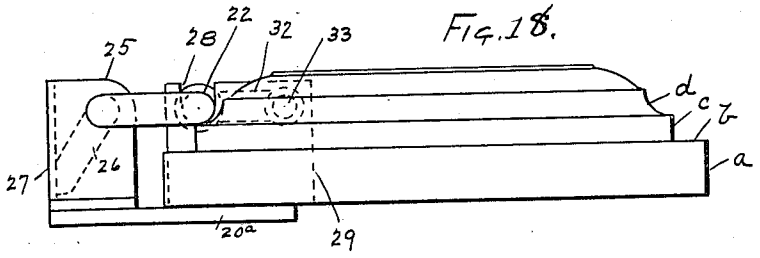


Fig. 18.

Inventor

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UNITED STATES PATENT OFFICE.

HUGH C. LORD, OF ERIE, PENNSYLVANIA.

TARGET-TRAP.

1,292,825. Specification of Letters Patent. Patented Jan. 28, 1919.

Application filed June 6, 1916. Serial No. 102,081.

To all whom it may concern:

Be it known that I, HUGH C. LORD, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Target-Traps, of which the following is a specification.

This invention relates to target traps and consists in certain improvements in the construction thereof as will be hereinafter fully described and pointed out in the claims.

The invention is illustrated in the accompanying drawings as follows:

Figure 1 shows a side elevation of the trap; Fig. 2 a section showing a part of the operating mechanism of the trap; Fig. 3 a development of the chance wheel; Fig. 4 a side elevation of said wheel; Fig. 5 an end view of the setting lever; Fig. 6 a side elevation of the same with its attached link; Fig. 7 a side elevation of the spring lever; Fig. 8 an end view of the same; Fig. 9 a section on the line 9—9 in Fig. 10; Fig. 10 an elevation of the pull slide; Fig. 10ª a diagram indicating the pull linkage; Fig. 11 a section on the line 11—11 in Fig. 1; Fig. 12 a plan view of the spring and attached parts; Fig. 13 a section on the lines 13—13; Fig. 14 an end view of the slide cross head; Fig. 15 a plan view of the throw arm; Fig. 16 a section on the line 16—16 in Fig. 17; Fig. 17 a side elevation of the throwing arm, the view being from the rear; and Fig. 18 an enlarged end view of the throwing arm with the target in place thereon.

1 marks the base of the trap, 2 an upstanding post thereon, 3 a swivel base on the post and 4 the throw arm frame. The base 1 is fixed on the post. The swivel base swings on this to vary the angle of flight. The throw arm frame carrying the operating mechanism of the throw arm is adapted to be shifted as to elevation.

The swivel base has a platform 5 and an arched arm 6 extending forwardly to the rear having a journaled end 7 arranged on the post 2. The post 2 has the shoulder 8 (see Fig. 9) which carries the weight of the frame, the journal 7 simply maintaining the alinement. Two supporting ears 9 and 9ª extend upwardly from the platform 5 and the downwardly extending ears 10 on the frame 4 fit between the ears 9 and 9ª and are pivotally mounted thereon by means of the screws 11 and 12. The ear 9ª is somewhat higher than the ear 9 and the ear 10 at this side of the frame has a slot 13. A screw 14 extends through this slot and into the upper end of the ear 9ª and affords a means for locking the throw arm frame as it is adjusted for elevation, the throw arm frame swinging on the pivots formed by the pins 11 and 12. A bearing 15 is arranged on the forward end of the throw arm frame and a shaft 16 extends through this bearing having a squared end (not shown) which extends through a squared opening 19 in the end of the throw arm 18.

The throw arm in this trap is designed to make a complete revolution and is preferably formed by a cast portion 20 and upper blade 20ª. The cast portion extends out a sufficient distance to engage a stop 21 by which the arm is arrested. A rod 22 is mounted above the plate 20ª. It has a return bend 23 at its outer end and the return end of this bend extends through a bracket 25 secured to the plate. The end of the rod is then turned downwardly at 26 forming a stop which engages a side flange 27 on the bracket. The inner end of the rod 22 is arranged in a slot 28 in a bracket 29. A spring 30 is coiled around the rod and locked therewith by means of a collar 31. The opposite end of the spring is secured to a lever 32 journaled on the rod 22. The lever 32 is secured by a pin 33 to an extension on the bracket 29.

