

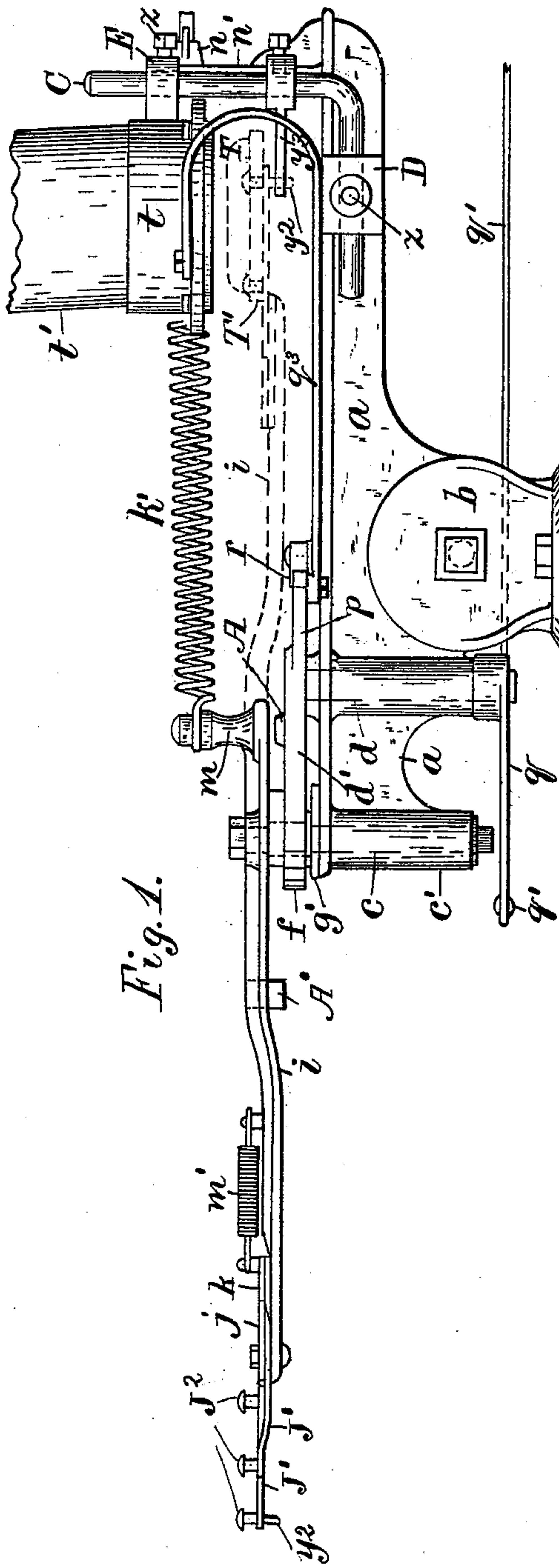
(No Model.)

3 Sheets—Sheet 1.

H. W. TICHENOR.  
SELF FEEDING TARGET TRAP.

No. 519,512.

Patented May 8, 1894.



