No. 683,308. Patented Sept. 24, 1901.

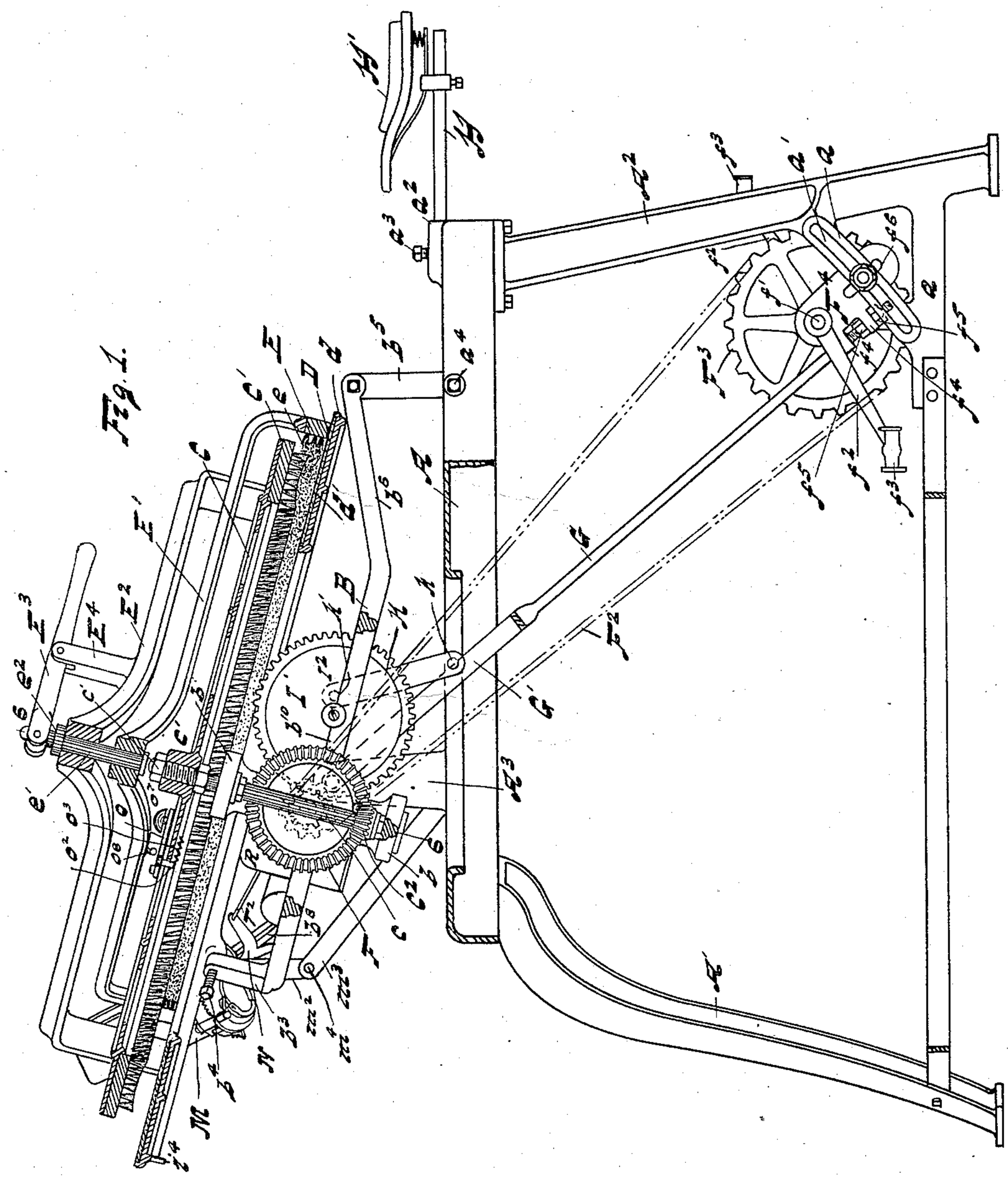
H. C. LORD.

TARGET TRAP.

(Application filed Mar. 25, 1901.)

(No Model.) 6 Sheets—Sheet 1.

Fig. 1.



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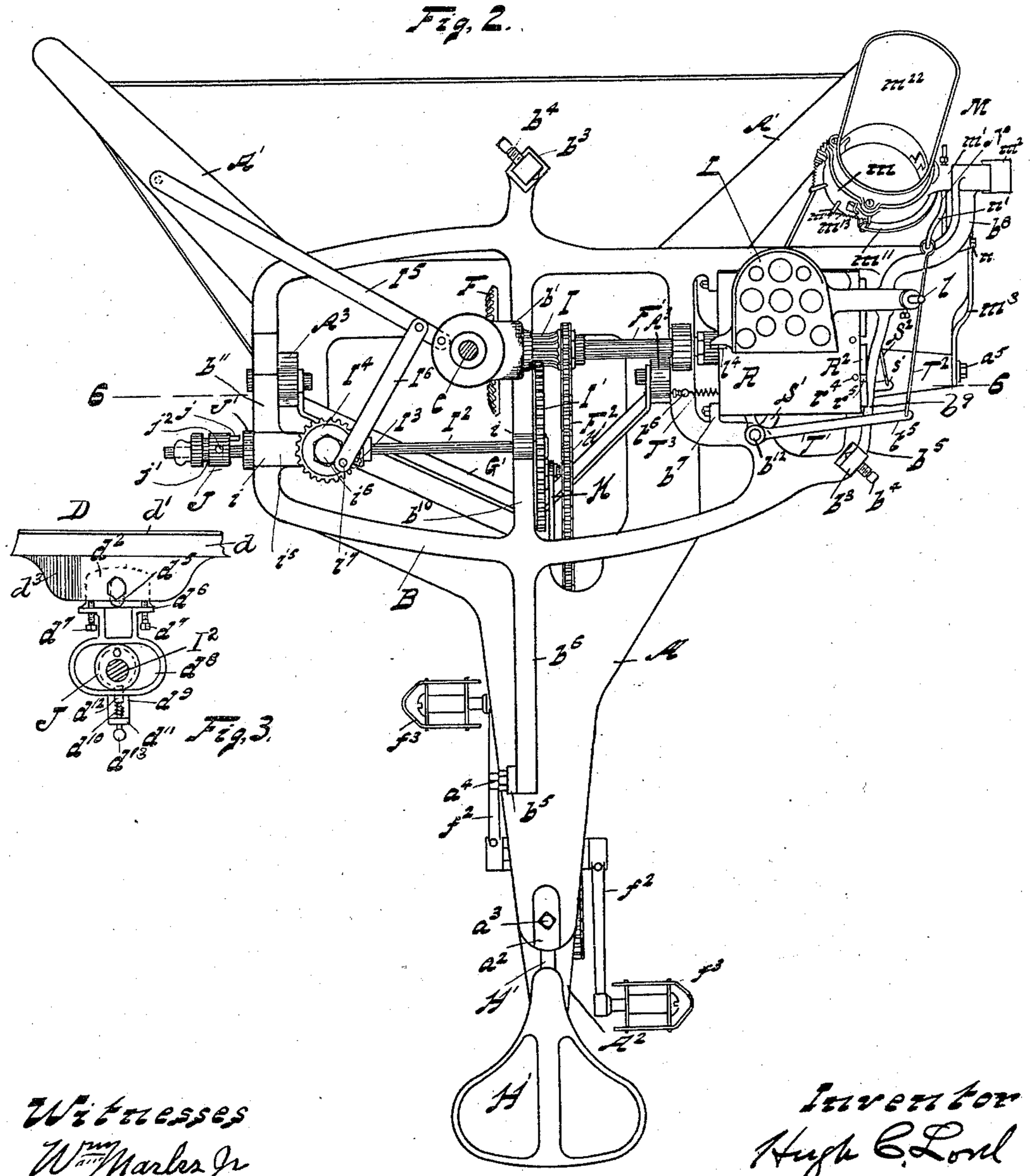
(No Model.) 6 Sheets—Sheet 2.

Fig. 2.



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(Application filed Mar. 25, 1901.)

(No Model.) 6 Sheets—Sheet 3.

Fig. 4.

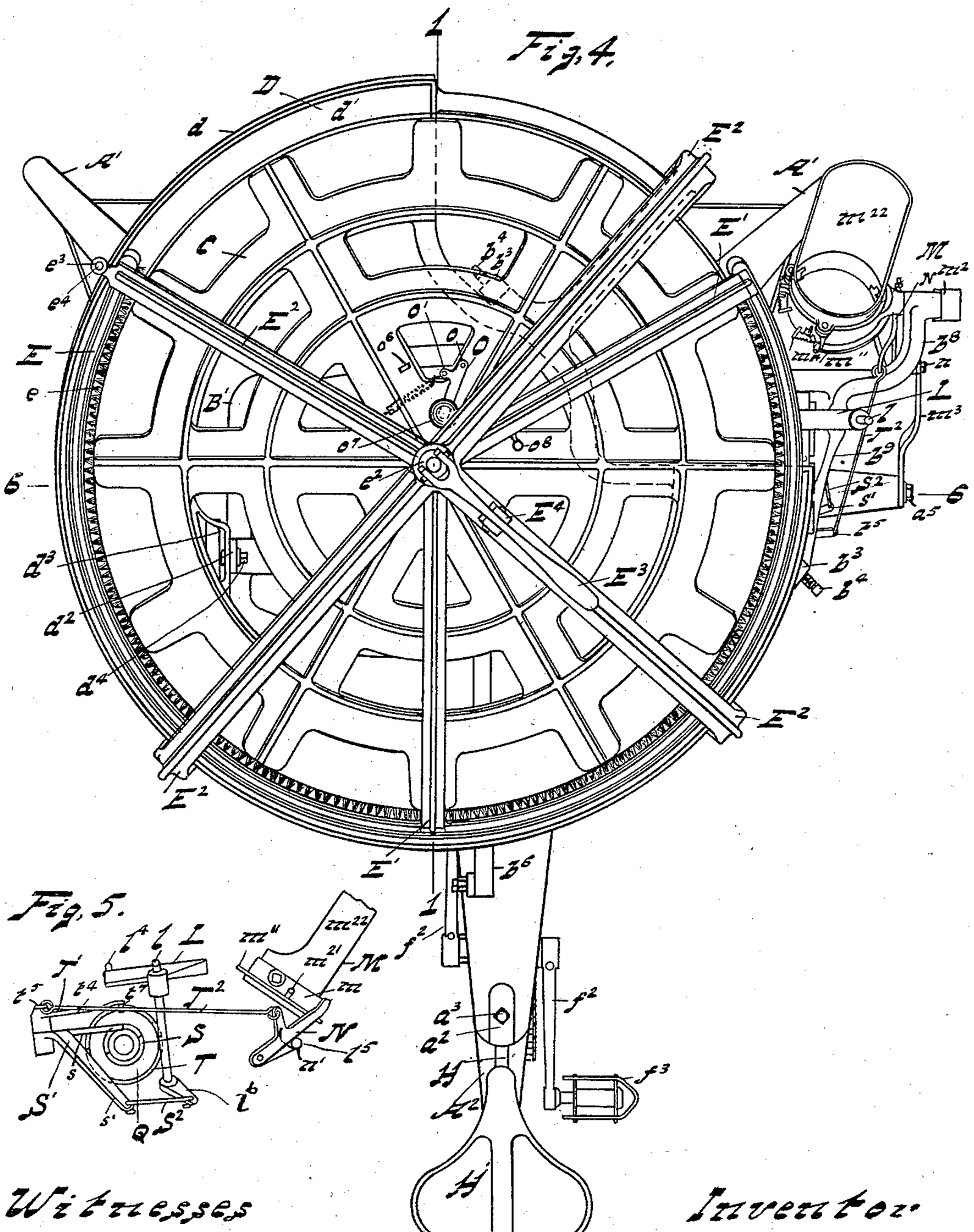

Fig. 5.

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(No Model.) 6 Sheets—Sheet 4.