Targets are placed on the plate 20ª and shoved under the rod 22, the rod 22 being spaced from the plate 20ª so as to make a spring grip for the target. The spring 30 is tensioned by swinging the lever downwardly to its position. Thus there is torsion put on the rod 22 which tends to turn the outward end of the rod downwardly, the opening in the bracket 25 forming a center for this turning movement. On the other hand, the rod can swing upwardly on the pin 33, the spring 30 opposing this move-

ment so that this spring 30 tends to hold both ends of the rod downwardly. By making the line between the pin 33 and the opening in the bracket 25 across the rod 22 as indicated in dotted lines Fig. 15 at an intermediate position two targets may be gripped at the same time by the rod 22, one being arranged at each side of the crossing of this line. In this way two targets may be thrown at once if desired. The direction of the target with relation to the trap frame may be controlled by the position that the targets are placed lengthwise of the rod 22. A stop 34 is provided for one of the targets so as to position it for the right direction for the last target of two. This stop may be changed for throwing single targets if desired.

Targets are ordinarily arranged with a rim *a*, with a platform *b* on top of this rim, an upwardly extending engaging surface *c* and a beveled portion *d* above this and it is the ordinary practice to engage these targets just above the platform *b*. In the present device the rod is arranged above the edge *c* and against the beveled surface. Two important functions are performed by this, first, the target is engaged above the center of gravity and consequently there is no tendency of the front edge of the target to tip up and, second, by engaging the beveled edge there is small resistance to the turning movement of the target and the wedging action assures with the spring action a close grip of the target. Thus the arm delivers a very flat target with a high degree of rotation.

A crank 35 is fixed on the lower end of the shaft 16. A swivel 36 is mounted on the lower end of the crank and the swivel secured thereon by means of a pin 37. The front end of a spring 38 is secured to the swivel 36. The rear end of the spring is secured to an eye-bolt 39 which extends through a trunnion 40 carried between the arms 41 on the spring lever 42. The spring lever 42 is journaled on a pin 43 extending between the sides of the frame 4.

The front surface of the spring lever has a curved segment 42ª with the center of the pin 43 as the center of the segment, the segment ending with a stop notch 44. The notch 44 engages the end 45 of a lever 46. The lever 46 is journaled on a pin 47 extending between the sides of the frame 4. The forward end of the lever is in the path of a cam 48 carried by the upper face of the crank 35. The operation of the throw arm and this feature of the mechanism is as follows: When the throw arm is released by the stop 21, the spring 38 acting on the crank gives it rotative movement. As the throw arm approaches a position in alinement with the arm, the cam 48 engages the end of the lever 46 and moves the forward end of this lever upwardly, thus depressing the rear end 45 and disengaging this from the notch 44. This permits the spring lever to swing forwardly and to release the tension on the spring so that the momentum of the throw arm will carry it through a complete rotation and into engagement with the stop 21. If the spring 38 is entirely released, the throw arm will strike the stop 21 with great violence. In order to bring the arm to nearly the stop before the engagement takes place as well as to partially tension the spring 38 a stop 49 is provided which engages the spring lever as it swings forward and limits its movement. This stop is so adjusted that the spring is tensioned toward the latter part of the movement of the throw arm so as to bring it to nearly a stop before the engagement of the stop 21 and also to re-set the spring so far as possible and thus reduce the labor of pulling the trap.

It will be understood that the energy necessary to throw the target is reduced by the tendency of the arm to return to the stop 21 or to make a complete rotation and where two targets are thrown a greater amount of energy is absorbed than where one target is thrown. In order to readily adjust the spring so as to compensate for these varying demands on the arm, I have formed the stop 49 in the form of an eccentric which is carried by a pin 50 journaled in the sides of the frame 4. An arm 51 is fixed on the pin 50 and may swing from one stop 52 to the other, thus bringing the large part of the cam into the path of the spring arm when a small amount of energy is absorbed and thus decrease the forward movement of the spring arm. Where doubles are thrown, the small part of the eccentric may be thrown into the path thus giving a greater release of the spring and assuring its return.

A setting lever 53 is U-shaped, the arms of the U extending each side of the spring lever. This lever is also journaled on the pin 43. A cross bar 54 is formed on the lever 42 so as to engage the arms of the lever 53. It will be readily seen, therefore, that as the lever 53 is pulled back it will carry with it by reason of its engagement with the cross bar 54 of the spring lever 42. On the other hand, the lever 53 may be swung forwardly independently of the lever 42.

The trip for the trap is set in motion by the swinging lever 53. A push rod 55 is journaled by means of a pin 56 in the ears 57 on the lever 53. The end 58 of the push rod 55 is adapted to engage the lower arm 59 of the trip lever 60. The trip lever 60 is journaled on the pin 47. The stop 21 extends upwardly from the lever 60 through an opening in the frame. A buffer plate 61 is carried by a pin 61ª extending through the stop 21. A spring 61ᵇ is arranged between the plate 61 and the stop 21, thus cushioning

the plate against the stop, the pin 61ª being movable in the stop 21 to permit this movement of the plate 61.