*Fig. 1.*

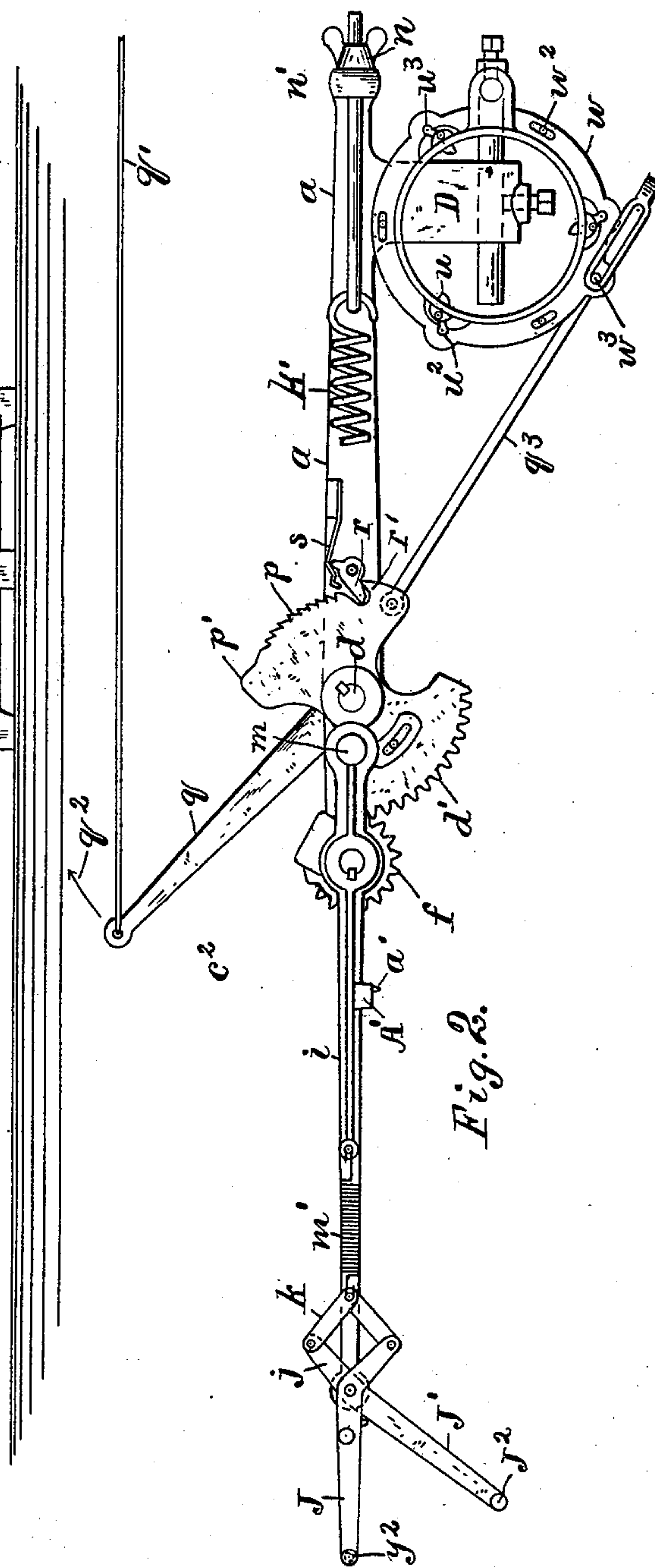


Fig. 2.

Attest:  
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Herbert W. Tichenor  
per Coane & Miller, Attys.

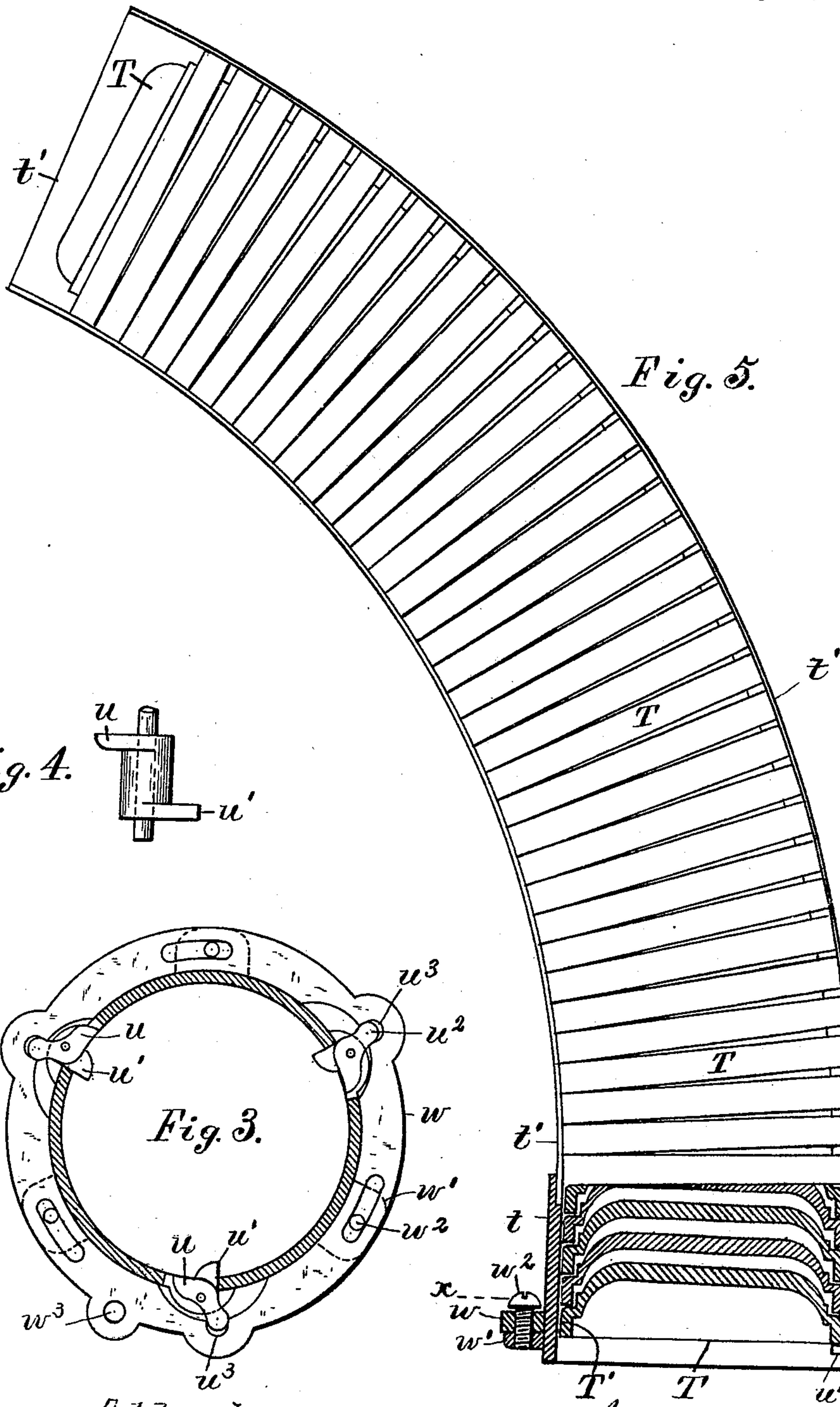
(No Model.)