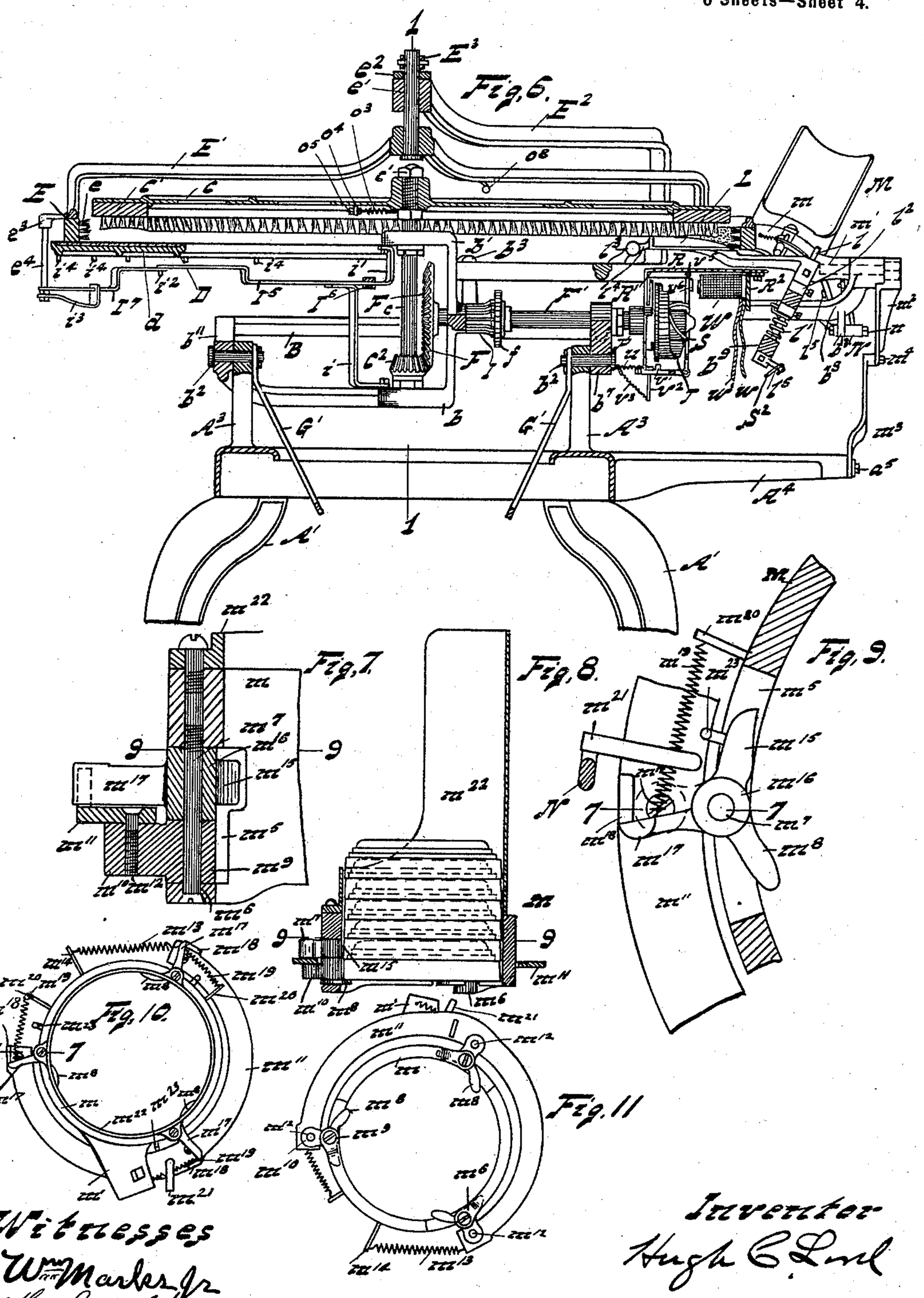

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

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(No Model.) 6 Sheets—Sheet 5.

Fig. 12.

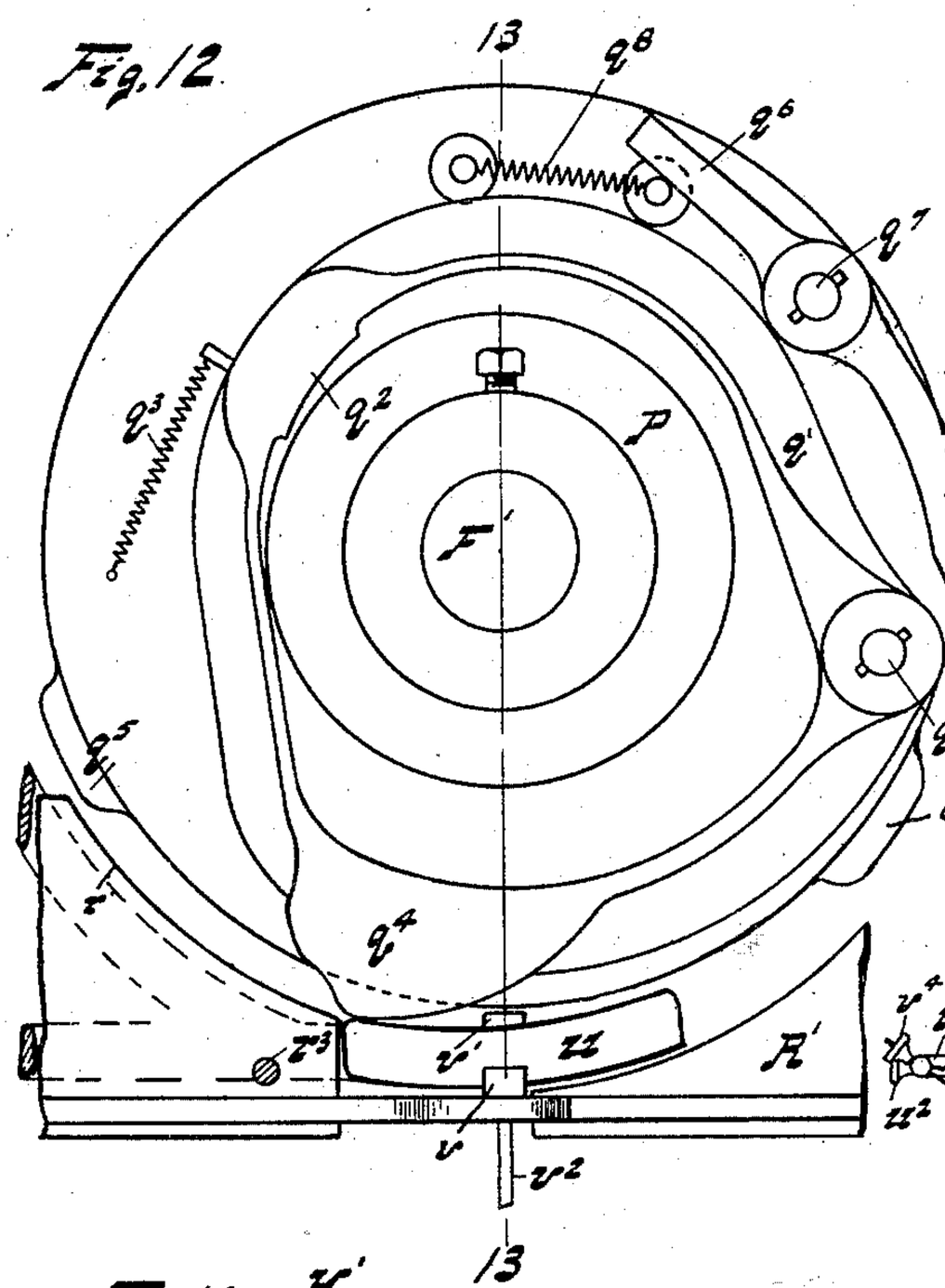


Fig. 13.

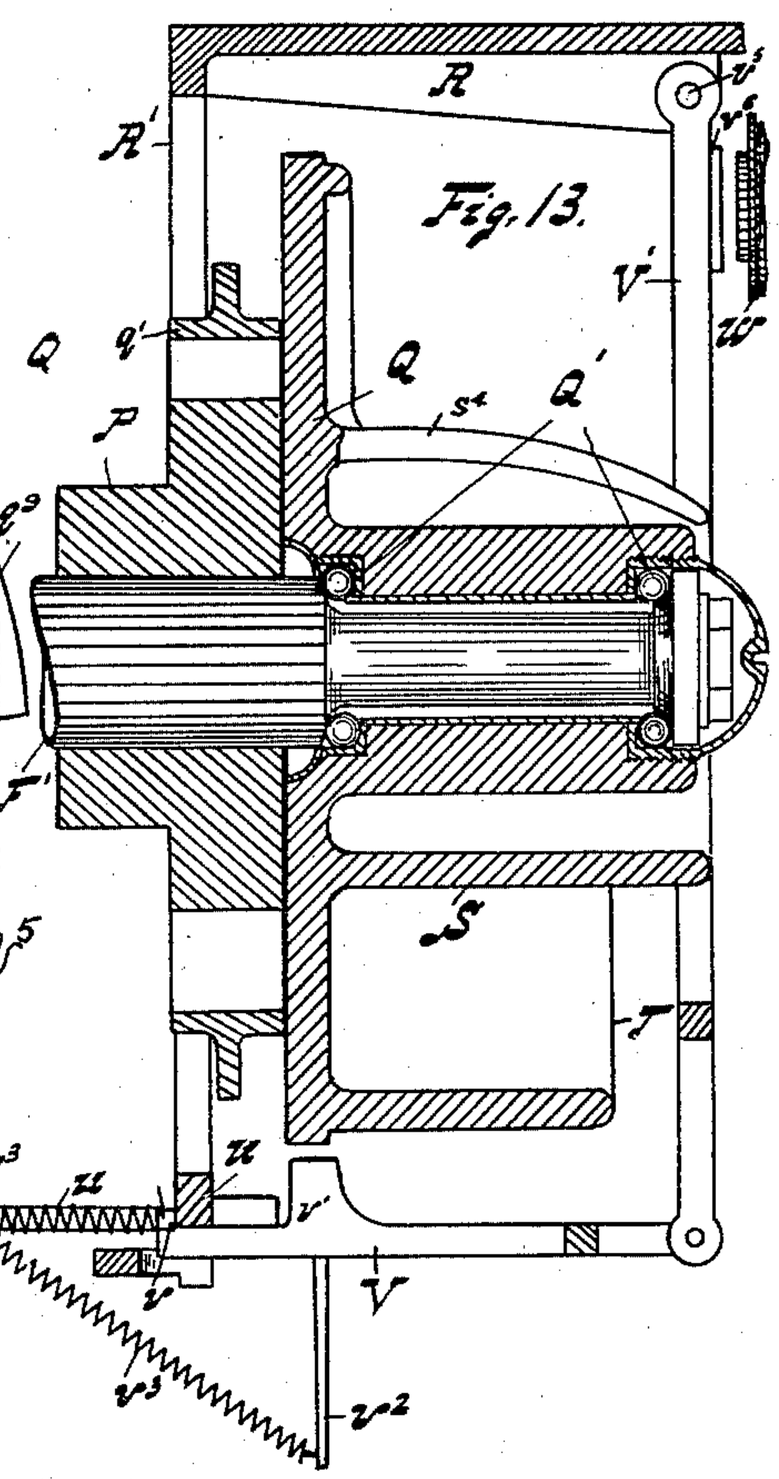


Fig. 14.