In the operation of the trip device when the lever 53 is moved forward, the end of the push rod 55 engages the trip lever 60, and pulls down the stop releasing the arm. The push rod 55 is slidingly mounted between the pins 62 on the spring releasing lever 46. The upward tendency of the arc on which the rear end of the push rod or lever 55 swings would swing the forward end of this lever down so as to disengage it if it were moved forward a sufficient distance. When, however, the releasing lever 46 is tripped by the cam 48 it moves the end 45 downwardly and this carries the end 58 of the push rod 55 downwardly so as to positively clear the end 59 of the lever 60. This also holds the push rod 55 in its lower position as the swinging lever 53 is returned in resetting the trap. It will be understood that as the lever 53 is returned or swung to the right, as shown in Fig. 2, it will at this point engage the cross bar 54 and carry with it the spring lever 42 carrying the notch 44 so as to permit the end 45 of the lever 46 to swing upwardly. This upward movement of the lever 46 carries the rod 55 upwardly so that it is positioned to engage the trip lever 60. As shown in Fig. 2 the stop 21 has been depressed and the arm has advanced so as to trip the lever 46 through the action of the cam 48. It will be understood that these parts as shown in Fig. 2 are in motion and the stop 21 is returned to its upper position in time to receive the arm as it completes its rotation, the lever 42 is just starting to move forward having been released and the lever 43 is in the forward end of its movement. A spring 63 is attached to the lower end 59 of the trip lever 60 and tends to return it so as to hold the stop 21 in its upper position and the spring 64 is attached to the lever 46 and tends to lift the end 45.

The lever 53 is actuated as follows: A slide 65 is provided with an undercut guide 66 at its lower end. This guide operates on a wheel 67 journaled on a screw 68 extending downwardly in the upper end of the post 2. A spherical knob 69 is arranged on the upper end of the slot 65 and is connected by a push link 70 with a joint on the lower end of the lever 53, the joint being formed with a knuckle lock 71 and pins 72 and 73, one pin being on the link 70 and the other pin extending from the lower end of the lever 53. It will be readily seen that this link 70 has a universal movement permitting the rocking movement of the lever 53 and also the swinging movement of the swivel base on the post 2.

This pull connection is a desirable feature in that it permits of the variation in elevation of the throw arm frame without disturbing the adjustment and also in that it readily transmits the movement of the slide 65 to the pull mechanism when the frame is at an angle with the same power and length of movement as when the throw arm frame is in a straight-away position or directly forward. By making the joint formed by the ball 69 at the axis of the pivotal mounting of the throw arm frame at the pins 9 and 9ª when in its rearward position the throw arm frame can be swung without disturbing the adjustment of the parts as the link 70 swinging on the ball 69 will be on the same axis as the throw arm frame.

In Fig. 10ª I have diagrammed the action of this link and the movement of the slides when the throw arm frame is thrown to different angles. I have marked here the forward position of the ball 69 as X, the intermediate position as Y and the rear position as Z. I have indicated the position of the lower end of the lever 53 as corresponding to X Y Z as X′ Y′ Z′ with the frame at an angle and as X^2 Y^2 Z^2 with the frame straight-away. Observing Y and Y′ with the frame at an angle the position of the link will be readily seen. At the completion of the movement which brings the ball to the initial position at the bottom of the lever 53 the ball will reach the position X′ and the point Z will be at Z′. The distance between X′ and Z′ will be just the distance between X and Z so that the throw or movement of the lever with the trap set at an angle is the same as the straight-away movement of the slide. With the frame set at straight-away and with the ball 69 at the point Y the lower end of the swinging lever 53 will be at Y^2 and at the rear position or Z the lower end of the lever will be at Z^2. Here again the movement of the point Z^2 will be just the distance between X and Z initially. It will be observed that with the frame at an angle the ball connected to Y results in a slightly greater movement from X′ to Y′ and from Y to Z a slightly greater movement than from Y′ to Z′. Thus in the initial tension of the spring there is a little loss of leverage. In the final tension there is a little increase of leverage when the frame is set at an angle so that this angular relation of the frame gives as easy a pull as the straight-away, and further there is very little tendency to swing the swivel base on the post due to this pulling action. While there is a little tendency in the intermediate stages of the movement, observing Fig. 10ª it will be seen that when the ball reaches its final position it is centrally located with the post and this tendency is entirely eliminated. This is desirable under any circumstances but particularly desirable where an automatic change of angle is accomplished.