3 Sheets—Sheet 2.

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*Fig. 4.*

*Fig. 5.*

*Fig. 3.*

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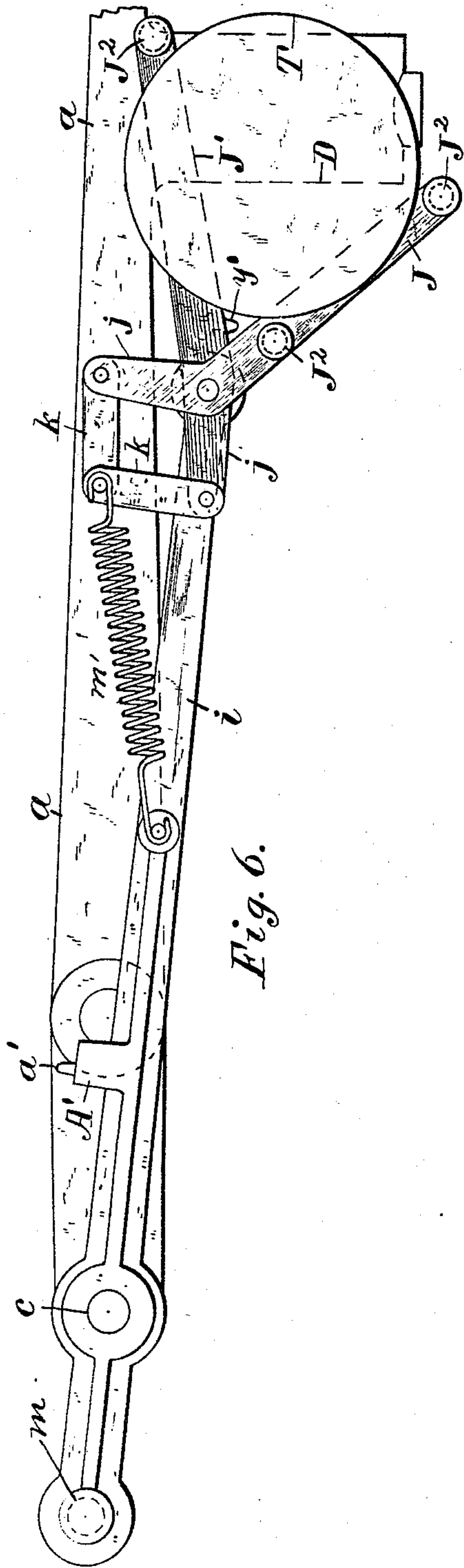


Fig. 6.