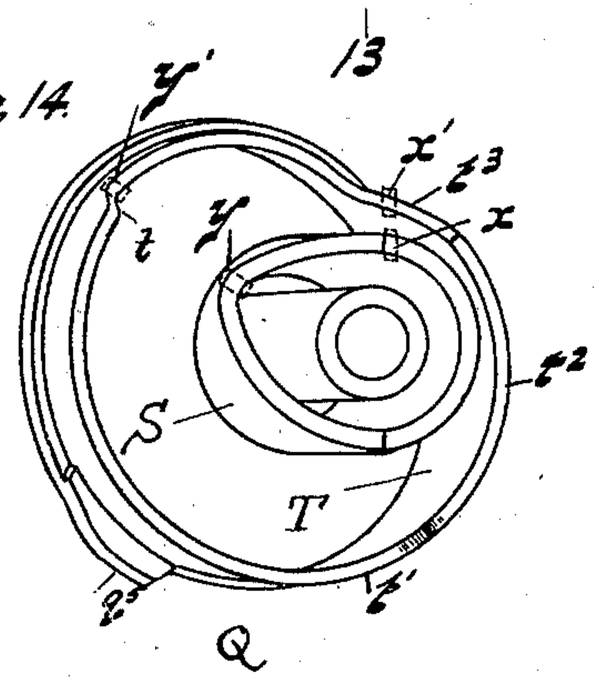
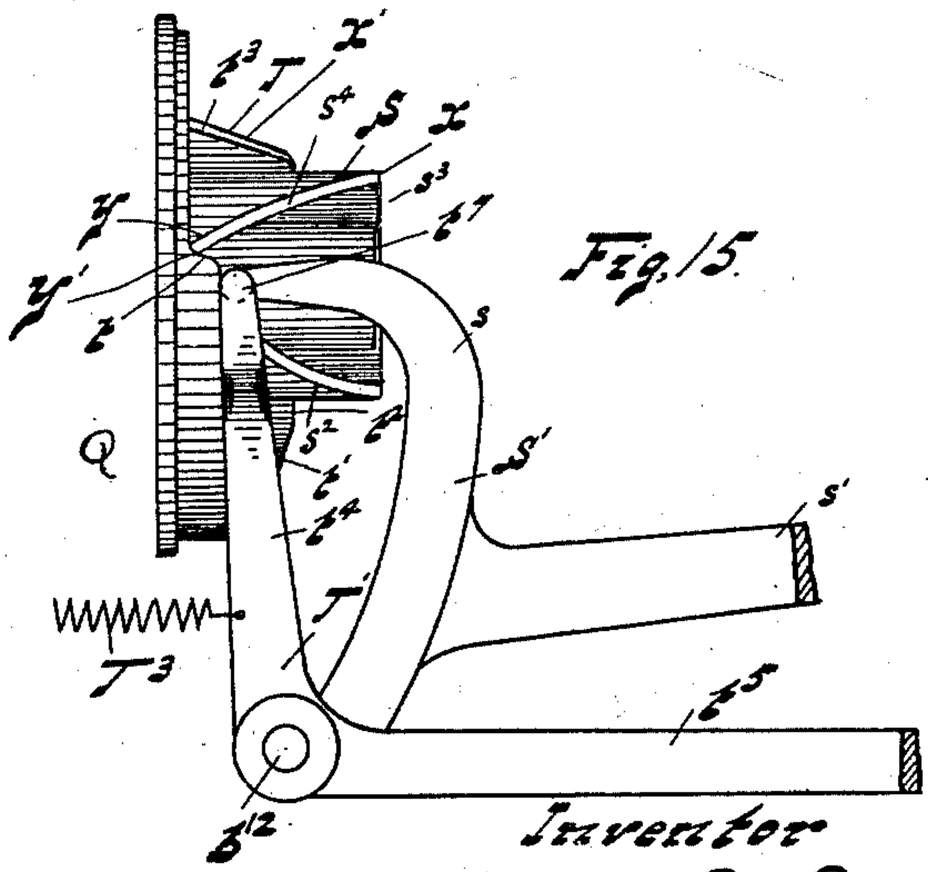


Fig. 15.



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(Application filed Mar. 25, 1901.)

(No Model.) 6 Sheets—Sheet 6.

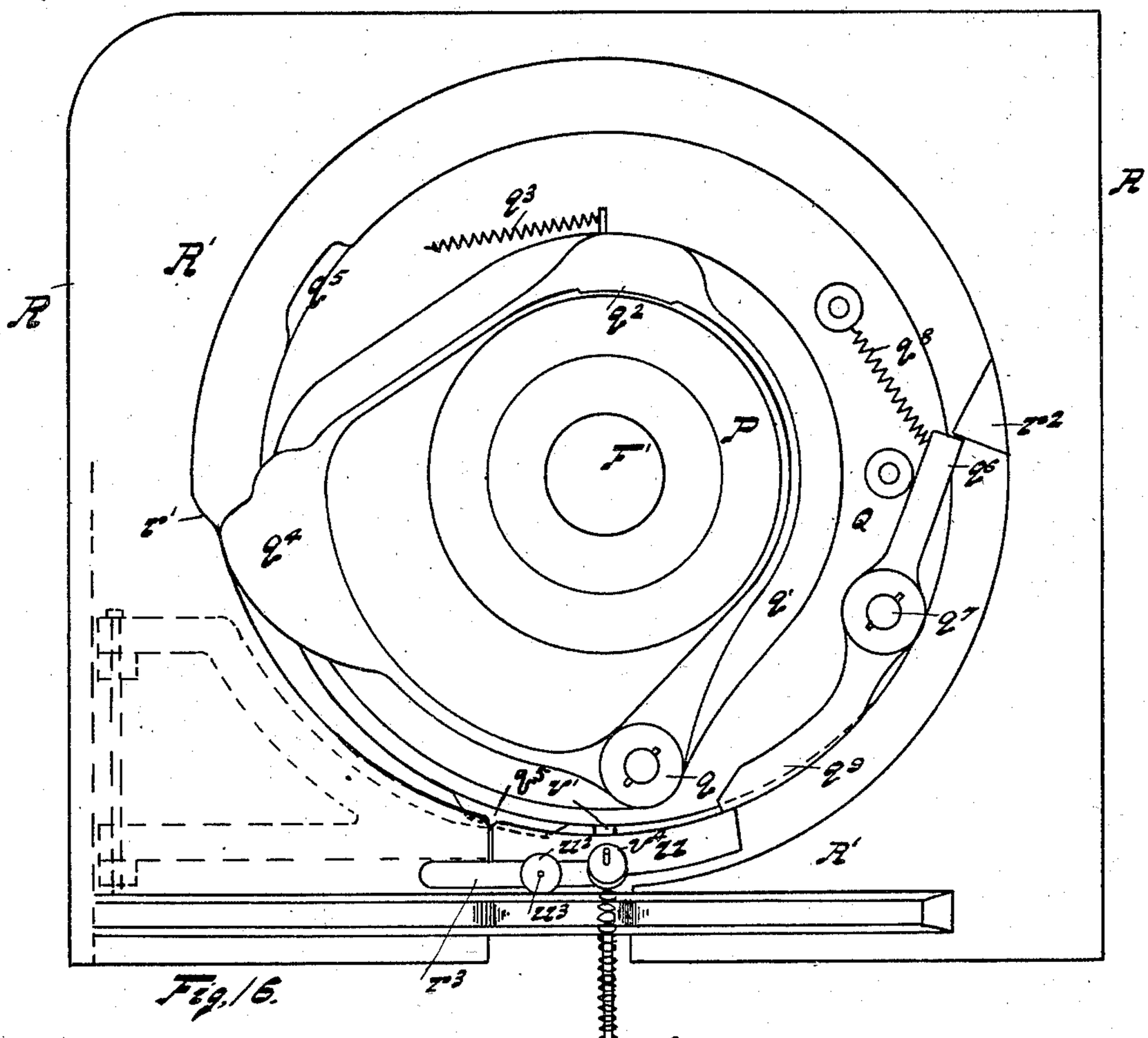

Fig. 16.

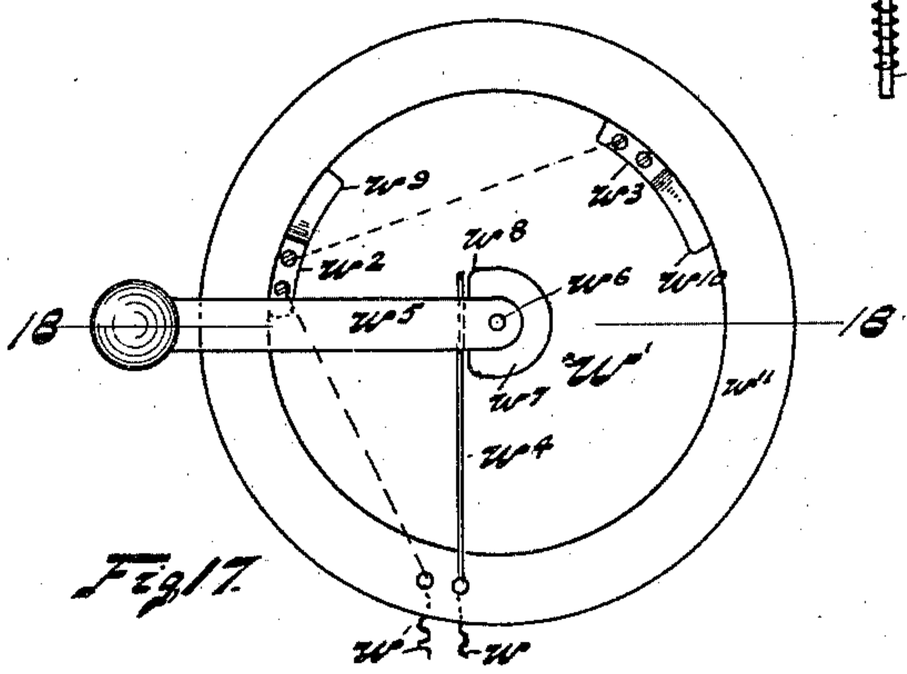

Fig. 17.

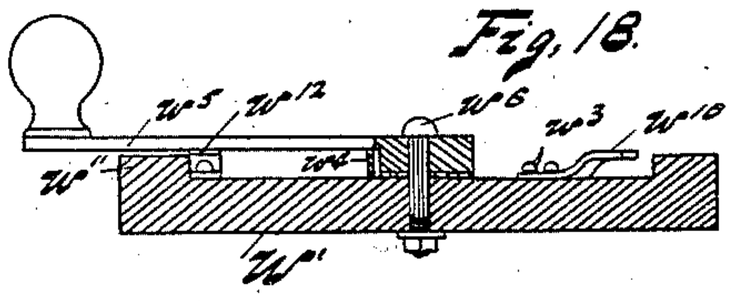

Fig. 18.

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UNITED STATES PATENT OFFICE.

HUGH C. LORD, OF ERIE, PENNSYLVANIA.

TARGET-TRAP.

SPECIFICATION forming part of Letters Patent No. 683,308, dated September 24, 1901.

Application filed March 25, 1901. Serial No. 52,758. (No model.)

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 certain new and useful Improvements in Target-Traps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

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

The purpose of the invention is to throw inanimate targets, usually made in the form of disks from a composition of clay and pitch. These targets are purposely made very fragile in order that they may readily break on being hit and so indicate the result of a shot. It is desirable that the flight of the target should imitate the flight of a bird, and to this end a comparatively flat trajectory is given to the target by making it disk-shaped and giving to it in its flight a spinning motion, which holds it substantially in a horizontal plane. To add to the similarity of the flight of a live bird, it is also desirable to vary the direction and elevation at which the target is thrown, so that the same uncertainty will exist in this respect as in the case of a live bird. The flight of the live bird may be still more closely imitated by varying the initial velocity of the targets. To provide a trap capable of all these methods of flight or a trap in which any one of them may be effected is within the scope of the purpose of my invention. It is also desirable that convenient means for delivering targets to the machine be provided and means by which the trap may be set to throw targets at a position remote from the trap. Such features also are included in my invention.

The invention further consists of the peculiar means for actuating the mechanism and details of construction hereinafter fully described, and pointed out in the claims.

The invention is illustrated in the accompanying drawings as follows.

Figure 1 shows a section on the line 1 1 in Figs. 4 and 6. Fig. 2 shows a plan view of the machine, the upper working part being removed. Fig. 3 shows a detail of the bracket for the supporting-plate. Fig. 4 shows a plan view of the machine. Fig. 5 shows a side elevation of parts from the right of Figs. 2 and 4. Fig. 6 shows a section on the line 6 6 in Figs. 1, 2, and 4. Figs. 7, 8, 9, 10, and 11 show details of the magazine, Fig. 7 being a section on the line 7 7 in Figs. 9 and 10, Fig. 8 showing a section on the same line, but including the entire magazine, Fig. 9 being a section on the line 9 in Figs. 7 and 8, Fig. 10 being a plan view, and Fig. 11 a bottom view, of the magazine. Fig. 12 shows a side elevation of the clutch and trip mechanism for operating the magazine and delivering mechanism. Fig. 13 is a section on the line 13 13 in Fig. 12. Fig. 14 is a perspective view of the cam mechanism for operating the delivering mechanism and the magazine. Fig. 15 is a plan view of the same. Fig. 16 is a side elevation of the clutch and trip mechanism for operating the delivering mechanism and the magazine, the parts being in a different position from that shown in Fig. 12. Fig. 17 shows a plan view of the switch for operating the electric pull. Fig. 18 shows a section on the line 18 18 in Fig. 17.