A pull rod 74 is attached to the slide 65. This rod extends through a post 75 extending upwardly from the base being free to slide therein and is screwed into a socket 77 in the end of the slide 65. The pull rod preferably has the knuckle 78 and the extension 79 to which the pull lever 80 is attached. The pull lever 80 is pivotally mounted by means of a pin 81 on a bracket 82 on any desirable base as 83. It will be understood that this pull lever is usually at some distance from the trap and thus it will be seen that the setting of the trap is accomplished by the pull lever. In the normal operation of the trap, the operator pulls the lever to the rear, thus putting the spring under tension and awaits the word to trip the trap. He then swings the lever forward carrying with it the slide and the lever 53 and thus trips the trap. It is desirable to shift the throw arm frame automatically so as to vary the angle at which the targets are thrown. This is accomplished in this trap as follows: A chance wheel 84 is provided with a hub 85 and the shell 84ª, the shell being curved lengthwise so that when the chance wheel is mounted its surface forms an arc with the center of the post as a center. The chance wheel is mounted on a pin 86 journaled in ears 87 extending to the rear of the arm 6. The shell of the chance wheel has a series of slots 88 of varying depths, the slots having bridges 89 the bridges for each slot being at a different position in the shell. Fingers 90 extend from the sleeves 91 which are journaled on the post 2 between the platform 5 and the journal 7. As these slots are swung the fingers are moved into or out of the slots 88, one finger into each end of the slot and as the fingers are brought together one of them at least engages a bridge 89 and swings the swivel base so as to bring this bridge that it may engage to a central position. If this bridge is centrally located then the throw arm frame will be directly forward. If this trip is near one end of the chance wheel then the throw arm frame will be at an angle, the extreme angle being nearly forty-five degrees. The number of angles is determined by the number of slots. It will be understood that the chance wheel is rotated in order to assure the entrance of the fingers 90. The entrance to the slots 88 are beveled at 88ª and the fingers are also beveled. Thus they readily enter these slots even though the wheel may be still rotating when they are released. One advantage of this chance wheel arranged as it is with its axis at an angle to a radial line extending from the post and also out of parallel with the axis of the post is that the trap is moved directly to its new position and thus moved the least distance possible. This does away with shock as the frame is stopped.

In order to operate the fingers the following mechanism is provided: Rollers 92 are mounted on the arms 93 and 94 extending from the sleeves 91. These rollers are engaged by push bars 95 extending from a cross head 96. The cross head 96 has a sleeve 97 which is fixed on the pull rod 74. Thus the push bars are reciprocated with the slide 65. In the initial position as shown in Fig. 13 the ends 98 of the push bars are in engagement with the rollers. As the push rod is pushed forward the push bars swing the fingers 90 outwardly like the opening of the blades of a shear. Near their forward position the rollers move off the ends 98 and the rollers then engage the surfaces 99 on the inner edges of the bars 95. This point is reached when the fingers are moved out of the slots 88 and from here on a forward movement of the push bars does not result in a movement of the fingers. The purpose of this added movement is to allow the operation of the mechanism to put the chance wheel in operation and this is done after these fingers have been moved out of the slots by the following mechanism:

A ratchet wheel 100 is fixed on the end of the shaft 86 and is adapted to be engaged by a pawl 101, the pawl being guided by a pin 102. The pawl is pivotally secured to a lever 103 by a pin 104. The lever 103 is fixed on a pin 105 extending through an opening 106 in the pivot pin 12. A lever 107 is arranged on the inner end of the pin 105 and is arranged in the path of a pin 108 on the side of the lever 53. These levers are so positioned with relation to the pin 108 that the lever 53 and, with it the slide 65 and push bars 95 have reached a position in their forward movement to disengage the fingers 90 from the chance wheel when the pin 108 engages the lever 107. A slight further forward movement of the mechanism pulls the pawl 101 rearwardly against the teeth of the ratchet wheel giving to the chance wheel a violent spin. It continues to rotate under its own momentum until it stops through its own action or if the pull rod is immediately returned it is stopped by the inward movement of the fingers, the fingers engaging some beveled edge 88ª and entering some slot as the chance may be. Springs 109 are connected through links 109ª with the arms 93 and 94, the opposite ends of the springs being connected to the cross head 110, carried by the pin 111. The pin 111 extends through the post 75 and into a socket 112 in a stop lever 113. These springs it will be seen return the fingers and force them to closed position. It will be seen that the push bars 95 may be immediately returned to their initial or rear posi-

tion without forcing or completing the swinging movement of the trap frame, this being accomplished by the closing of the fingers and this being yieldingly accomplished through the action of the springs. Consequently the frame cannot be thrown violently from one position to another, as it is under all circumstances moved through the action of the spring. Furthermore when the fingers have been brought to a central position if there is any tendency of the frame to over-run the opposite finger offers a yielding resistance through the action of its spring. Thus the fingers form not only a positioning device but buffers for stopping the frame at the end of the movement.