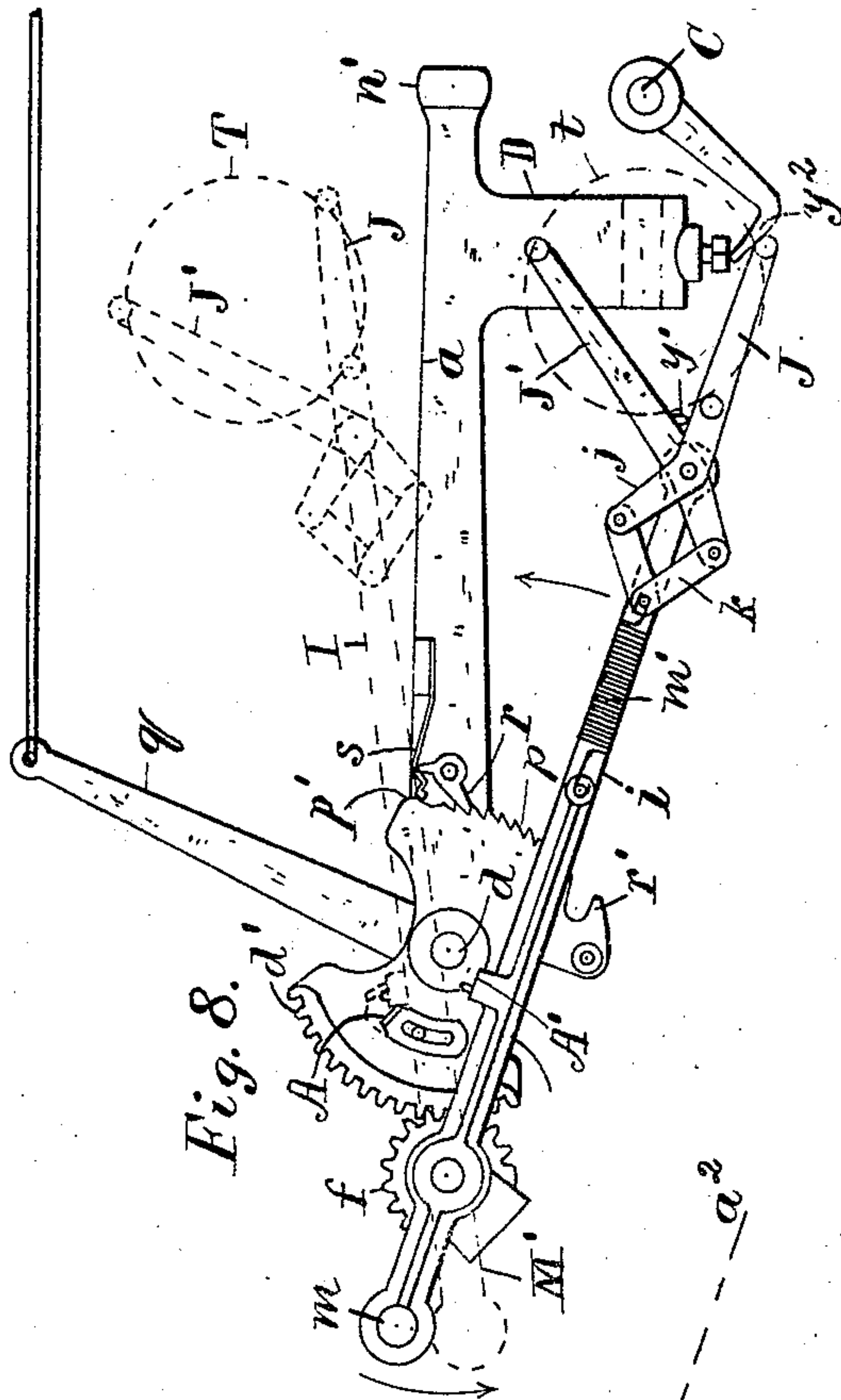


Fig. 8.