The throwing mechanism.—A marks the base-plate, supported by the front legs A′ and the rear leg A^2. These legs are suitably braced. Extending upwardly from the plate A are the posts A^3, between which is pivoted the tilting frame B. The pivotal joint is formed by the pins b^2 passing through parts of the frame B and the post A^3. A bar b^5 extends from an arm b^6 on the frame B through a slot in the plate A. A set-screw a^4, passing into the slot in the frame, locks the bar b^5, and consequently the frame B, in any pitch desired. Mounted on the shaft *c* is a disk C. The shaft *c* is journaled in the arms *b* of the frame B, preferably with ball-bearings. The disk is adjustable up and down by means of the screw-thread and the lock-nuts *c′ c′*, as clearly shown in Figs. 1 and 5. Secured to the lower edge of the disk is an annular brush C′, with downwardly-extending bristles. These bristles also slant forward or in the direction of movement of the disk as the machine is driven. Directly beneath the brush C′ is a supporting-plate D. This is formed by a trough-

shaped casting d, which forms about three-quarters of a circle, beginning at the right center of the machine, as shown in Fig. 4, and extending around to the top of said figure. Seated in cement in the trough portion of this plate is a glass plate d', preferably of hard glass. Extending around a portion of the annular brush C′ and just above the glass plate d' is a cushion-guide E, the cushion being preferably formed by the bristles e. This guide E is carried by a spider E′, and this spider is journaled on a pin e'. The pin e' extends through a second spider E^2, which is secured to and supported by the plate D. A collar e^2 holds the pin e' in place and supports the weight of the spider E′, so that the guide E will move freely over the plate D. Extending upwardly from the arms of the spider is a post E^4. A lever E^3 is fulcrumed on this post and secured to the pin e'. It will readily be seen that by depressing the end of the lever E^3 the guide E may be raised, so as to allow the escape of any pieces of target that may be broken in the trap and also for cleaning the plate D.

The operation of the trap so far as described is as follows: Targets are delivered to the machine at the right-hand side, as shown in Fig. 4, the bottom of the target resting on the plate D, the edge against the cushion E, and the top being in contact with the brush C′, the force of the contact initially, however, being very slight. The brush C′ is rotated continuously at a high rate of speed. Through its contact with the target the target is caused to move. The contact being a yielding one the brush moves relatively by or past the parts of the target engaged and the target is got under way gradually, so that it is not broken by the shock and is constantly accelerated. As the target gets under way the centrifugal force crowds it against the cushion E. This retards the outer edge of the target and causes the target to roll on the brush E. As the target approaches the point of discharge the force of the contact of the brush C′ is increased, so that the target as it leaves the machine has approximately the linear velocity of the brush. The target leaves the machine at a tangent to the brush C′ at the end of the guide E. The brush C′ is preferably curved slightly to conform to the ordinary shape of targets, and it is preferably made to operate with the greatest force at the side of the target the most remote from the center of the trap in order that the action of the rotating brush C′ may tend to crowd the target away from the cushion E, so as to relieve the target from some of the crushing strain which otherwise it would have against the cushion E. It will be noted that the brush C′ cushions the target, and in the broader features of my invention I wish to include a brush comprised in an accelerating means which engages the target whether the target is accelerated by the direct action of the brush or not.

Driving mechanism.—The means for driving the disk C is as follows: Arranged on the shaft c is a beveled gear c^2 and meshing this gear is a second gear F. The gear F is fixed on a shaft F′. A sprocket f is also fixed on the shaft F′. A chain F^2 extends from the sprocket f to a driving-sprocket F^3. The driving-sprocket F^3 is fixed in a crank-shaft f'. The crank-shaft is journaled in a bracket F^4, preferably with ball-bearings. Secured to the crank-shaft are the cranks f^2, on which are the pedals f^3. At the rear of the base-plate A is a socket-lug a^4, in which there is an opening, and a seat-rod H is secured in this socket by means of a set-screw a^3. The seat H′ is mounted on the seat-rod f^4. The operator sits on the seat, operates the crank and driving-sprocket, and conveys movement to the disk through the mechanism just described. The bracket F^4 has a slot f^6, which is adapted to come into register with the slot a' in a forwardly-extending arm a on the leg A^2. The slot a' is preferably in an arc, with the pivot formed by the pins b^2 as a center. Extending from the pivots b^2 and secured thereto is a yoke G′, and extending from this yoke is a rod G. The rod G extends through the lugs f^4 f^4 on the bracket F^4 and is adjustable with relation to the bracket F^4 by means of the nut f^5. It will readily be noted that the slot f^6 allows an end movement of the bracket F^4 and that the chain F^2 may be tightened by operating the nuts f^5 f^5. The purpose of the slot a' is to allow the cranks to be brought closer or farther from the seat H′ to accommodate operators of different sizes. Whatever loosening or tightening there is incident to the fact that the pin b^2 is not on the same center with the shaft F may be accommodated by the adjusting means just described.

Means for varying the directions.—In order that the directions of the targets may be varied, it is necessary to change the position of the end of the guide E. This may be accomplished in various ways; but I prefer to accomplish it by oscillating the entire guide E. In the mechanism described this is readily done on the pivot-pin e'. Extending outwardly from the end of the spider E′ at the end of the guide E is a lug e^3. Extending downwardly from this lug is a pin e^4. Loosely secured at one end to the lower end of the pin e^4 is a link I^7. The other end of the link I^7 is perforated, so that the lugs i^4 on the under side of the plate D may readily pass into the perforation. A spring i^3 tends to press the link I^7 upwardly, so that when it is placed on the lug i^4 it is retained in position. As many lugs as desired may be placed on the under side of the plate D, usually five lugs, in order to give the five different directions. The pin e^4 should be sufficiently long to allow the upward movement of the guide E through the operation of the lever E^3, when desired, without disengaging the link I^7 from the lug i^4. Where the guide E is locked in position, as

just described, targets are thrown, as understood by marksmen, at known angles. It is often desirable to throw targets at unknown angles—that is, at angles unknown to the marksman who is to shoot at the target. This is accomplished in this trap by the following mechanism: Secured to the shaft F', adjacent to the sprocket *f*, is a spur-gear I. This meshes a spur-gear I', preferably of considerably larger size than the gear I. The gear I' is fixed on a shaft I^2. The shaft I^2 is journaled in the cross-pieces b^{10} and b^{11} of the frame B by means of the boxes *i i*. Fixed on the shaft I^2 is a beveled gear I^3, and meshing this beveled gear is a second beveled gear I^4. The beveled gear I^4 is supported by a bracket i^5, extending from the cross-piece b^{11}, and is journaled on a pin i^6. A rock-lever I^5, having the arms $i' i'$, is pivoted between the arms *b* and *b'*. A link I^6 extends from this rock-lever I^5 to a pin i^7 on the gear I^4. On the under side and at the outer end of the rock-lever I^5 is a downwardly-projecting pin i^2. This pin is adapted to enter a perforation in the link I^7. When an unknown angle is desired, the link I^7 is placed on the lug i^2. It will readily be seen that as the rock-lever I^5 is oscillated through the crank formed by the pin i^7 and the link I^6 the guide E is also oscillated. The extent of this oscillation is preferably one-quarter of a circle. As the guide E when so connected is constantly in motion the direction of the flight of the target is dependent entirely upon the moment of delivering the target to the machine and as in the ordinary operation of the machine the machine is out of sight of both the marksman and the one controlling the moment of delivery it will readily be seen that the direction of flight, so far as the marksman is concerned, cannot be ascertained except by the flight of the target.

Means for varying the elevation—The trajectories may be varied as well as the direction of the targets. I have arranged an automatic means for moving the tilting frame B. This is accomplished by securing the link K to a pin *k* on the frame and a pin *k'* on the gear I'. The set-screw a^4 is loosened when this result is desired. It will readily be seen that as the machine is operated the frame B is constantly oscillated, varying the elevation to which the target is thrown. This automatic variation of the elevation may be thrown out by disengaging the link K and setting the frame B to any angle desired through the link b^5 and set-screw a^4. When the gear I^4 is double the size of the gear I^3 and the pin *k'* set in proper relation to the pin i^7, a higher elevation is given to the quarters than the straight-away targets.

Means for varying the discharge velocity of the target.—As the acceleration of the target depends upon the force given to it through its contact with the revolving brush C', the velocity of the target may be varied by varying the force of this contact. In the present machine the plate D is pivoted by means of the screw b^4, having the cone ends between the posts b^3, which posts extend upwardly from the tilting frame B. The third point of support of the plate D is formed by the bracket d^2, (see Figs. 3 and 4,) which is adjustably secured to an arm d^3, extending from the inner edge of the plate D. This adjustment is accomplished by forming the slot d^5 (see Fig. 3) through the bracket d^2 and securing it to the arm d^3 by means of a screw-bolt d^4. A shoulder d^6 is arranged on the bracket d^2 immediately under the arm d^3, and the set-screws d^7 are arranged in this shoulder. These may be used to assist in the adjustment of the plate D by screwing them against the bottom edge of the arm d^3. A transverse slot d^8 passes through the body of the bracket, and in this is arranged an eccentric J. This eccentric is slidingly mounted on the shaft J^2 and has an inwardly-projecting pin *j*, which is adapted to enter a perforation (see dotted line, Fig. 3) in a collar J'. The collar J' is fixed on the shaft I^2. It will readily be seen that when the eccentric is pressed inwardly, so as to bring the pin *j* in the perforation, the eccentric is made to move with the shaft I^2 and in rotating raises and lowers through the bracket d^2 the plate D. In this manner the distance between the plate D and the brush C' is constantly varied, and as this is varied the force of contact upon the target is varied, so that the discharge velocity or distance to which the target is thrown is constantly varied. As this variation is accomplished automatically by the machine, it depends entirely upon the moment when the target is delivered to the trap at what speed the target will be discharged. The discharge velocity of the target is unknown to the marksman and can only be ascertained by the flight of the target itself. The eccentric is held in this position by means of a pin d^9, which passes through the bracket into the slot d^8 and into a groove j' in the eccentric. When it is desired to give to the target a fixed or known velocity, the pin d^9 is withdrawn from the groove j', the eccentric drawn out, so as to bring the pin *j* out of the perforation in the collar J', and the eccentric is locked in any desired position by placing the pin d^9 in one of a series of openings j^2 in the periphery of the eccentric. The pin d^9 has a reduced extension which passes through a lug d^{11} on the bracket. A spring d^{10} is tensioned between the lug d^{11} and the shoulder d^{12} on the pin. A knob d^{13} is provided on the pin, by means of which it may be withdrawn from the groove j' or the holes j^2. By this arrangement it will readily be seen that it may be adjusted to throw at unknown distances or adjusted to known distances and different known distances. The gears I^3 and I^4 are of different size, so that the variation in speed due to the eccentric J and the variation in direction due to the oscillation of the lever I^5 may be differently timed, so that the directions at which the fastest targets go are constantly varied.

Delivering mechanism.—By reason of the fact that the machine is constituted to oscillate the guide E it is obvious that a portion of the guide will pass beyond the delivering-point on the plate D. The targets, therefore, cannot be readily delivered with a movement directly in the plane of the plate D, but must be carried under the guide E into position. I accomplish this by providing a deliverer L, which is adapted to receive a target outside of the guide E, and I mount this deliverer on a shaft l, which is set at a decided angle to the plane of the plate D. This slant on the shaft l makes the swing of the deliverer L extend as it is swung outwardly in a downwardly direction. As the deliverer L is swung from outside of the guide E an upward slant is given to the direction of its forward movement, so that a target may be carried from a position outside of and below the guide E to a position in the plane of the plate D inside of the guide E. The deliverer L is fixed on the shaft l, and the shaft is journaled in a cross-arm b^9 of the frame B. A spring l' is tensioned on the shaft l, so as to force the deliverer L inward. A magazine M is arranged just outside of the guide in proper position to drop targets into the deliverer L when the deliverer is in its outward position. The spring l' is arranged to force the deliverer forward and to thus carry a target to position in the plate D when the trap is pulled. A buffer l^3, preferably of rubber or similar material, is arranged in the path of an arm l^4 on the deliverer to break the shock at the end of its delivering movement, and a buffer l^5, secured by the screw-bolt n on the stud b^{13}, is arranged to prevent the overrunning of the deliverer in its outward movement. Such a movement would displace the target as the deliverer returned to its final position.

