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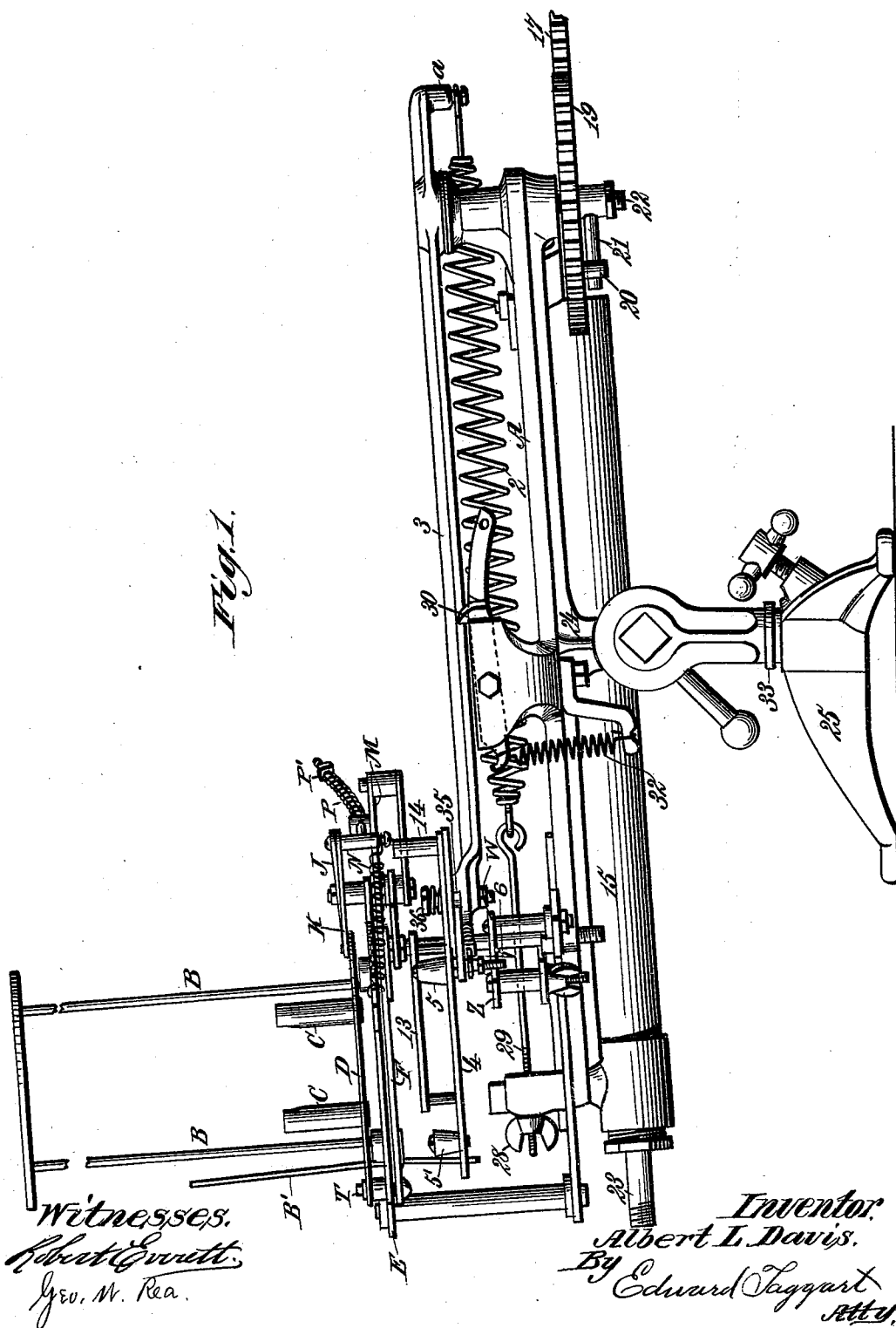
4 Sheets—Sheet 1.

A. L. DAVIS.
TARGET THROWING TRAP.

No. 554,990.

Patented Feb. 18, 1896.

Fig. 1.