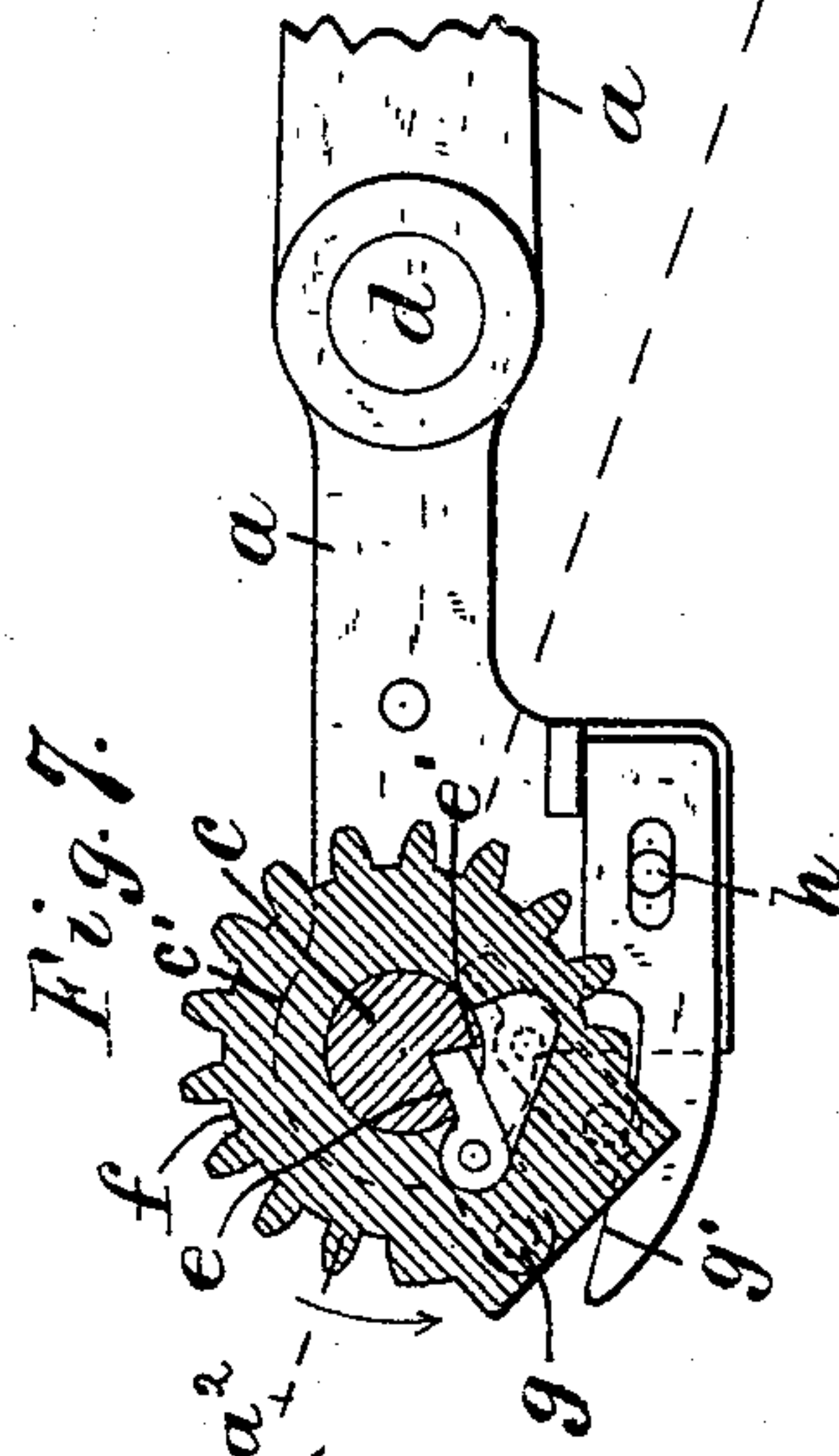


Fig. 7.

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# UNITED STATES PATENT OFFICE.

HERBERT W. TICHENOR, OF IRVINGTON, NEW JERSEY.

## SELF-FEEDING TARGET-TRAP.

SPECIFICATION forming part of Letters Patent No. 519,512, dated May 8, 1894.

Application filed November 25, 1893. Serial No. 491,975. (No model.)

*To all whom it may concern:*

Be it known that I, HERBERT W. TICHENOR, a citizen of the United States, residing at Irvington, Essex county, New Jersey, have invented certain new and useful Improvements in Automatic Self-Feeding Target-Traps, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to that class of target-traps or throwers in which an arm is retracted in opposition to spring tension, and is released after being charged with a target; and the invention consists partly, in the means for setting and releasing the arm, and partly in means for automatically feeding the targets to a clamp upon the arm during its retraction.

In the present construction the arm is pivoted upon a spindle, and a crank pin is projected from the opposite side of the spindle to connect the arm with a tension spring. The arm is arranged to make a complete rotation in the same direction about the spindle, at each actuation, the arm rotating first about one hundred and eighty degrees in which position it is held by a catch until it is discharged. This is effected by releasing the arm which then rotates in the same direction through the remainder of the circle. As the arm is rotated about the spindle its movement for one half a revolution is in opposition to the tension of the spring; while the remainder of the movement is effected by the contraction of the spring; and the arm may thus be readily set for automatic operation, if its movement during retraction be arrested by a suitable stop just after it has passed the central position, in which the crank is almost upon its dead center in relation to the spring. The withdrawal of the stop permits the tension of the spring to continue the rotation of the arm in the same direction in which it was retracted, and thus extends the arm with the desired velocity to discharge the target.

In the present invention the spindle is connected by suitable gearing with a lever, which is provided with a stop adapted to arrest the arm when it has been retracted a little more than one hundred and eighty degrees, and the crank pin has passed its dead center. The

lever is actuated by a pull cord, and any movement of such cord thus operates simultaneously to retract the arm and to set or lock it for automatic discharge by the interposition of the stop. A further movement of the same lever operates to draw the stop from its engagement with the arm, and the spring then acts automatically to throw the arm forward and discharge the target as desired. The concussion of the arm with the stop, when the cord is pulled to a certain point, serves as a signal to the operator through the shock conveyed by the cord; and he is thus enabled to set the arm for operation and to release the same for its discharge by the successive movements of the same cord.

The apparatus is furnished with a hopper supplied with a series of targets, and the arm is furnished with a clamp which is automatically opened as it passes beneath the hopper, to receive one of the targets. The hopper is provided with oscillating dogs which are actuated, by a connection to the settling lever, to release one target at a time. The hopper is curved upwardly and laterally to relieve the oscillating dogs from the greater part of the weight in the series of targets.