Means for actuating the delivering mechanism.—The mechanism for carrying the deliverer to a position under the magazine is as follows: Arranged on the shaft F′ is a friction-disk P. (See Figs. 12 and 13.) Journaled on the shaft F′, preferably by means of the ball-bearings Q′, is the clutch-disk Q. The clutch-dog q' is pivoted on the pin q, extending from the disk Q. It is provided with a clutch-surface q^2 and operates by frictional contact in the manner of an ordinary pipe-wrench. The clutch is normally placed in such a position (see Fig. 12) that it will drop into engagement by its own weight. I prefer, however, to provide the spring q^3 to prevent its disengagement as the disk is turned should the machine be operated backward. On one edge of the dog q' is a trip-plate q^4. On the opposite face of the disk Q is a cam S, and operating against this cam is a lever S′. The lever S′ is pivoted on a pin b^{12}, secured on the frame B. The lever S′ has the arm s, which extends inwardly and is provided on its inner end with a wearing-surface for operating on the cam. It also has an outwardly-extending arm s'. The outwardly-extending arm s' is connected by the link S^2 (see Figs. 2, 4, and 6) with an arm l^6, extending from the lower end of the shaft l. (See Figs. 4 and 6.) The cam S is provided with the outwardly-forcing surface s^2, the straight surface s^3, and the escaping-surface s^4. With the deliverer L in the position shown in Fig 2—that is, in position against the plate D—the arm s is at the point shown at Y in Figs. 14 and 15. When the clutch-dog q' is dropped into engagement with the disk P, it locks the disk Q with the rotating shaft F′, and the action of the cam on the arm s forces the arm s' toward the rear of the machine, and this, through the connecting-link l^6, swings the deliverer L back under the magazine. The cam continues to move until the straight portion passes by the arm s. The clutch-dog is tripped just before the arm reaches the point X in Figs. 14 and 15. The arm is held in this position until the magazine is tripped by a mechanism hereinafter described. When tripped, the spring l' throws the deliverer up under the brush, so as to deliver the target.

Tripping mechanism.—The tripping mechanism is as follows: Secured to the cross-arm b^7 of the frame B is a box-shaped frame R, which carries the tripping mechanism. The inner face R′ of this frame has an opening cut through it to permit the dog q' to operate just flush with this face. (See Figs. 13 and 16.) The greater portion of this opening is sufficiently large so that it does not influence the tripping-plate q^4, carried by the dog q'. Just before, however, the arm s reaches the end of the straight portion s^3 of the cam S the trip-plate q^4 reaches a trip-shoulder r' on the plate R′ and passes up onto said shoulder. The radius of this trip-plate is sufficiently large to hold the clutch-dog q' out of engagement with the friction-disk P. Pivoted on the disk Q by means of the pin q^7 is a stop-dog q^6, having the trip-plate q^9 extending therefrom. A spring q^8 tends to draw this dog inwardly and to force the trip-plate q^9 outwardly. A stop r^2 projects from the plate R′ in the path of the dog q^6 when said dog is at its outer position, as shown in Fig. 16. A swinging trip-arm U is pivoted just on the inside of the plate R′ (see Fig. 16) and forms a continuation of the shoulder r'. A spring u is tensioned between this swinging arm and a spring-arm r^3, which extends outwardly from the plate R′. The spring is preferably provided with a thumb-nut u^2, by which the spring may be tensioned as desired. The spring holds the swinging arm normally against the plate R′ and in the path of the trip-plates q^4 and q^9. Beneath the arm U is a catch-arm V, having at its end a catch v for engaging the swinging arm U, and immediately to the rear of the arm U is a shoulder v', between which and the catch v the arm U is held. Arranged on the disk Q are the cams q^5. The shoulder v' is in the path of these cams, so that immediately after the trip-plate q^4 or q^9 passes the swinging arm U

the catch-arm V is forced downwardly by a cam q^5, so as to relieve the arm U from the catch v. The catch-arm V is pivoted on the armature-frame V', and this is pivoted at r^5 on the under side of the top part of the frame R. A pin v^2 extends downwardly from the catch-arm V, and a spring v^3 extends from the end of the pin v^2 to the arm r^3. A thumb-nut v^4 is provided, by which the tension of the spring v^3 may be varied. It will be noted that the spring v^3, operating, as it does, on an angle, draws the catch-arm V both upwardly and forwardly. Magnetic coils W (see Fig. 6) are secured on the under side of the top part of the frame R by means of a plate R^2. The plate R^2 is provided with the slots r^5, (see Fig. 2,) and the screw-bolts r^4 are passed through these slots into the top plate. By this means the coils W, which are carried by the plate R^2, can be adjusted to and from the armature v^6, as desired.

The operation of this trip device is as follows: With the clutch mechanism as shown in Figs. 12 and 13 the deliverer is at the position clearly shown in Fig. 2 and the end of the arm s is at the point Y. (See Figs. 14 and 15.) The current is turned into the coils W, and this, attracting the armature, causes an outward movement of the catch-arm V. This carries the swinging trip-arm U out from under the trip-plate q^4. The clutch-dog then immediately drops into engagement with the disk P, and the clutch-disk Q is turned with the shaft F'. This action turns the cam S around, so as to bring the arm s up onto the straight part s^3 of the cam. The deliverer of course reaches a position under the magazine at the moment the arm reaches the straight portion s^3. The clutch mechanism, however, remains in engagement until the straight portion s^3 has passed by the arm s for the purpose of operating the magazine, as hereinafter described. Just as the point X reaches the end of the arm s the trip-plate q^4 strikes the trip-shoulder r' and throws the clutch-dog out of engagement. During the movement of the disk Q through the clutch action just described the trip-plate q^9 of the stop-dog q^6 has come into contact with the trip-shoulder r' and moves the stop-dog to its outer position. The dog q^6 is held in its outer position as the trip-plate q^9 is passed over the shoulder r' and swinging trip-arm U, and just before the trip-plate q^9 passes the swinging trip-arm U the stop-dog comes in contact with the stop r^2 on the plate R, and the disk is brought to rest at this point, the deliverer being under the magazine. When it is desired to deliver a target, the current is turned into the coil the second time by the switch, hereinafter described. This carries the swinging arm U from under the trip-plate q^9 and permits the spring q^8 to draw the stop-dog q^6 out of engagement with the stop r^2, so that the disk Q is free to move forward. The end of the arm s resting on the straight portion will not, of course, effect a forward movement of the cam-disk q. The initial movement, therefore, of the cam is effected by the magazine mechanism, hereinafter described, and when so operated the end of the arm s is carried past the point X. The force of the spring l' carries the deliverer and the target up into the plane of the plate D. At the same time by the action of the escape-surface s^4 the cam S forces the disk Q in a forward direction, so as to bring the trip-plate q^4, with the swinging trip-arm U, in position for a second operation, when the operation just hereinbefore described may be repeated.

The magazine.—The magazine M comprises the main ring or frame m. Extending from this is an arm m'. A pin (see Fig. 6) extends from the arm m' through an arm b^8 of the tilting frame B and is fixed with a rock-arm m^2 by means of a squared end. (See Fig. 4.) The rock-arm m^2 is connected by a link m^3 with the arm A^4, extending from the frame-plate A. The link m^3 is connected with the arm m^2 by a joint m^4 and with the arm A^4 by a joint a^5. The length of the arm m^2 is exactly the distance between the pivots b^2 extended and the joint a^5. The joint m^4 is in the same relation to the pin extending through the end of the arm b^8 as is the joint a^5 to the pin b^2. By this paralleling mechanism the magazine is kept at the same angle to a horizontal plane whatever angle may be given to the swinging frame. By this arrangement the magazine may be tilted, so that the entire weight of the target is not placed upon the dropping mechanism, and at the same time the angle does not become so great through a movement of the tilting frame but what the target will drop freely. The frame-ring m of the magazine is provided with three slots m^5, in which the drop-dogs are placed. Beneath each of these slots m^5 is a supporting-lip m^8. (See Fig. 9.) Extending up through this lip and into the main portion of the frame-ring are the pins m^7, on which the drop-dogs are pivoted. The drop mechanism comprises generally a lower stop m^8 and a presser-dog m^{15}. These are arranged to be brought into action alternately, so that when the stop m^8, which is at the bottom, is drawn out from under the bottom target the presser-dog m^{15} engages the next to the lowermost target and supports the column, while the stop m^8 is withdrawn. The stop m^8 is provided with a hub m^9, and this hub is journaled on the pivot-pin m^7. Extending from the hub m^9 is the arm m^{10}. These arms are connected by means of a plate m^{11}. The plate is secured to each arm by means of the pin m^{12}. A spring m^{13} is connected with the plate m^{11} and a pin m^{14}, which extends from the frame-ring m. This spring tends to normally hold the plate m^{11} in position to hold the stop-dog m^8 at its inward position or under the lowermost target in the magazine and to hold the presser-dog m^{15} within the recess m^5. The presser-dog m^{15} is provided with the hub m^{16}, which is pivoted on the pin

m^7, and is also provided with the outwardly-extending arm m^{17}. The arms m^{17} engage the shoulders m^{18} on the upper surface of the ring m^{11}. The springs m^{19} extend from the arms to the pins m^{20} in the ring m and force the arms m^{17} into engagement with the shoulders m^{18}. As the ring m^{11} is forced around against the tension of the spring m^{13}, so as to draw the stop m^8 from under the lowermost target, the springs m^{19} compel the presser-dogs to follow this movement by keeping the arms m^{17} in contact with the shoulders m^{18} until the presser-dogs m^{15} come in contact with the next to the lowermost target. The moment of contact, of course, should precede the time when the dog m^8 is entirely from under the lowermost target. A continued movement of the plate m^{11} carries the stop-dog m^8 out from under the lowermost target. Of course the presser-dog does not follow this movement, but is held in engagement with the next to the lowermost target by the full tension of the spring m^{19}, and this tension should be sufficient to sustain the desired number of targets in the magazine. In order that the presser-dogs m^{15} may not engage an upper portion of the lowermost target in the magazine as the stop-dog m^8 is withdrawn from under it, the stops m^{23} are provided. These engage the ring and limit the inward movement of the presser-dog, so as to prevent this result. A contact-shoulder m^{21} is arranged on the plate m^{11}, by means of which the magazine may be operated by the mechanism hereinafter described. Secured to the upper surface of the frame-ring m and extending upwardly is a guide m^{22} for supporting a column of targets. The opening to the guide, of course, should be toward the upper side of the magazine, as shown, and this is toward the operator, so that the targets may be conveniently placed in the magazine by the operator.

Means for actuating the magazine.—In the operation of the magazine the deliverer is brought under the magazine by the mechanism hereinbefore described, and just as the deliverer reaches a position under the magazine, the magazine should be open, so as to permit the dropping of the lowermost target. The magazine parts are preferably brought back to their normal position before the completion of the operation or before the actuating parts reach the position shown in Fig. 16. This is particularly so in a trap having mechanism continuously in operation, because by reason of the vibration of the machine where the magazines are left normally open between the throwing of different targets it is difficult to sustain the column by means of the presser-dogs m^{15}, and of course if the stop-dogs m^8 are held at their outer position during the time that the deliverer is under the magazine if a second target works past the presser-dog m^{15} it is dropped onto the deliverer and the machine is blocked. I prefer, therefore, as above stated, before the operation of bringing the deliverer under the magazine is completed to have the drop-dogs brought to the position shown in Fig. 9. When this is done, the lowermost target then rests on the stop m^8, and of course there is no possibility of its disengagement from this position by the jar of the machine. The machine herein shown is designed to so operate. Extending downwardly from the arm b^8 of the frame B is a lug b^{13}. A rock-arm N is journaled on a pin n, secured to this lug. The end of this arm N is curved with the center of the pin supporting the magazine as a center, and it is also arranged to contact the shoulder m^{21} as it is rocked. It will readily be seen that by so curving the arm it is immaterial in what position the magazine may be by reason of the tilting of the frame, so far as the moment of tripping is concerned. Extending forwardly from this arm is a short arm n'. A lever T′ (see Figs. 15, 5, and 2) is pivoted to the frame B on the pin b^{12}. This lever has the two arms t^4 and t^5. The link T^2 connects the arm t^5 with the arm n' of the rock-arm N. Arranged on the disk Q outside of and concentric with the cam S, which may be termed the "deliverer-cam," is a cam T, which may be termed the "magazine-cam." The cam T has the shoulder t, working portion t', a straight portion t^2, and an escape-surface t^3. A spring T^3 is secured to a pin t^6 (see Fig. 2) on the frame B and to the arm t^4 and tends to draw the arm t^4 toward the cam T. The end of the arm t^4 is provided with the wearing-pin t^7, (see dotted line,) and this is arranged in the path of the cam. When the clutch mechanism is in the position shown in Fig. 12, the pin t^7 will be at the point Y′—that is, against the shoulder t. The purpose of this shoulder is to prevent the overrunning of the disk Q by reason of the action of the spring l' operating through the lever S′ on the escape portion s^4 of the cam S. Should an overrunning take place, it would carry the trip-plate q^4 beyond the swinging trip-arm U. This would allow the dog to drop into engagement, so that the deliverer might be retracted before the proper delivery of the target. When the trip-arm U is withdrawn, as hereinbefore described, the clutch causes the cam to operate, and the pin t^7 is forced outwardly by the action of the cam-surface t'. This moves the arm t^5 toward the rear and draws the rock-arm N toward the shoulder m^{21}. The adjustment of the parts is such that the rock-arm N is brought into contact with the shoulder m^{21} just before the end of the arm s reaches the straight portion s^3 of the cam S. The continued operation of the cam opens the magazine just as the deliverer is brought in place under the magazine. The straight portion t^2 of the cam makes a pause, which holds the magazine open a sufficient length of time to permit the dropping of the lowermost target. Just before the trip-plate q^4 reaches the trip-shoulder r' the bearing-pin t^7 passes the end of the straight