The trap may be operated without any positive stop but it is desirable to have a positive stop for locking the frame as the throwing movement takes place and also for locking the frame if desired to throw known angles. The lever 113 is adapted to engage and enter stop notches 114 in the platform 5. This lever is pivoted on a pin 115 extending through ears 115ª on the base. An arm 116 extends rearwardly from the stop lever 113 forming a bell crank therewith. It has a cam surface 117. This cam surface is adapted to be engaged by a pin 118, this pin being clearly shown in Fig. 14 in its retracted position. When the pin is in its forward position and the pull lever is pulled to the rear as shown in Fig. 1, it, acting on the cam surface 117 depresses the end 116 of the lever drawing the stop lever 113 out of the notches 114 but on the forward movement of the slide and before the fingers 90 are out of the slots 88 the stop lever 113 is allowed to reënter a notch 114 thus locking the throw arm frame in its then present angle. On the return or rearward movement of the cross head 96 carrying with it the pin 118 the stop lever 113 is retracted, thus permitting the fingers 90 to re-position the frame. When, however, it is desired to throw known angles, the stop pin 118 is retracted as shown in Fig. 14 and the stop lever 113 then remains in a notch 114 thus locking the swivel base against turning. The fingers may operate and the chance wheel may operate, the springs 109 permitting them to yield so that there is no action. The springs 109 acting on the rod 111 force the lever 113 in its locking position. In order to conveniently lock the pin 118 in or out as desired the pin 118 has grooves 119 which engage a pin 120 arranged in the cross head. By lifting this pin 120 the pin may be locked in its inner or outer position as desired.

What I claim as new is:—

1. In a target trap, the combination of a base; a swinging frame thereon; a chance device carried by the frame; means for actuating the chance device; and mechanism actuating the swinging frame, said mechanism being varied in its action by the chance device.

2. In a target trap, the combination of a base; a swinging frame thereon; a chance wheel carried by the frame; means for actuating the chance wheel; and mechanism actuating the swinging frame, said mechanism being varied in its action by the chance wheel.

3. In a target trap, the combination of angle changing elements comprising a frame and base having relative motion; a chance wheel carried by one of said elements; and a device carried by the other element operating against the chance wheel for varying the angular relation between said elements.

4. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; a chance wheel carried by the frame having an axis eccentric to the axis of said elements; and mechanism controlled by said chance wheel for varying the relation of said elements.

5. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; a chance wheel carried by the frame having an axis eccentric to the axis of said elements; and mechanism controlled by said chance wheel and acting thereon for varying the relation of said elements.

6. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; a chance wheel; and swinging fingers operating opposingly on said chance wheel to vary said elements.

7. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; a chance wheel having an axis eccentric to the axis of the elements; and fingers swingingly mounted with an axis concentric with the axis of the elements operating on said chance wheel for varying the relation between said elements.

8. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; a chance wheel mounted on the frame; and fingers swingingly mounted with an axis concentric with the axis of the elements operating on said chance wheel to vary the relation between said elements.

9. In a target trap, the combination of angle changing elements comprising a base and frame, the frame being pivotally mounted on a post on the base; a chance wheel carried by the frame; and fingers pivotally mounted on the post and operating on the chance wheel to vary the relation between said elements.

10. In a target trap, the combination of

angle changing elements comprising a base and frame having swinging relative motion, the frame being mounted on a post on a base; a chance wheel mounted on the frame and having slots therein of varying depths; and fingers swingingly mounted on the post and operating in the same plane and operating in said slots to vary the relation between said elements.

11. In a target trap, the combination of angle changing elements comprising a base and frame; a chance wheel having slots therein bridged at varying depths; and means operating against the bridged portions for varying the relation of said elements.

12. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; a chance wheel having axial slots in the surface bridged at varying depths; and means acting on the bridged portions for varying the relation of said elements.

13. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; a chance wheel pivoted on an axis at right angles to a radius extending from the axis of the elements, said chance wheel having a curved surface, the elements of which when in a horizontal plane form arcs of a circle with the axis of the elements as a center; and means operating on the chance wheel for varying the relation between said elements.

14. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; a chance wheel pivoted on an axis at right angles to a radius extending from the axis of the elements, said chance wheel having a curved surface, the elements of which when in a horizontal plane form arcs of a circle with the axis of the elements as a center, said chance wheel having axial slots bridged to varying depths; and fingers swingingly mounted at the axis of the elements operating in said slots against said bridged portions for varying the relation between the elements.

15. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; swinging fingers operating opposingly; push bars actuating said fingers; and a chance wheel operating in connection with said fingers for varying the relation between said elements.

16. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; swinging fingers operating opposingly; a chance wheel acting in connection with said fingers for varying the relation between said elements; push bars for disengaging said fingers; and springs bringing said fingers into action.

17. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; swinging fingers operating opposingly; a chance wheel acting in connection with said fingers for varying the relation between said elements; push bars for disengaging said fingers; and springs bringing said fingers into action, said springs forming with said fingers a buffer for retarding the swinging movement of the frame.

18. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; a chance wheel mounted on the frame; swinging fingers operating on the chance wheel to actuate the frame; push bars operating on said swinging fingers to open the same and disengage them from the chance wheel; and springs for closing the swinging fingers and swinging the frame relatively to the base.

19. In a target trap, the combination of a swinging frame; a base; a post on the base on which the frame is mounted; a chance wheel mounted on the frame; swinging fingers pivotally mounted on the post and operating on the chance wheel; push bars for disengaging the fingers; and springs actuating the fingers to operate on the chance wheel to swing the frame.

20. In a target trap, the combination of a base; a swinging frame thereon; a pull; a chance device carried by the frame; means actuated by the pull for actuating the chance device; and mechanism actuating the swinging frame, said mechanism being varied in its action by the chance device.

21. In a target trap, the combination of angle changing elements comprising a base and frame having swinging relative motion; a pull; a chance wheel carried by the frame having an axis eccentric to the axis of said elements and at an angle to a radius to the axis of said elements; and mechanism actuated by the pull and controlled by the chance wheel for varying the relation of said elements.

22. In a target trap, the combination of a frame; a base; a chance wheel on the frame; swinging fingers operating on the chance wheel and pivotally mounted on the base, having bell cranks thereon; and push bars arranged in parallel relation and operating on said bell cranks for actuating said fingers.

23. In a target trap, the combination of a frame; a base; a chance wheel on the frame; swinging fingers operating on the chance wheel and pivotally mounted on the base, having bell cranks thereon; push bars

arranged in parallel relation and operating on said bell cranks for actuating said fingers, said push bars being arranged to overrun the bell cranks; and devices for actuating the chance wheel operated during said over-running movement of said push bars.

24. In a target trap, the combination of a base; a swinging frame thereon; a lock operating on the swinging frame for locking it with the base; a pull; means actuated by the pull for automatically swinging the frame on the base; and mechanism actuated by the pull for disengaging the lock during the changing movement.

25. In a target trap; the combination of a base; a swinging frame thereon; a bell crank lever having one arm engaging the swinging frame for locking the same with the base; a pull; means actuated by the pull for automatically swinging the frame on the base; and mechanism carried by the pull and operating on one arm of the bell crank lever for disengaging the same during the changing movement of the frame.

26. In a target trap, the combination of a swinging frame; a base on which the frame is mounted; a lock for locking the base with the frame; a pull; mechanism actuated by the pull for automatically swinging the frame; means actuated by the pull for operating the lock during the changing movement; and devices for moving said means out of operative position.

27. In a target trap, the combination of a swinging frame; a base on which the frame is mounted; a lock for locking the base with the frame; a pull; mechanism actuated by the pull for automatically swinging the frame, said mechanism comprising a yielding connection permitting a movement of the pull relatively to the frame; means actuated by the pull for operating the lock during the changing movement; and devices for moving said means out of operative position.

28. In a target trap, the combination of a frame; a rotating throw arm; a crank connected with the throw arm; a spring operating on the crank; means for releasing the spring at an intermediate point in the rotation of the crank; and devices for arresting the means at a point in the travel of the crank in advance of the completion of its outward movement whereby the spring is put under tension to assist in arresting the arm.

29. In a target trap, the combination of a frame; a rotating throw arm; a crank connected with the throw arm; a spring operating on the crank; means for releasing the spring at an intermediate point in the rotation of the crank; and adjustable devices for arresting means at a point in the travel of the crank in advance of the completion of its outward movement whereby the spring is put under tension to assist in arresting the arm.

30. In a target trap, the combination of a frame; a rotating throw arm; a crank connected with the throw arm; a spring operating on the crank; means for releasing the spring at an intermediate point in the rotation of the crank; and devices having two pre-determined points of adjustment for arresting means at a point in the travel of the crank in advance of the completion of its outward movement whereby the spring is put under tension to assist in arresting the arm.

31. In a target trap, the combination of a rotatable throw arm; a frame in which it is mounted; a crank operating the throw arm; a spring attached to the crank; a stop for arresting the movement of the arm; a trip lever tripped at an intermediate point in the travel of the throw arm to release the spring; and a device guided by said trip lever for actuating the stop.

32. In a target trap, the combination of a rotatable throw arm; a crank on the throw arm; a stop for arresting the movement of the throw arm; a spring operating on the crank; a trip lever for releasing the spring at an intermediate point in the travel of the throw arm; a push rod operating on the stop and supported by the trip lever, said push rod being moved out of the path of the stop when the trip lever is actuated to permit the free return of said push rod.