The construction will be understood by reference to the annexed drawings, in which—

Figure 1 is a side elevation, and Fig. 2 a plan of the apparatus with the throwing arm extended. Fig. 3 is a plan of the magazine in section on line *x, x*, in Fig. 5. Fig. 4 is a view, upon the inner end, of one of the oscillating dogs with its pivot. Fig. 5 is a sectional elevation of the magazine and hopper, with the clamp beneath the same, and a target in its jaws. Fig. 6 is a plan of the clamp as opened by contact with the stop beneath the magazine. Fig. 7 is a plan of the pawl connection between the pinion and spindle in section through the plane of the pinion; and Fig. 8 is a plan of the apparatus with the magazine represented merely by a dotted circle *t*, and the clamp in its first position beneath the same.

*a* is a frame mounted upon the usual stand *b* which has circular adjustments in horizontal and vertical planes.

The spindle *c* is pivoted in bearing *c'* upon the front end of the frame, and a shaft *d* is



provided upon the frame adjacent to the spindle to drive the toothed segment  $d'$ , which meshes with a pinion  $f$  fitted to turn upon the spindle. The pinion, as shown in Fig. 7, is provided with a pawl  $e$  fitted to a notch  $e'$  in the spindle  $c$ , which pawl is designed to cause the pinion to rotate with the spindle  $c$  to a certain point and then be automatically released to allow it to reverse its movement with the segment  $d'$ , for a purpose that will appear later on. The pawl is pivoted within the pinion, and is provided with an arm or lug  $g$  adapted to engage a cam or guide  $g'$  which is secured adjustably at the top of the bearing  $c'$  by a screw  $h$ . The throwing arm  $i$  is attached to the spindle and formed at its rear end with the spring controlled crank  $m$ . A setting-lever  $q$  is attached to the shaft  $d$  and provided with a cord  $q'$  to pull the same, the arm being rotated with the spindle during the first half of its rotation by the oscillation of the toothed segment, when the setting-lever is moved in the direction of the arrow  $q^2$ . (See Fig. 2.) To the crank  $m$  a spirally coiled spring  $k'$  is secured by a loop, while the other end of the spring is secured by a tightening screw and nut  $n$  to an ear  $n'$  upon the rear end of the frame. The tension of the spring holds the crank normally in a line drawn between the spindle and the lug  $n'$ , and the rotation of the arm and crank, with the spindle, operates first to extend the spring and then to relax the same as it passes the dead center; the crank passing a little beyond its dead center when the arm is "locked," as indicated by the dotted lines  $I$  and  $M'$  in Fig. 8; and the spring then exerting its maximum tension.

The toothed segment  $d'$  is provided with a segmental ratchet  $p$ , and a pawl  $r$  is pivoted adjacent to the rack and provided with a tooth which is pressed upon opposite sides by a spring  $s$  to hold the pawl into engagement with the rack or disengagement from the same. The opposite ends of the ratchet  $p$  are provided respectively with a hook  $r'$  and a projection  $p'$  adapted respectively to throw the pawl into and out of engagement with the rack.

To arrest or lock the arm, when "set," by the primary movement of the lever  $q$ , a lug  $A$  is projected upward from the segment  $d'$ , and a seat  $A'$  is extended downward from the arm  $i$  to contact with the same just after the crank  $m$  has passed its dead center. The tension of the spring then holds the seat firmly against the lug  $A$ , such tension preventing the further movement of the setting lever except by a little backward movement of the arm  $i$ . The resistance imparted to the cord  $q$  by the spring pressure of the arm or its seat  $A'$ , indicates to the operator that the arm is set and locked; but sufficient force, when applied to the cord, continues the movement of the segment, which first pushes the arm  $i$  a little backward and then moves the lug past the seat  $A$ ; which releases the arm from its "stop" and permits the spring  $k'$  to throw

it forward with the target in the desired manner. To prevent the seat from sliding past the edge of the lug, under the tension of the spring  $k'$  a pin  $a'$  is projected from the seat upon the forward side of the lug, which resists the tension of the spring  $m'$ ; but does not prevent the lug from sliding upon the seat in the opposite direction to release the arm, upon the secondary movement of the setting lever. The two movements of the setting lever are thus successive movements in the same direction, and can be perfectly effected by the single cord  $q'$ , which in practice would be pulled by a lever of suitable proportions, to overcome the resistance of the spring  $k'$ . As before stated, the two movements are readily distinguished and separated by the operator through the signal which is imparted by the concussion of the seat  $A'$  with the lug  $A$ , when the crank arm  $m$  is carried violently past its dead center by the spring  $k'$ .

The magazine is formed, as shown in Figs. 3 and 5, with a ring  $t$  at the base, upon which the oscillating dogs  $u, u'$  are pivoted, and projected within the ring. A sheet metal hopper  $t'$  is curved upwardly and laterally from the ring and is shown in Fig. 5 filled with the targets  $T$ , the weight of the targets resting in great part upon the curved side of the hopper, and thus relieving the dogs from a portion of the load.