portion t^2 down onto the escape portion t^3 of the magazine-cam and is therefore pressing the disk Q forward before the clutch-dog is tripped. When the pin t^7 has reached about the point X′, the stop-dog q^6 comes in contact with the stop r^2. It will be noted that when the parts are in this position the stop-dog is relieved of the pressure of the comparatively heavy spring l' and is subject only to the forwardly-acting pressure of the spring T^3. This pressure, while sufficient to cause the starting movement of the disk Q, is so slight upon the stop as to permit of the use of a very light spring q^8, and such a spring as q^8, acting upon the trip-plate q^9, exerts so little pressure upon the swinging arm U that the frictional resistance of the tripping movement of the arm U is very slight. When the swinging arm U is drawn from under the trip q^9, the spring q^8 withdraws the stop-dog q^6, and the action of the spring T^3 on the arm t^4 and the escape cam portion t^3 forces the disk Q forward a sufficient distance to carry the end of the arm s past the point X, and of course at this point the deliverer is carried forward by the spring l'. The overrunning of the mechanism is stopped by the shoulder t, as described. During this action the rock-lever N is simply moved a farther distance from the shoulder m^{21}. The magazine of course is brought to its normal position with the pin t^7 at the point X′, so that the dropping of the column of targets takes place before the completion of the operation.

Controlling-switch.—It is desirable to have a switch which with a single operation will make the two pulls, so as to trip the delivering mechanism to deliver targets, give the necessary pause to the upper position of the delivering apparatus to permit the target to properly enter the machine, and then to make the second pull, so as to return the delivering apparatus to the position under the magazine ready for the next target. The switch for accomplishing this purpose (see Figs. 17 and 18) is as follows: A switch-frame W′, preferably of wood or some insulating material, is turned, with the annular shoulder w^{11}, around the upper edge. Two contact-plates w^2 and w^3, with the spring portions w^9 and w^{10}, are secured on the upper surface of the cavity formed in the upper surface of the frame. The spring-surfaces w^9 and w^{10} preferably just come flush with the top edge of the annular shoulder w^{11}. A crank w^5 is secured to the center of the frame by the screw w^6. Forming a part of the hub of the crank is a cam w^7, having the flat portion w^8. A contact-brush w^4 is secured in the shoulder w^{11} and is arranged below the surface of the contacts w^9 w^{10} and rests against the cam w^7. It is of sufficient spring tension to form a perceptible resistance to the movement of the crank when the brush is brought on the flat portion w^8 and holds the crank in this position. The under side of the crank is provided with a small boss w^{12}, which will contact, if the crank is turned, with the spring-contacts w^9 w^{10}. The wires w and w', forming the two sides of the circuit, are connected with the brush w^4 and the contacts w^9 w^{10}, respectively. It will be noted that the circuit is closed through the contact w^9 immediately upon the starting of the crank. This trips the delivering mechanism and delivers the targets. As the crank is turned forward a pause is made between the time it leaves the contact w^9 and reaches the contact w^{10}. During this time the delivering operation is completed. The crank then closes the circuit through the contact w^{10}, and this makes the second pull and brings the delivering apparatus under the magazine. The pause during the continued movement of the crank to its normal position (shown in Fig. 17) gives the necessary time for this return movement of the delivering mechanism. The length of the crank may be adjusted to give the proper pause between the contacts even with the most rapid movement of the crank that may be effected by hand, so that a perfect operation may be assured with each revolution. It will be noted that if the crank is arrested on the contact w^9, so that the catch-lever V is held in its outer position, the machine will make but a single operation, because the catch v will be forced out of engagement through the action of the cam q^5 acting upon the shoulder v'. Each operation, therefore, must be accompanied by a voluntary act of the operator.

Speed indicator.—It is desirable that some means may be provided whereby a uniform speed must be maintained in order that one marksman may not be favored over another. I provide such a mechanism as follows, (see Figs. 14 and 6:) Pivoted at o on the disk C is an arm O. At one side of the arm is a projection o'. Extending downwardly through the disk (see Fig. 1) is a pin o^2, and secured to this pin is a spring o^3. The end of the spring is straightened and passes through a shoulder o^4 on the under side of the disk. A thumb-nut is secured on the end of the spring, so that the tension of the spring may be varied. The directions of the spring and lug o' are preferably such as to give the arm O normally a position extending toward the axis of the machine. A stop o^6 is provided to prevent an outswinging of the arm O should the machine be run at an excessive speed. A bell is secured to the free end of the arm O. There is preferably arranged on top of the bell a raised portion o^7. Secured to the under side of one of the arms of the spider E′ is a spring-tappet o^8. The tappet is so placed and the tension of the spring so adjusted that the tappet will be in the path of the raised portion o^7 when the machine is running at the desired speed. With any excessive speed the raised portion is carried outside of the tappet, and where the speed is decreased below what is desired as a minimum the raised portion is drawn in by the spring out of the path of the tappet. The range between the maximum and minimum

speed at which it is desired that the machine may operate can be regulated by the length of the raised portion—that is, the portion which comes in contact with the tappet—or by a variation in the arrangement of the spring, whereby a difference in the variation in the tension is effected in relation to a given movement of the bell. It will be noted, therefore, that this indicator indicates not only a sufficient speed, but also indicates when an excess of speed is reached. It will also be noted that should the guide E be raised to allow the removal of a broken target it will carry the tappet out of the path of the bell, so that the person operating the pull may be immediately apprised of the fact.

I claim—

1. In a target-trap, a means for accelerating a target by a movement of the means past and in contact with the target.

2. In a target-trap, the combination of means for accelerating a target by a movement of the means past and in contact with the target; and means for increasing the force of contact as the target is accelerated.

3. In a target-trap, a continuously-operating means for accelerating a target by a movement of the means past and in contact with the target.

4. In a target-trap, the combination of a continuously-operating means for accelerating a target by a movement of the means past and in contact with the target; and means for increasing the force of contact as the target is accelerated.

5. In a target-trap, the combination of a continuously-operating means for accelerating the target; and means for delivering the targets to said means at a point on said means having the speed of the means at the point of discharge.

6. In a target-trap, the combination of a continuously-operating means for accelerating the target; and means for delivering the targets to said means at a point on said means having the speed of the means at the point of discharge, said accelerating means yieldingly engaging said target.

7. In a target-trap, the combination of a continuously-operating means for accelerating the target, said means engaging the target with a yielding resistance.

8. In a target-trap, a means for accelerating a target with greater speed at one side than at the other to impart rotary movement to the target, said acceleration being effected by a movement of the means past and in contact with the target.

9. In a target-trap, the combination of a means for accelerating a target by a movement of the means past and in contact with the target; and means for imparting to the target rotary motion.

10. In a target-trap, the combination of a continuously-operating means for accelerating a target by a movement of the means past and in contact with the target; and means for imparting to the target rotary motion.

11. In a target-trap, the combination of a continuously-operating means for accelerating the target with greater speed at one side than at the other to impart rotary motion to the target; and means for delivering the targets to said means at a point on said accelerating means having the speed of the accelerating means at the point of discharge.

12. In a target-trap, the combination of a means for accelerating the target by a movement of the means past and in contact with the target; means for engaging one side of the target and imparting to it a speed less than that of the body of the target to give it a rotary motion.

13. In a target-trap, the combination of a continuously-operated accelerating means; and a shoulder arranged in the path of a target actuated by the accelerating means and adapted to engage a side of the target to impart rotary motion to it and being in the direction at the discharge in line with the flight of the target.

14. In a target-trap, the combination of a continuously-operated accelerating means; and a shoulder arranged in the path of a target actuated by the accelerating means and adapted to yieldingly engage a side of the target to impart rotary motion to it and being in the direction at the discharge in line with the flight of the target.

15. In a target-trap, the combination of a supporting-plate; a guide adjacent to said plate; means for accelerating a target on said plate and against said guide; and a continuously-operating mechanism for acting upon said accelerating means.

16. In a target-trap, the combination of a supporting-plate; a guide adjacent to said plate, said guide having a direction, at the discharge, in line with the direction of flight of the target; means for accelerating a target on said plate and against said guide; and a continuously-operating mechanism for acting upon said accelerating means to give to it its accelerating movement.

17. In a target-trap, the combination of a continuously-operating accelerating means; an annular driving-surface arranged on said means and adapted to accelerate a target by its engagement, said surface being arranged in the direction of the flight of the target at the discharge.

18. In a target-trap, the combination of a rotating accelerating means; and an annular driving-surface arranged on said means and adapted to accelerate the target by its engagement.

19. In a target-trap, the combination of a rotating accelerating means; an annular driving-surface arranged on said means and adapted to accelerate the target by its engagement;

and means for increasing the force of the engagement of the driving-surface with the target.

20. In a target-trap, the combination of a rotating accelerating means; and an annular driving-surface on said means adapted to accelerate a target by a movement past and in engagement with the target.

21. In a target-trap, the combination of a rotating accelerating means; and an annular driving-surface on said means for accelerating a target with a rotary motion by its engagement therewith.

22. In a target-trap, the combination of a rotary accelerating means; an annular driving-surface on said means adapted to engage and accelerate a target; and a guide adjacent to said surface for guiding the target in relation thereto.

23. In a target-trap, the combination of a rotary accelerating means; an annular driving-surface on said means adapted to engage and accelerate a target; and a supporting-plate opposite said driving-surface and adapted to hold the target in engagement with said means.

24. In a target-trap, the combination of a rotary accelerating means; an annular driving-surface on said means adapted to engage and accelerate a target; a guide adjacent to said surface for guiding the target in relation thereto; and a supporting-plate opposite said driving-surface for holding said target in engagement.

25. In a target-trap, the combination of an accelerating means comprising a cushioning-brush arranged to engage the target; and means for imparting motion to the accelerating means.

26. In a target-trap, the combination of an accelerating means comprising a cushioning-brush arranged to engage the target; and means for imparting continuous motion to the accelerating means.

27. In a target-trap, the combination of an accelerating means comprising a brush forming a driving-surface to cushion a target and to accelerate a target by its engagement; and means for imparting motion to said accelerating means.

28. In a target-trap, the combination of an accelerating means comprising a brush forming a driving-surface to cushion a target and to accelerate a target by its engagement; and means for imparting continuous movement to said accelerating means.

29. In a target-trap, the combination with an accelerating means comprising an annular brush; and means for supporting and forcing the target into engagement with said brush.

30. In a target-trap, the combination of an accelerating means comprising an annular brush; a supporting-plate opposite said brush in position to support a target and to hold the target in engagement with said brush during the accelerating movement.

31. In a target-trap, the combination of an accelerating means comprising an annular brush; and an arc-shaped guide adjusted to said brush and adapted to guide a target in proper relation to said brush.

32. In a target-trap, the combination of an accelerating means comprising an annular brush, a supporting-plate opposite said brush to hold a target in contact with said brush; and an arc-shaped guide adjusted to said brush to guide a target in proper relation to said brush.

33. In a target-trap, the combination of an arc-shaped supporting-plate; and an accelerating means arranged over said plate; said means comprising a brush forming a driving-surface to engage a target on the plate and accelerate the target by its engagement.

34. In a target-trap, the combination of an arc-shaped supporting-plate; an accelerating means comprising a driving-brush arranged over said plate and an arc-shaped guide having a brush-cushion for guiding said target on said plate.