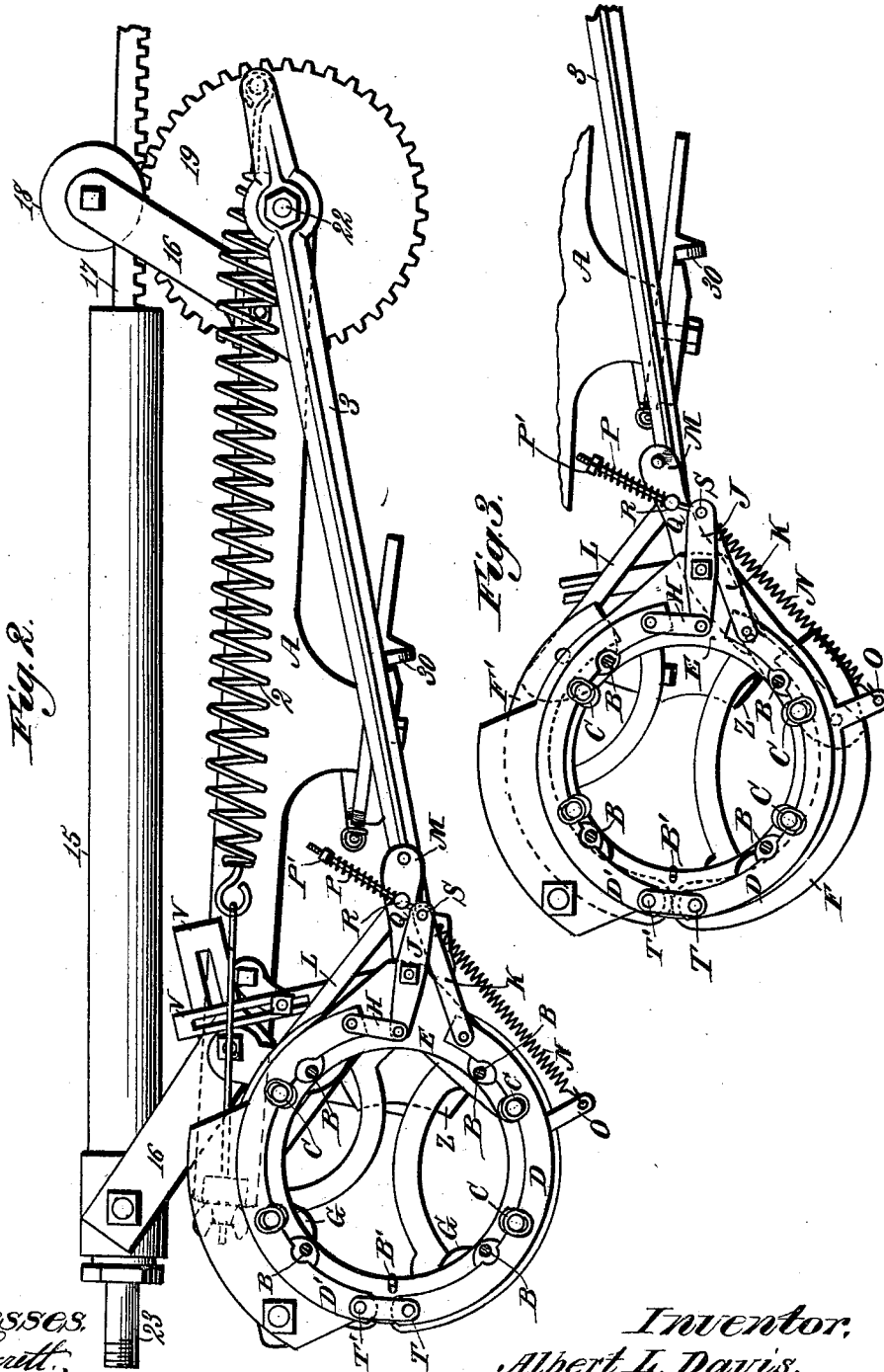
(No Model.)

4 Sheets—Sheet 2.

A. L. DAVIS.
TARGET THROWING TRAP.

No. 554,990.