33. In a target trap, the combination of a rotatable throw arm; a crank for operating the throw arm; a spring actuating the crank; a swinging lever to which the spring is attached, said lever having a segment and a stop notch thereon; a trip lever operating in said notch and against said segment and adapted to move out of the notch to release the spring at an intermediate point in the movement of the throw arm; a stop for arresting the movement of the throw arm; and devices operating on the stop controlled by the trip lever.

34. In a target trap, the combintion of a swinging frame; a throw arm on said frame; a spring for actuating the arm; a movable anchor for the spring mounted on the frame; a pull having a reciprocating motion to tension the spring; and a push link connected to the pull and with the anchor.

35. In a target trap, the combination of a swinging frame; means for varying the elevation of the frame; a throw arm on said frame; a spring for actuating the arm; a movable anchor for the spring; a pull having reciprocating motion for tensioning the spring; and a push link extending from the pull to the anchor.

36. In a target trap, the combination of a swinging frame; a throw arm on said frame;

a spring for actuating the arm; a movable anchor for the spring mounted on the frame; a pull having a reciprocating motion to tension the spring; and a push link having a travel across the axis of the frame.

37. In a target trap, the combination of a swinging frame; a throw arm on said frame; a spring for actuating the arm; a movable anchor for the spring mounted on the frame; a pull having a reciprocating motion to tension the spring; and a push link connected to the pull and with the anchor, said link having a travel across the axis of the frame, the travel being limited bringing the connections with the pull and anchor alternately to the axis of the frame.

38. In a target trap, the combination of a swinging frame; a throw arm on said frame; a spring for actuating the throw arm; a lever swingingly mounted on the frame and forming an anchor for the spring; a pull having reciprocating motion; and a push link connected to the lever and to the pull.

39. In a target trap, the combination of a swinging frame; a throw arm on said frame; a spring for actuating the throw arm; a lever swingingly mounted on the frame and forming an anchor for the spring; a pull having reciprocating motion; and a push link connected to the lever and to the pull, said push link having a travel across the axis of the frame.

40. In a target trap, the combination of a swinging frame; a throw arm on said frame; a spring for actuating the throw arm; a lever swingingly mounted on the frame and forming an anchor for the spring; a pull having reciprocating motion; and a push link connected to the lever and to the pull, said push link having a travel across the axis of the frame and limited to bring its connections with the pull and with the anchor alternately to the axis of the frame.

41. In a target trap, the combination of a swinging frame; a throw arm on said frame; a spring for actuating the arm; a movable anchor for the spring mounted on the frame; a pull having a reciprocating motion to tension the spring; a push link connected to the pull and with the anchor, said link having a travel across the axis of the frame, the travel being limited bringing the connections with the pull and anchor alternately to the axis of the frame; and a horizontal axis for the frame for changing the elevation of the frame, said horizontal axis being adjacent to the axis of the swinging frame and to one of the connections on the push link when said connection is at the end of its movement.

42. In a target trap, the combination of a swinging frame; a throw arm on said frame; a spring for actuating the arm; a movable anchor for the spring mounted on the frame; a pull having a reciprocating motion to tension the spring; a push link connected to the pull and with the anchor, said link having a travel across the axis of the frame, the travel being limited bringing the connections with the pull and anchor alternately to the axis of the frame; and a horizontal axis of the frame for changing the elevation of the frame, said horizontal axis being adjacent to the axis of the swinging frame and to the connection between the push link and the anchor at one end of its movement.

43. In a target trap, the combination of a swinging frame; a throw arm on said frame; a spring for actuating the throw arm; a swinging lever to which the spring is attached; a pull slide; a push link having a universal joint with the slide and lever; and a horizontal axis on which the frame is mounted, said horizontal axis being adjacent to the axis of the swinging frame and to the connection between the push link and the slide when the slide is in its rear position.

44. In a target trap, the combination of a swinging frame; a base on which it is mounted; a horizontal pivot for the frame; a reciprocating pull; a throw arm; a spring for actuating the throw arm; an anchor for the spring; and a push link having connections with the pull and with the anchor, one of said connections being adjacent to the horizontal axis when said connection is at the end of its travel.

45. In a target trap, the combination of a swinging frame; a throw arm rotatably mounted on the frame; a crank actuating the throw arm; a spring operating the crank; a trip for releasing the spring at a point intermediate of the movement of the throw arm; an anchor to which the spring it attached; a pull device; a push link between the anchor and the pull device; and a stop for the throw arm actuated by the pull device.

46. In a target trap, the combination of a swinging frame; a throw arm rotatably mounted on the frame; a crank actuating the throw arm; a spring operating the crank; a trip for releasing the spring at a point intermediate of the movement of the throw arm; an anchor to which the spring is attached; a pull device; a push link between the anchor and the pull device, said link having a travel across the axis of the frame; and a stop for the throw arm actuated by the pull device.