35. In a target-trap, the combination of an accelerating means; a brush for retarding one side of the target to give it a rotary motion.

36. In a target-trap, the combination of a continuously-operating accelerating means; and a brush for retarding one side of the target to give it a rotary motion.

37. In a target-trap, the combination of a continuously-operating accelerating means, having a driving-surface; and a brush-guide adjacent to said driving-surface, and in line with the direction of its movement, engaged by a target actuated by said driving-surface.

38. In a target-trap, the combination of a rotating accelerating means, having an annular driving-surface thereon; and an arc-shaped guide adjacent to said driving-surface, said guide being provided with a brush-cushion.

39. In a target-trap, the combination of an accelerating means comprising an annular brush; an arc-shaped guide adjacent to said brush and having a brush-cushion thereon.

40. In a target-trap, the combination of the disk, C; means for rotating said disk; the annular brush, C′; the plate, D, opposite said brush; and the arc-shaped guide, E, having the brush-cushion adjacent to the brush, C′.

41. In a target-trap, the combination of an accelerating means comprising an annular brush engaging the target with greater force at the side more remote from the axis of the brush-support; and said brush-support.

42. In a target-trap, the combination of a rotary accelerating means, having a driving-surface thereon; a supporting-plate opposite said driving-surface; a guide adjacent to said accelerating means and on said plate; and means for moving said guide away from said plate for the purpose described.

43. In a target-trap, the combination of a rotary accelerating means; a shaft by which said means is carried; a supporting-plate ad-

jacent to said accelerating means; and means for adjusting said accelerating means toward and from said plate.

44. In a target-trap, the combination with an accelerating means comprising a brush, the elements of said brush being inclined in the direction of the accelerating movement of the accelerating means; means for imparting movement to said accelerating means.

45. In a target-trap, the combination of means for accelerating the target by a movement of the means past and in contact with the target; and means for varying the direction of the flight of said target.

46. In a target-trap, the combination of means for accelerating the target by a movement of the means past and in contact with the target; and means for automatically varying the direction of the flight of said target.

47. In a target, the combination of a continuously-operating means for accelerating a target by a movement of the means past and in contact with the target; and means for varying the direction of the flight of the target.

48. In a target-trap, the combination of a continuously-operating means for accelerating the target; and means for delivering the target to said means at a point on said means having the speed of the means at the point of discharge; and means for varying the direction of flight of the target.

49. In a target-trap, the combination of a continuously-operating means for accelerating a target; and means for varying the direction of the flight of the target irrespective of the starting of the accelerating movement of the target.

50. In a target-trap, the combination of an accelerating means; a guide for controlling the direction of the flight of the target; and means for oscillating said guide relatively to said accelerating means to vary the direction of the flight of the target.

51. In a target-trap, the combination of an accelerating means; a guide for controlling the direction of the flight of a target; and means for continuously oscillating said guide to vary the flight of the target.

52. In a target-trap, the combination of a continuously-operating accelerating means; a guide for controlling the direction of the flight of the target; and means for oscillating said guide to vary the flight of the target.

53. In a target-trap, the combination of a continuously-operating accelerating means; a guide for controlling the direction of the flight of the target; and means for continuously oscillating said guide to vary the flight of the target.

54. In a target-trap, the combination of a rotating accelerating means; a guide adjacent to said means for guiding the target in proper relation to said means and for controlling the direction of flight of the target; and means for varying the position of said guide to vary the direction of flight.

55. In a target-trap, the combination of a rotating accelerating means; a guide adjacent to said means for guiding the target in proper relation to said means and for controlling the direction of flight of the target; and means for continuously varying the position of said guide to vary the direction of flight.

56. In a target-trap, the combination of a supporting-plate; a guide adjacent to said plate; means for oscillating said guide on said plate; means for accelerating a target on said plate and against said guide.

57. In a target-trap, the combination of a supporting-plate; a guide adjacent to said plate; means for oscillating said guide on said plate; means for accelerating a target on said plate and against said guide; and a continuously-operating mechanism for operating upon said means and for actuating said oscillating guide.

58. In a target-trap, the combination of a rotating accelerating means; an arc-shaped guide adjacent to said accelerating means; means for locking said guide in different positions to vary the flight of the target; and means for securing said guide to a continuously-oscillating mechanism to automatically vary the direction of the flight of the target.

59. In a target-trap, the combination with a means for controlling the direction of flight of the target; means for locking said controlling means in one position; means for connecting said controlling means to automatically vary the flight of targets; and a spring for holding said locking and connecting means in an operative position.

60. In a target-trap, the combination with a means for controlling the direction of flight of targets; the link, I^7 controlling said means; means for locking said link in position; and a spring for holding said link in said locking position.

61. In a target-trap, the combination of the guide, E; the spider, E′, carrying said guide; a journal for said spider; a rotating accelerating means adjacent to said guide; a plate opposite said accelerating means beneath said guide; and means for lifting said guide from said plate.

62. In a target-trap, the combination of the plate, D; the disk, C, having the brush, C′ thereon; the guide, E; spider, E′; a journal for said spider; the link, I^7, on said guide; an oscillating lever adapted to be connected with said link; and means for driving said disk and oscillating lever.

63. In a target-trap, the combination with an accelerating means; of means for automatically actuating the trap to vary the elevation of the target.

64. In a target-trap, the combination of an accelerating means; a continuously-operating mechanism for actuating said means; and means actuated by said mechanism for continuously operating the trap to vary the elevation of the target.

65. In a target-trap, the combination of a

continuously-operating accelerating means; and means for automatically actuating the trap to vary the elevation of the target.

66. In a target-trap, the combination of a continuously-operating accelerating means; a mechanism for actuating said accelerating means; and means operated by said mechanism for actuating the trap to continuously vary the elevation of the target.

67. In a target-trap, the combination of a continuously-operating accelerating means; means for automatically varying the direction of flight of the targets from said trap; and means for automatically increasing the elevation of the targets on quarter.

68. In a target-trap, the combination of an accelerating means; means for varying the direction of flight of the target; means for varying the elevation of the target; and means for continuously actuating each of said means.

69. In a target-trap, the combination of a means for accelerating a target by a movement of means past and in contact with the target; and means for automatically actuating the trap to vary the elevation of the target.

70. In a target-trap, the combination of a rotating accelerating means; a driving-surface on said means; an oscillating guide adjacent to said driving-surface, said guide controlling the direction of flight of said target; and means for automatically increasing the elevation of the trap with the guide arranged to throw targets at quarter.

71. In a target-trap, the combination of a rotating accelerating means; a driving-surface on said means; an oscillating guide adjacent to said surface; means for continuously oscillating said guide; and means for continuously actuating said trap to increase the elevation of the target at quarters.

72. In a target-trap, the combination of an accelerating means; and means for automatically varying the discharge velocity of the target.

73. In a target-trap, the combination of an accelerating means; a continuously-operating mechanism for actuating said means; and means actuated by said mechanism for automatically varying the discharge velocity of the target.

74. In a target-trap, the combination of a continuously-operating accelerating means; and means for automatically varying the discharge velocity of the target.

75. In a target-trap, the combination of a means for accelerating a target by a movement of the means past and in contact with the target; and means for varying the force of contact to vary the discharge velocity of the target.

76. In a target-trap, the combination of a means for accelerating a target by a movement of the means past and in contact with the target; and means for automatically varying the force of contact to vary the discharge velocity of the target.

77. In a target-trap, the combination of a continuously-operating means; a driving-surface on said means adapted to engage and accelerate a target; and means for varying the force of said engagement to vary the discharge velocity of the target.

78. In a target-trap, the combination of a rotating accelerating means adapted to accelerate a target by a movement of the means past and in contact with the target; and means for varying the discharge velocity of the target by varying the force of contact between said means and the target.

79. In a target-trap, the combination of an accelerating means comprising a brush for engaging a target and means for varying the force of contact of said brush upon the target.

80. In a target-trap, the combination of a continuously-operating accelerating means comprising a brush for engaging and accelerating a target by said engagement; and means for varying the force of engagement of the brush upon the target for varying the discharge velocity of the target.

81. In a target-trap, the combination of an accelerating means; a supporting-plate opposite said means; and means for varying the position of said supporting-plate relatively to the accelerating means to vary the discharge velocity of the target.

82. In a target-trap, the combination of a rotating accelerating means, having a driving-surface thereon, adapted to engage and accelerate a target by said engagement; a supporting-plate opposite said driving-surface; and means for varying the position of said plate relatively to said driving-surface to vary the discharge velocity of the target.

83. In a target-trap, the combination of an annular brush; means for rotating said brush; a supporting-plate opposite said brush; and means for automatically vibrating said plate to vary the discharge velocity of the target.

84. In a target-trap, the combination of means for accelerating a target; means for automatically varying the direction of flight of said target; and means for automatically varying the velocity of the target.

85. In a target-trap, the combination of means for accelerating a target; a continuously-operating mechanism for actuating said means; means for varying the direction of flight of said target; and means for automatically varying the discharge velocity of the target.

86. In a target-trap, the combination of an accelerating means; a continuously-operating mechanism for actuating said means; means actuated by said continuously-operating mechanism for varying the direction of the flight of the target; and means controlled by said continuously-operating mechanism for varying the discharge velocity of the target.

87. In a target-trap, the combination of a

continuously-operating accelerating means; means for varying the direction of flight of the target; and means for automatically varying the discharge velocity of the target.

88. In a target-trap, the combination of a continuously-operating accelerating means; means for automatically varying the direction of flight of the target; and means for automatically varying the discharge velocity of the target.

89. In a target-trap, the combination of means for accelerating a target by a movement of the means past and in contact with the target; means for varying the direction of flight of the target; and means for automatically varying the discharge velocity of the target.

90. In a target-trap, the combination of means for accelerating a target; means for varying the elevation of the target; means for automatically varying the discharge velocity of the target.

91. In a target-trap, the combination of means for accelerating the target; means for varying the elevation of the target; means for varying the direction of flight of the target; and means for automatically varying the discharge velocity of the target.

92. In a target-trap, the combination of an accelerating means; means for automatically varying the elevation of the target; means for automatically varying the direction of the flight of the target; and means for varying the discharge velocity of the target.

93. In a target-trap, the combination of a rotary accelerating means; a driving-surface on said means; a plate opposite said driving-surface; means for vibrating said plate relatively to said driving-surface to vary the discharge velocity of the target; means for automatically tilting said plate and accelerating means to vary the elevation of the target a guide adjacent to said driving means; and means for automatically oscillating said guide to vary the direction of the flight of the target.

94. In a target-trap, the combination of a continuously-operating means for accelerating a target by a movement past and in contact with the target; and means for delivering targets to said means.

95. In a target-trap, the combination of a means for accelerating targets adapted to actuate a target by a movement of the means past and in contact with the targets; a continuously-operating mechanism for actuating said means; a delivering mechanism having a return movement and a delivery movement; and means actuated by said mechanism for operating said delivering mechanism in one direction.

96. In a target-trap, the combination with a means for accelerating targets by a movement past and in contact with the target; a continuously-operating mechanism for actuating said means a delivering mechanism; a spring for actuating said delivering mechanism for delivering a target; and means for coupling said delivering mechanism with said continuously-operating mechanism to return the parts to normal.

97. In a target-trap, the combination with a means for accelerating targets by a movement past and in contact with the target; a continuously-operating mechanism for actuating said means; delivering mechanism; a spring for actuating said delivering mechanism for delivering a target; a mechanism for returning said delivering mechanism to normal; a friction-clutch for locking said mechanism with continuously-operating mechanism; and means for throwing said clutch out of engagement at the completion of the return movement of the delivering mechanism.

98. In a target-trap, the combination with a means for accelerating targets by a movement past and in contact with the target; a continuously-operating mechanism for actuating said means; delivering mechanism; a spring for actuating said delivering mechanism for delivering a target; a mechanism for returning said delivering mechanism to normal; a friction-clutch for locking said mechanism with said continuously-operating mechanism; and means for throwing said clutch out of engagement at the completion of the return movement of the delivering mechanism, and for locking said delivering mechanism in position against the tension of the spring at the completion of said movement.

99. In a target-trap, the combination of a rotating accelerating means; a driving-surface on said means; a guide adjacent to said driving-surface and in the plane of the target as it is accelerated; means for oscillating said guide; and a delivering means for carrying a target from without said guide to position in contact with said driving-surface.