The magazine is supported by a carrier rod  $C$  having its lower end bent at right angles to its body, such lower end and body being fitted respectively to lugs  $D$  and  $E$  upon the frame  $a$  and the ring  $t$ . The lugs are provided with set screws  $z$ , and the form of the carrier permits the magazine to be adjusted vertically and laterally into the required position over the clamp upon the throwing arm, to fit the latter when moved in setting the same.

Several of the targets within the ring  $t$  are shown in section, of the usual form, with a flat marginal collar  $T'$  at the base and a convex hollow body by which the targets "nest" closely together. The dogs  $u$  and  $u'$  are at a suitable distance apart to engage the upper and lower sides of the collar  $T'$ , and both dogs are shown projected partly over the opposite sides of the collar in Fig. 5, as would be the case when the lower dog is being retracted, to drop the target, and the upper dog is entering the magazine to sustain the succeeding target. Each of the dogs is provided with an actuating arm  $u^2$  which is fitted to a notch  $u^3$  in a collar  $w$  which encircles the ring. The collar is supported upon lugs  $w'$  upon the ring and held movably thereon by screws  $w^2$  through slatted openings, and when oscillated actuates all the dogs simultaneously. The collar is connected with the setting arm  $q$  by a link  $q^3$ , which is pivoted at one end to the segmental rack  $p$ , and slotted at the other end to fit a pin  $w^3$  upon the collar. The slot permits the rack to move without affecting the ring until the setting arm is under the magazine, as indicated by the full lines in Fig. 8.



The end of the arm is provided with a clamp consisting of jaws J and J' attached to a common pivot at the end of the arm, and provided with studs J<sup>2</sup> to engage the edge of the target T. Arms j are projected in opposite directions from the jaws, at the pivot, and two links k are pivoted to the said arms and to one another, and connected with a spring m'. The spring m' is connected with a pin upon the throwing arm and may be made adjustable by a screw and jam nuts. The jaws are held normally apart by a stop y', and a stud y<sup>2</sup> is projected downward from the jaw J to engage a stop y<sup>3</sup> upon the carrier rod C. The clamp is held by the spring m', normally, in the position shown in Fig. 2, with the jaw J in a line with the throwing arm i; but the stop y<sup>3</sup> is so adjusted that when the clamp as in Fig. 8, is just beneath the magazine, it arrests the motion of the jaw J (by contact with the stud y<sup>2</sup>), and draws the jaws apart into the position shown in Fig. 6 by the altered action of the links k upon the arms j. The jaws are thus held temporarily beneath the magazine to receive the target; while the arm is advanced to its locked position (indicated by the dotted lines I and M') by the continued movement of the setting lever. Such continued movement actuates the link q<sup>3</sup> and drops the lowest target from the magazine upon the jaws J, J', while the studs J<sup>2</sup> are sufficiently separated to admit the same. The movement of the arm thereafter draws the stud y<sup>2</sup> away from the stop y<sup>3</sup>, and permits the teeth J<sup>2</sup> to clasp and hold the edges of the target, as the setting arm reaches its locked position.

During the retraction of the throwing arm, the pawl r operates as a safety catch to secure the arm from flying violently backward in case the pull cord is broken by accident; and the movement of the segment d', which is necessary to move the arm from the magazine into contact with the lug A, brings the projection r<sup>2</sup> against the inner side of the pawl, and disengages it from the rack teeth; in which position it is held by the spring s during the reverse movement of the setting lever. During the retraction of the setting arm the pawl e retains its engagement with the spindle c until the spring controlled crank m has moved past its dead center, after which the spindle and the throwing arm are entirely free to operate under the control of the spring k'; and the pinion f is free to resume its initial position, shown in Fig. 2, when the cord q' is relaxed, as shown in the same figure. Such release of the pawl e is effected by the operation of the cam g'; the pawl and the pinion being shown in full lines in the position corresponding to that of the arm a in Fig. 8, and the axial line of the arm being indicated by the dotted line a<sup>2</sup> in Fig. 7.

The position of the pawl e when retracted by the cam is indicated in dotted lines in Fig. 7, which position is assumed just before the throwing arm is set in contact with the lug A.

The frame a is shown in a horizontal position, and the bearings for the spindle c and shaft d are arranged vertically upon the one side of the stand b; the frame projecting from the other side of the stand to carry the bearing n' to which the spring k' is secured. By this construction the frame may be made of the usual flat plate, ribbed at the top to secure the necessary strength, and all the parts are thus arranged in a line upon the top, and the whole device is rendered exceedingly compact and cheap to construct.

The essential novelty in this invention consists in the combination with the pivoted throwing arm and a spring for extending the same, of a setting lever and gearing adapted to set and release the arm by successive movements of the lever.