Patented Feb. 18, 1896.



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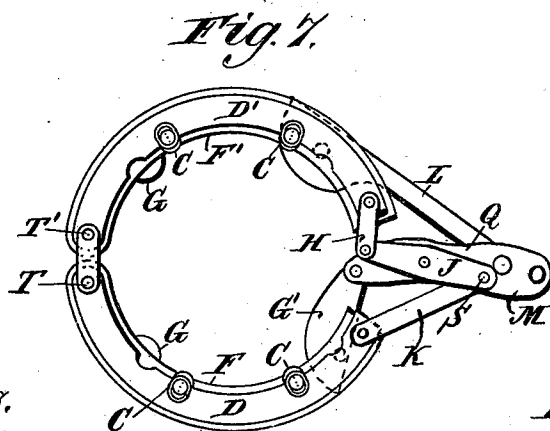
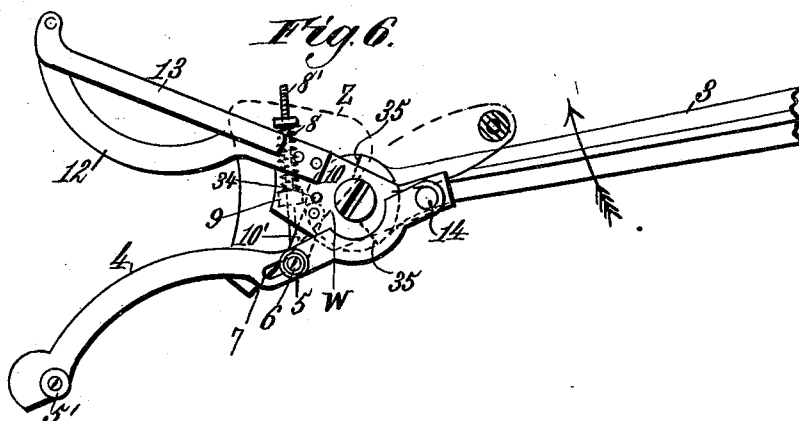
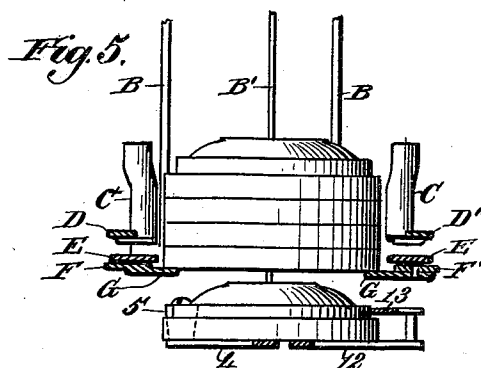
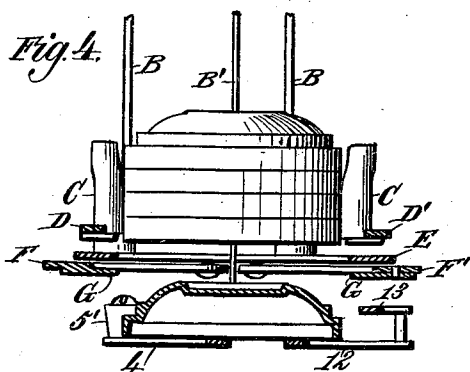
(No Model.)