100. In a target-trap, the combination of a rotary accelerating means; a driving-surface on said means; a supporting-plate opposite said driving-surface; a guide on said supporting-plate and in the plane of movement of the target on said plate; and means for delivering a target from without said guide to a position on said plate.

101. In a target-trap, the combination of an accelerating means; a driving-surface on said means; a plate opposite said means, said plate being pivoted; a continuously-operating mechanism for driving said accelerating means; an eccentric driven by said mechanism and operating upon said plate to vibrate said plate; a delivering mechanism for delivering targets upon said plate, the line of the axis of the pivot being adjacent to the point of delivery.

102. In a target-trap, the combination of an accelerating means; a delivering mechanism for delivering targets to said means; a driving mechanism for driving said means; the friction-disk, P, driven by said driving means; the clutch-dog, q', for engaging said disk; a connecting mechanism between said clutch and said delivering mechanism, whereby said

delivering mechanism may be moved in one direction by the action of said clutch; the trip-plate, q^4; the trip-shoulder, r'; the swinging trip-arm, U, arranged in the path of the trip-plate, q^4; and means for actuating the swinging trip-arm, U.

103. In a target-trap, the combination of an accelerating means; a delivering mechanism for delivering targets to said means; a driving mechanism for driving said means; the friction-disk, P, driven by said driving means; the clutch-dog, q', for engaging said disk; a connecting mechanism between said clutch and said delivering mechanism, whereby said delivering mechanism may be moved in one direction by the action of said clutch; the trip-plate, q^4; the trip-shoulder, r'; the swinging trip-arm, U, arranged in the path of the trip-plate, q^4; means for actuating the swinging trip-arm, U; the stop, r^2; the stop-dog, q^6; and the trip-plate, q^9, on the stop-dog, said trip-plate, q^9, being arranged to rest on the swinging trip-arm, U, with the stop-dog in position against the stop, r^2.

104. In a target-trap, the combination of an accelerating means a continuously-operating mechanism for actuating said means; a magazine having a stop-dog normally closed at the bottom thereof; a presser-dog normally open adapted to engage the next to the bottom target when the stop-dog is open; and means actuated by said continuously-operating mechanism for actuating said magazine to open the stop-dog, close the presser-dog, and then close the stop-dog and open the presser-dog in one operation.

105. In a target-trap, the combination of an accelerating means; a mechanism for actuating said means; a magazine having a normally closed stop-dog; a normally open presser-dog; a cam operated by said actuating mechanism; a connecting mechanism between said cam and said magazine, said cam operating upon said connecting mechanism to open the stop-dog and to close the presser-dog, to form a pause in the movement of the connecting mechanism and then to permit a return movement of the connecting mechanism and magazine parts before the completion of the operation.

106. In a target-trap, the combination of an accelerating means; a mechanism for actuating said means; a magazine having a stop-dog normally closed and a presser-dog normally open; a cam; a clutch mechanism for locking said cam with the actuating mechanism; a connecting mechanism actuated by said cam for controlling the magazine, said cam operating upon said connecting mechanism to effect an opening of the stop-dog and closing of the presser-dog; a pause in the movement, the closing of the stop-dog and opening of the presser-dog; and a mechanism for throwing said clutch out of engagement at the completion of said operation.

107. In a target-trap, the combination of an accelerating means; a continuously-operating mechanism for actuating said means; a magazine adjacent to said accelerating means; a delivering mechanism arranged to carry a target from the magazine to the accelerating mechanism; means for coupling the delivering mechanism with a continuously-operating mechanism to effect a movement of said delivering mechanism in one direction; and means actuated by said continuously-operating mechanism for delivering a target from the magazine to the delivering mechanism.

108. In a target-trap, the combination of an accelerating means; a continuously-operating mechanism for actuating said means; a magazine; mechanism for delivering targets from the magazine to the accelerating means; a cam mechanism; means for locking said cam mechanism with a continuously-operating mechanism; and a connecting mechanism actuated by said cam mechanism for operating said delivering mechanism in one direction and for operating the magazine to deliver targets to the delivering mechanism.

109. In a target-trap, the combination of an accelerating means; a continuously-operating means for actuating said accelerating means; a cam mechanism; a clutch adapted to lock said cam mechanism with said continuously-operating means; spring-actuated levers operating against said cam; a trip mechanism for said clutch mechanism, said cam mechanism, tripping mechanism and clutch mechanism exerting force in a forward direction on said cam mechanism, in each position of the cam mechanism.

110. In a target-trap, the combination of a continuously-operating actuating means; a cam mechanism comprising a delivering-cam and magazine-cam; spring-actuated levers for operating against said cam, the cam-lever operating upon the magazine-cam being arranged to be at the point, X′, when the lever upon the delivering-cam is at the point, X; a clutch mechanism for locking said cam mechanism with said continuously-operating mechanism; and means for tripping said clutch mechanism.

111. In a target-trap, the combination of the cams, S and T, the cam, S, having the working part, s^2, the straight portion, s^3, and escape portion, s^4, the cam T, having the shoulder, t, working portion, t', the straight portion, t^2 and escape-surface, t^3; a delivering mechanism; the magazine; a connecting mechanism operating upon and cams for actuating said delivering mechanism and magazine; and the clutch mechanism for locking said cam mechanism with the continuously-operating mechanism.

112. In a target-trap, the combination of a continuously-operating accelerating means; means for delivering targets to said means; a pull mechanism for controlling said delivering mechanism; means for automatically throwing said delivering mechanism out of action after a single delivering operation.

113. In a target-trap, the combination of a

continnously-operating actuating means; the friction-disk, P; the clutch-disk, Q; the clutch-dog, q'; the trip-shoulder, r'; the trip-arm, U; the clutch-dog, q', having a trip part thereon adapted to come into the path of the shoulder, r' and the swinging arm, U; a stop, r^2; a stop-dog, q^6; a trip-plate on said stop-dog, q^6, adapted to come in the path of the trip-arm, U; the delivering-cam, S, on said clutch-plate, Q, having the working surface, s^2, the straight portion, s^3, and escape portion, s^4; the magazine-cam, T, on said clutch-plate, Q, having the shoulder, t, working portion, t', straight portion, t^2, and escape portion, t^3, thereon; levers operating upon said cams; a swinging delivering mechanism; a link connecting the lever working upon the delivering-cam with said swinging delivering mechanism; a magazine; a link connecting the magazine mechanism with the lever operating upon the magazine-cam, said magazine comprising a stop-dog and a presser-dog, and adapted to be operated by said cams to keep the stop-dogs normally closed and the presser-dogs normally open.

114. In a target-trap, the combination of an accelerating means; mechanism for delivering targets from a magazine to said accelerating means; the magazine comprising a frame-ring, m, a stop-dog, m^8, pivoted in said frame; a presser-dog, m^{15}, also pivoted in said frame and adapted to engage the next to the lowermost target; means for actuating said stop-dog; a spring secured to said presser-dog and tending to move said presser-dog inwardly; a connecting mechanism between said presser-dog and stop-dog for preventing the outward movement of the presser-dogs, except with an outward movement of the stop-dog, said connecting mechanism being disengaged from the presser-dog when the presser-dog engages the target.

115. In a target-trap, the combination of an accelerating means; mechanism for delivering targets from a magazine to said accelerating means; the magazine comprising a frame-ring, m, stop-dogs, m^8, pivoted therein; presser-dogs, m^{15}, also pivoted therein adapted to engage the next to the lowermost target; a mechanism connecting the presser-dog with the stop-dog, said mechanism preventing an inward movement of the presser-dog except with an outward movement of the stop-dog and compelling an outward movement of the presser-dog with an inward movement of the stop-dog; a spring tensioned on said presser-dog and tending to press said presser-dog inwardly.

116. In a target-trap, the combination of a tilting frame; a magazine carried by said frame; and means for maintaining said magazine at a fixed angle to a horizontal plane.

117. In a target-trap, the combination of an accelerating means; a swinging delivering mechanism for delivering a target to said means; a continuously-operating mechanism for actuating said accelerating means; means for coupling said delivering mechanism with said continuously-operating means for moving said delivering mechanism in one direction; and a pull mechanism operating upon said coupling mechanism to give to said delivering mechanism one movement only, either a delivering or a return movement with a single operation of the pulling mechanism.

118. In a target-trap, the combination of an accelerating means; a swinging delivering mechanism for delivering a target to said means; a continuously-operating mechanism for actuating said accelerating means; means for coupling said delivering mechanism with said continuously-operating means for moving said delivering mechanism in one direction; a pull mechanism operating upon said coupling mechanism to give to said delivering mechanism one movement only, either a delivering or a return movement with a single operation of the pulling mechanism; and a mechanism having a single operation for effecting two pulls at each single operation.

119. In a target-trap, the combination of an accelerating means; a swinging delivering mechanism for delivering a target to said means; a continuously-operating mechanism for actuating said accelerating means; means for coupling said delivering mechanism with said continuously-operating means for moving said delivering mechanism in one direction; a pull mechanism operating upon said coupling mechanism to give to said delivering mechanism one movement only, either a delivering or a return movement with a single operation of the pulling mechanism; a crank; and mechanism actuated by said crank for operating said pull mechanism twice, with each revolution of the crank.

120. In a target-trap, the combination of an accelerating means; a swinging delivering mechanism for delivering a target to said means; a continuously-operating mechanism for actuating said accelerating means; means for coupling said delivering mechanism with said continuously-operating means for moving said delivering mechanism in one direction; a pull mechanism operating upon said coupling mechanism to give to said delivering mechanism one movement only, either a delivering or a return movement with a single operation of the pulling mechanism; an electric releasing mechanism for said pull mechanism; and a switch operating with one complete movement for making two pulls on the pulling mechanism.

121. In a target-trap, the combination of an accelerating means; a swinging delivering mechanism for delivering a target to said means; a continuously-operating mechanism for actuating said accelerating means; means for coupling said delivering mechanism with said continuously-operating means for moving said delivering mechanism in one direction; a pull mechanism operating upon said coupling mechanism to give to said delivering mechanism one movement only, either a

delivering or a return movement with a single operation of the pulling mechanism; an electric mechanism for operating said pull; a switch having a double contact for actuating said electric mechanism; and a crank operating over said contacts to give two pulls with each revolution of the crank.

122. In a target-trap, the combination of an accelerating means; a swinging delivering mechanism for delivering a target to said means; a continuously-operating mechanism for actuating said accelerating means; means for coupling said delivering mechanism with said continuously-operating means for moving said delivering mechanism in one direction; a pull mechanism operating upon said coupling mechanism to give to said delivering mechanism one movement only, either a delivering or a return movement with a single operation of the pulling mechanism; an electric mechanism for operating said pull; a switch comprising an insulating-block; a crank journaled on said block; a cam having a flat portion on said crank; a contact-brush operating upon said cam, adapted to stop the crank at a fixed position and two contacts in the path of said crank adapted to close the circuit through said crank, said contact being arranged on said insulating-block, to give the proper pause between the pull.

123. In a target-trap, the combination of an accelerating means; a continuously-operating means for actuating said accelerating means; and means actuated by said continuously-operating means for indicating a speed either above or below the desired maximum or minimum.

124. In a target-trap, the combination of a continuously-operating accelerating means; means actuated with said accelerating means for indicating a speed either above or below a desired minimum or maximum speed of said accelerating means.

125. In a target-trap, the combination of a continuously-operating accelerating means; a bell and a tappet, one carried by the operating means and one in a comparatively stationary part; and means for controlling the part on the accelerating means to permit of a movement out of the range of the stationary part with each speed of the accelerating means either above or below a desired maximum or minimum, respectively.

126. In a target-trap, the combination of an accelerating means; a tappet and gong, one carried by the accelerating means and the other held comparatively stationary, the one on the accelerating means being carried by a pivoted arm; a spring arranged to effect a centripetal action on the said pivoted arm to draw said arm and the element carried by said arm out of the range of the stationary element with a decrease in speed of the accelerating means, below a desired minimum, the tension on the spring permitting of an outward movement to carry the part on the pivoted arm without the range of the stationary part with an excess of speed.

127. In a target-trap, the combination of a rotating accelerating means; a guide adjacent to said accelerating means; a bell and gong, one carried with said guide and the other with the accelerating means; and means for raising said guide and the part carried by said guide out of the range of the indicating part carried by the accelerating means.

In testimony whereof I affix my signature in presence of two witnesses.

HUGH C. LORD.

Witnesses:
JUSTIN P. SLOCUM,
H. LIPPOLD.