47. In a target trap, the combination of a swinging frame; a throw arm on said frame; a spring for actuating the arm; a movable anchor for the spring mounted on the frame; a pull having a reciprocating motion to tension the spring; a push link connected to the pull and with the anchor; and means actuated by the pull for automatically changing the angle of the frame.

48. In a target trap, the combination of a

swinging frame; a throw arm on said frame; a spring for actuating the throw arm; a lever swingingly mounted on the frame and forming an anchor for the spring; a pull having reciprocating motion; a push link connected to the lever and to the pull; and means actuated by the pull for automatically changing the angle of the frame.

49. In a target trap, the combination of a throw arm having a target platform thereon; and a rail on which a target runs as it is discharged extending along said platform, said rail being placed above the platform a distance to engage a target above the center of gravity.

50. In a target trap, the combination of a throw arm having a target platform thereon; and a rail extending along said platform, said rail being placed above the platform a distance to engage a wedging surface on a target above the center of gravity.

51. In a target trap, the combination of a spring actuated throw arm having a target platform thereon; a rail arranged along said arm above the platform, said rail forming a clamp to initially hold a target in place on the platform; and means for exerting a yielding pressure on said rail.

52. In a target trap, the combination of a spring actuated arm having a target platform thereon; a rail arranged above the arm and being placed above the platform on the arm a distance to engage a target above the center of gravity; and means for exerting a yielding pressure on the rail, said rail forming a clamp to initially hold a target in place.

53. In a target trap, the combination of a throw arm having a target platform thereon leaving the front edge of a target thereon projecting beyond the platform; and a rail extending above said arm, said rail being distanced above the platform to engage a target above the center of gravity.

54. In a target trap, the combination of a throw arm having a target platform thereon leaving the front edge of a target thereon projecting beyond the platform; a rail extending along said arm and above the platform; and means for exerting a yielding pressure on said rail.

55. In a target trap, the combination of a throw arm having a target platform thereon leaving the front edge of a target thereon projecting beyond the platform; a rail extending along said arm and above the platform; and means for exerting a yielding pressure on said rail, said rail forming a clamp for initially holding a target in place.

56. In a target trap, the combination of a throw arm having a target platform thereon, said platform permitting the front edge of a target to extend in front of the platform; and a rail in the form of a rod extending above said platform and engaging the rear of the target.

57. In a target trap, the combination of a throw arm having a target platform thereon, said platform permitting the front edge of a target to extend in front of the platform; a rail in the form of a rod extending above said platform and engaging the rear of the target; and means acting on the rod to yieldingly press it toward the platform to engage the target with a yielding pressure.

58. In a target trap, the combination of a throw arm having a target platform thereon, said platform permitting the front edge of a target to extend in front of the platform; and a round rail arranged above the platform and distanced to engage a wedging surface on the target.

59. In a target trap, the combination of a throw arm having a target platform thereon, said platform permitting the front edge of a target to extend in front of the platform; a rail in the form of a rod arranged above the platform, said rail being supported at its ends; and means for exerting a yielding pressure upon one end of the rail.

60. In a target trap, the combination of a throw arm having a target platform thereon, said platform permitting the front edge of a target to extend in front of the platform; a rail in the form of a rod arranged above the platform, said rail being supported at its ends; and means for exerting a yielding pressure at both ends of the rail.

61. In a target trap, the combination of a throw arm having a target platform thereon, said platform permitting the front edge of a target to extend in front of the platform; and a rail extending above said platform, said rail being in the form of a rod and swingingly mounted at its outer end.

62. In a target trap, the combination of a throw arm having a target platform thereon, said platform permitting the front edge of a target to extend in front of the platform; a rail extending above said platform, said rail being in the form of a rod and swingingly mounted at its outer end; and means for exerting torque on the rod.

63. In a target trap, the combination of a throw arm having a target platform thereon, said platform permitting the front edge of a target to extend in front of the platform; a rail extending above said platform, said rail being in the form of a rod and swingingly mounted at its outer end; and means in the form of a spring at the rear end of the rod for exerting torque on the rod.

64. In a target trap, the combination of a throw arm having a target platform thereon, said platform permitting the front edge of a target to extend in front of the platform; a rail extending above said platform, said rail being in the form of a rod and swingingly mounted at its outer end; and means in the form of a spring at the rear end of the rod for exerting torque on the rod, said

spring being anchored by a lever giving to the rear end a yielding swinging movement.

65. In a target trap, the combination of a throw arm having a target platform thereon adapted to hold a target with its front edge in front of the platform; a rail arranged above the platform and adapted to yieldingly press the edge of a target, said rail being adapted to exert pressure at two points to clamp two targets initially on the platform.

In testimony whereof I have hereunto set my hand.

HUGH C. LORD.