4 Sheets—Sheet 3.

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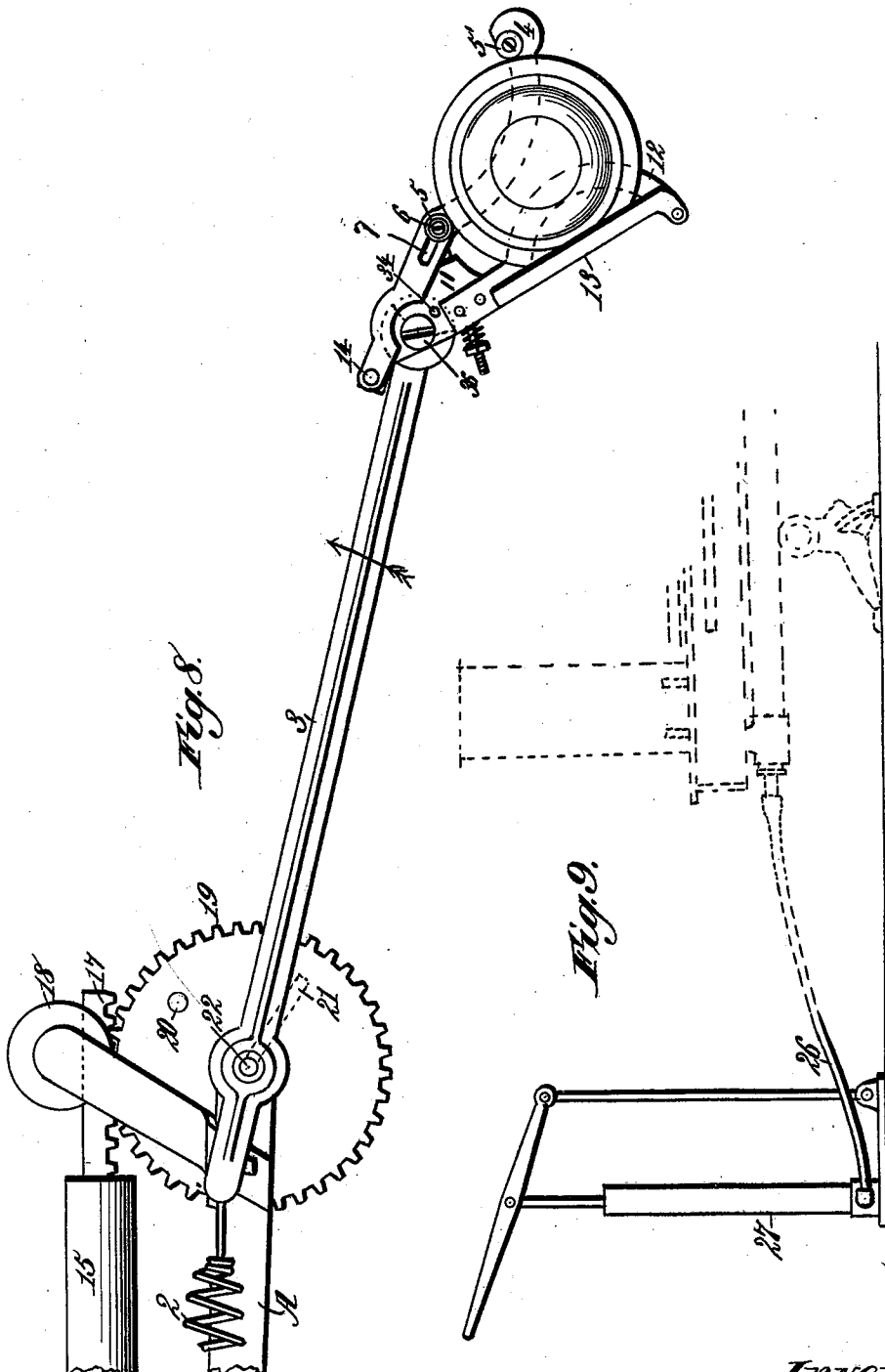
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4 Sheets—Sheet 4.

A. L. DAVIS.
TARGET THROWING TRAP.

No. 554,990.

Patented Feb. 18, 1896.



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UNITED STATES PATENT OFFICE.

ALBERT L. DAVIS, OF GRAND RAPIDS, MICHIGAN.

TARGET-THROWING TRAP.

SPECIFICATION forming part of Letters Patent No. 554,990, dated February 18, 1896.

Application filed November 22, 1894. Serial No. 529,610. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. DAVIS, a citizen of the United States, residing at the city of Grand Rapids, in the county of Kent and State of Michigan, have invented a certain new and useful Target-Throwing Trap, of which the following is a specification.