It is immaterial whether both the movements of the lever be in the same direction, as indicated in the drawings, as it is obvious that the lug A and seat A' may be disengaged by a movement in either direction of the segment to which the lug A is attached, such movement operating in either case to slide the lug out of contact with the seat A' upon the throwing arm.

By my invention the operator is enabled to set and discharge the throwing arm by means of a single cord and lever and the construction and operation of the device are thus simplified.

Having thus set forth the nature of my invention, what I claim herein is—

1. In a target thrower, the combination, with a pivoted throwing arm arranged to make a complete rotation about its pivot at each actuation, of a crank-pin with spring extending the arm, and a setting lever and gearing adapted to set and release the throwing arm by successive movements of the setting lever, the parts being arranged and operated substantially as herein set forth.

2. In a target thrower, having a pivoted throwing arm arranged to make a complete rotation at each actuation, the combination, with the spindle c, of a throwing arm pivoted thereon, a crank and spring extending the throwing arm, a lever with pull cord and gearing rotating the spindle to retract the throwing arm, and a stop movable with the lever for "setting" the throwing arm when retracted, the parts being arranged and operated substantially as herein set forth.

3. In a target thrower having a pivoted throwing arm arranged to make a complete rotation at each actuation, the combination, with the spindle c, of a throwing arm pivoted thereon, a crank and spring extending the throwing arm, a lever with pull cord and gearing rotating the spindle to retract the throwing arm against the tension of the spring, and a stop to arrest and "set" the arm at the maximum tension of the spring, the parts being arranged and operated substantially as herein set forth.

4. In a target thrower having a pivoted



throwing arm arranged to make a complete rotation at each actuation, the combination, with the spindle *c*, of a throwing arm pivoted thereon, a crank and spring extending the  
 5 throwing arm, a lever with pull cord and gearing rotating the spindle to retract the throwing arm against the tension of the spring, and a stop movable with the lever arresting  
 10 the throwing arm when retracted, and releasing the throwing arm upon the further movement of the setting lever the parts being arranged and operated substantially as set forth.

5. In a target thrower having a throwing arm adapted to make a complete rotation at  
 15 each actuation, the combination, with the spindle *c*, of the throwing arm *i* pivoted thereon and provided with a target clamp, the crank *m* and spring *k'* extending such arm, the pinion *f* connected with the spindle by a  
 20 pawl, a toothed segment and setting lever rotating the pinion, and a stop arresting the arm when retracted, the parts being arranged and operated as herein set forth.

6. In a target thrower having a throwing  
 25 arm adapted to make a complete rotation at each actuation, the combination, with the spindle *c*, of the throwing arm *i* pivoted thereon and provided with a target clamp, the crank *m* and spring *k'* to extend such arm,  
 30 the pinion *f* connected with the spindle by a pawl, a toothed segment and setting lever for rotating the pinion, a safety pawl for holding the arm during retraction, and a stop for arresting the arm when retracted, the whole ar-  
 35 ranged and operated substantially as herein set forth.

7. In a target thrower, the combination, with a spindle, of a throwing arm pivoted thereon, a spring extending said arm, a pin-  
 40 ion connected with the spindle by a pawl, a toothed segment and setting lever rotating the pinion, a segmental ratchet and safety pawl holding the arm during retraction, means holding the pawl in an operative and inop-  
 45 erative position, and projections at opposite ends of the segmental ratchet shifting the pawl alternately into such positions, and a

stop arresting the throwing arm when fully retracted, as herein set forth.

8. In a self-feeding target thrower having  
 50 a pivoted throwing arm arranged to make a complete rotation about its pivot at each actuation, the combination, with a throwing arm carrying a target clamp at its outer end, of  
 55 means setting and releasing the arm, a target magazine supported over the path of the clamp, dogs projecting through the sides of the magazine and mechanism for actuating  
 60 the same, and the hopper *t* extending vertically and laterally from the magazine in a curve, the whole arranged and operated as herein set forth.

9. In a self-feeding target thrower having  
 65 a pivoted throwing arm arranged to make a complete rotation about its pivot at each actuation, the combination, with a throwing arm carrying a target clamp at its outer end, of  
 70 means retracting the arm, a target magazine supported over the path of the clamp, dogs projected through the sides of the magazine, means connected with the retracting mechanism  
 75 actuating such dogs, means arresting the arm when retracted, and means releasing the arm, the whole arranged and operated as herein set forth.

10. In a self-feeding target thrower, the combination, with a throwing arm arranged to  
 80 make a complete rotation about its pivot at each actuation, of a clamp having jaws pivoted upon the arm, a spring or springs having an unequal tension upon the jaws, a target  
 85 magazine supported over the path of the clamp, and a stop temporarily checking one of the jaws and thereby opening the clamp beneath the magazine, the parts being arranged and operated substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HERBERT W. TICHENOR.

Witnesses:

LEVI I. DARBY,  
 T. S. CRANE.