My invention relates to target-throwing traps in which the target is received from the target-holder and is thrown by the throwing-arm swinging in proper direction to deliver the target into the air; and the invention consists, first, in the mechanism for delivering the target to the carrier on the throwing-arm; second, in operating the arm for setting by means of a cylinder and a fluid under pressure; third, in the construction of jaws having spring-tension for retaining the targets in the magazine or reservoir, and, fourth, in the details of construction hereinafter described.

The objects of my invention are, first, to deliver, one at a time, the targets to the throwing-arm; second, to retain the targets in the magazine by means of jaws having spring tension or bite; third, to combine with the holding-jaws a series of projecting pins, preferably covered with rubber or some elastic material, which serve to retain all the targets within the magazine excepting the one to be delivered to the throwing-arm; fourth, to operate the throwing-arm by means of a piston and piston-stem connected by suitable mechanism to the throwing-arm so that the pressure of the fluid forces the arm into position to receive targets; fifth, to combine with the piston a reaction mechanism whereby the piston can be withdrawn to normal position ready for the succeeding setting; sixth, in the various mechanisms hereinafter described for operating the throwing-arm and delivering the targets from the magazine and receiving them into the carrier. These objects I accomplish by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved trap, showing the same set in position in readiness to throw a target. Fig. 2 is a plan view thereof. Fig. 3 is a detail plan view illustrating the parts in the position they assume when a target is dropped from the magazine into the carrier. Fig. 4 is a detail ele-

vation, partly in section, of a portion of the magazine and carrier, one of the targets being shown as having been dropped into the carrier, the targets in the magazine being grasped by the carrier-jaws and prevented from dropping. Fig. 5 is a similar view illustrating the parts in the position they assume when the trap is set, the targets in the magazine resting upon the retaining-jaws, in which position the lowermost is adapted to be dropped into the carrier when said jaws are opened. Fig. 6 is a detail plan view of the carrier, the jaws being shown open. Fig. 7 is a similar view of the clamping and retaining jaws, the supporting-plate being omitted for the sake of clearness. Fig. 8 is a similar view of the throwing-arm and carrier and a portion of the mechanism for actuating the same. Fig. 9 is a partial elevation illustrating the pump for compressing the fluid that operates the actuating mechanism.

Similar letters and figures refer to similar parts throughout the several views.

The machine is supported upon a main frame, (shown by A,) which main frame is also supported by the parts hereinafter described.

B B represent the magazine, which is preferably formed of a series of rods or bars in order to facilitate the insertion of the targets within it.

D and D' represent the clamping-jaws, which are operated as hereinafter described, and which serve, when closed, to retain all the targets within the magazine, except the lower one, which is always in position to be delivered to the thrower-arm. The jaws D and D' are provided with a series of pins or projections covered, preferably, with rubber or other elastic material, extending up a sufficient distance above the jaws D and D' to clasp and retain the targets immediately above the lowest one. These pins or teeth are shown by C C, &c. The jaws D and D' are semicircular in form, and are pivoted at T T', upon which pivots they turn in opening and closing.

E is a plate supported by the base, and serves to support the magazine and also the jaws and their connections.

B' is a guide-rod which prevents the released target from sliding out of the jaws of

the carrier before they are closed. A plurality of these guides may be used, and in cases where the magazine stands perpendicularly these guides may be dispensed with.

- 5 F and F' are retaining-jaws placed beneath the plate E, and are pivoted preferably by the same pivots which are used to pivot the jaws D D', or, in other words, the pivots T and T', which pass through the plate E and
 10 pivot the jaws F and F' below the said plate, said plate separating the jaws D D' from the jaws F F', and also supporting said jaws. The jaws F F' are semicircular and are preferably provided with projections G, upon
 15 which the lower target drops when the upper jaws are opened, and thereby supporting the body of targets in the magazine until the upper jaws are again closed. The function of the upper jaws is to hold the entire body of
 20 targets, but when opened the whole body drops downward, the lower one passing below the grasp of the upper jaws, D D', and is received upon the projections or flanges G on the jaws F F'. When the jaws D D' are closed
 25 they grasp the target above the one resting upon the flanges G and support the remainder of the targets within the magazine, the operation being to open the upper jaws, D D', allowing the targets to drop down, so that the
 30 lower one rests upon the flanges G of F F', and just before the jaws F F' are opened the jaws D D' are closed, retaining all the targets except the lower one, which is in position to be delivered from the jaws F F' to the jaws
 35 of the carrier when the jaws F F' are opened. The connection of the jaws is such that they are opened automatically by means of the pressure of the throwing-arm with its target-holding jaws, as hereinafter described.
 40 H is a link connecting the jaw D' to the end of a pivoted lever J. The lever J turns upon a pivot intermediate its ends and has its outer end sustained by the pivot or bolt S, which is held in position by means of the rod which
 45 passes through the spring P, so that the same moves with the movement of the lever Q until the movement of the jaws D and D' is arrested, as hereinafter described.

- K is a link pivoted at one end to the jaw D
 50 and at the other end to the lever J, preferably by the same bolt or pivot S. By moving the outer or right end of the lever Q backward or toward the top of the sheet, as shown in Fig. 3, the link K draws in the jaw D, while
 55 the pivoted lever J, by means of the connection H, moves the jaws D and D' toward each other in order to close them upon the targets, while the reverse motion opens the jaws.

- The lever Q may be pivoted to the plate E
 60 by the same pivot which passes through the central portion of the lever J. It also has connected with it rigidly a cam M, which cam may be integral with the lever Q. The jaws F and F' are also operated by the movement
 65 of the lever Q.

L is a link connection pivoted at one end to the lever Q and at the other end to the jaw

F', while the lever Q passes beyond the pivot on which it turns and has a link G' pivoted to the inner end of Q at one end and having
 70 its other end pivoted to the free-moving part of the jaw F, so that on the moving of the outer end of the lever Q backward—that is, toward the top of the sheet—as shown in Fig. 7, the link L pushes the jaw F in the opposite direc-
 75 tion, the connection of the jaws D D' by the links above described and the jaws F F' by the links above described being such that the backward movement of the outer end of lever Q shuts the jaws D and D' just before it opens
 80 the jaws F and F'.

In the example of my invention shown in the drawings the link G' and also the link L project so as to form shelves, which partly
 85 support the target when it drops upon the flanges G G' of the jaws F and F'. This, however, is not essential, as the jaws F and F' may be constructed in any manner suitable to receive the target when it drops from the
 90 jaws D and D'.

M is a cam-surface upon the lever Q, which is moved by the contact of the pin 14 on the carrier-jaws when the carrier is brought into position to receive the target. When the carrier-jaws are withdrawn from contact with
 95 the part M, the tension-spring N, which is connected at one end to the projection on the base E at the point O and at the other end to the pivot S of the lever J, serves to return the jaws to their normal position, in which position the jaws D and D' are opened and the
 100 jaws F and F' are closed, so that the projections G G' support the targets in the magazine.

Inasmuch as the jaws D and D' grasp the targets with sufficient strength to retain the
 105 entire body within the magazine, and inasmuch as the targets are made of a very frail and brittle material, in order to prevent a rigid grasping of the targets I provide a spring P, which is preferably supported upon
 110 a rod secured to the pin or pivot S, and which passes through a guide rigid with the lever Q, which guide is shown by R, and in the example of my invention shown in Fig. 3 the same guide forms a pivot for the link L. The
 115 guide also forms an abutment for the spring P at one end, while the nut P' forms an abutment at the other end of the spring P, said nut P' being adjustable so as to increase or decrease the force of the spring.
 120

As the lever Q is pressed backward it carries with it the link K, and turns the lever J until the pressure of the jaws against the targets overcomes the tension of the spring P and arrests the motion of the jaws D and D',
 125 but allowing the further movement of the lever Q to continue the opening of the jaws F and F', thus allowing the lowest target to drop into the carrier.

In the example of my invention shown, the
 130 plate E is supported by the arms V extending from the main frame. It, however, may be supported in any suitable manner.

Z is a plate supported by an arm project-

ing from the main frame which is provided with an inclined abutting surface W, preferably made rigid with Z, which abutting surface W is in position to come in contact with the pin 6 of the carrier-frame, said pin 6 sliding on the surface W in order to arrest its forward motion and to give to the jaw 4 a backward movement in order to open the jaw, while the jaw 12 and 13 is being carried in the opposite direction.

2 is the main spring which operates the throwing-arm. One end of this spring is attached in any suitable manner to the frame A, and the other end is secured to the arm at the point a, the throwing-arm 3 being rigid with the shaft 22, pivoted in the front end of the frame A, turns with its shaft, and the spring 2 serving the purpose of throwing the throwing-arm in the ordinary manner or so that the carrier-jaws are swung or thrown from a position beneath the magazine outwardly to substantially the position shown in Fig. 8.

The jaw 4 of the throwing-arm is provided with fingers or projections 5 and 5', having preferably an outer surface of elastic material.

6 is a pin passing through a slot in the jaw 4 and attached to the link 10', which link 10' is pivoted at the other end to the plate 11 by the pivot 10, which plate 11 is pivoted to the throwing-arm by a pivot 36. The pivot or pin 6 moves in the slot 7, and the jaw 4 is pivoted at the point 14, which point 14 is a pivot extending above the arm for the purposes hereinafter described.

The jaw 4 is held in its closed position by means of the spring 8, which spring 8 is supported on the rod 8', one end of which rod is fastened to the pin 6, and which passes through the support or guide 9, said spring 8 being a compression-spring abutting against said guide 9 at one end and against an adjusting-nut at the other end, and said spring serving to close the jaws by expansion.

The jaw 12 and 13 is rigidly attached to the plate 11 so as to move with it at all times, the lower portion of the jaw (shown by 12) supporting the target from the lower side, while the part 13 is placed so as to pass over the upper surface of the target and serves as a guide. This part of the jaw may be dispensed with, if desired, but I deem it of some importance in retaining the target in position.

35 35 are stops arresting the swinging movement of the plate 11 and its attachments upon the throwing-arm, said stops 35 35 being shoulders or other devices on the throwing-arm adapted to come into contact with projections from the plate 11 for the purpose of limiting the swinging movement of the carrier-jaws in either direction.

I will now proceed to describe the means for setting the arm, which consists of a cylinder 15 filled with water or other suitable fluid. Within the cylinder 15 is a piston 17, having a piston-stem extending beyond the

cylinder, provided with a rack which engages with and operates the gear-wheel 19 in setting the arm so as to receive the target. The cylinder 15 is attached to the main frame by means of arms 16, or any other suitable means.

18 is a guide supported by the main frame and adapted to retain the piston-stem in operative contact with the gear-wheel 19. The gear-wheel 19 is supported on a pin or shaft 22, upon which it turns freely as a journal. 21 is an arm which is attached to this shaft 22.

20 is a pin which is rigid with the gear-wheel 19, which pin comes into contact with the arm 21, which arm 21 extends outwardly from the shaft 22, said shaft 22 being substantially rigid with the throwing-arm 3.

In case water or other fluid is used a pipe 23 connects the cylinder 15, by means of suitable conduits, to the pipe 26, and thereby to the compression-cylinder 27. In the example of my invention shown in the drawings the connection from the cylinder 15 is the connecting-pipe 23.

Other methods of making the connection for the fluid may be used without departing from the spirit of my invention.

27 shows any suitable pump or compressing device for forcing the fluid into the cylinder 15 with sufficient pressure to drive outwardly the piston with its rack 17 for the purpose of extending the spring 2 and forcing the arm or its jaws beneath the magazine in order to receive the target. In order to retract the piston 17, the plunger in the pumping or compressing cylinder 27 is reversed and the rack is withdrawn, turning backward the gear-wheel 19, which turns independently of its shaft.

When the arm has been forced into position and has received the target, as herein-after described, it springs back until it comes into contact with and is held by the catch on the trip 30, and the arm is now set with a target in the jaws ready to be thrown.

28 is a thumb-nut operating on the screw-bolt 29 for the purpose of adjusting the tension of the spring 2.

The trip 30 is pivoted or suitably attached to the main frame, and 32 is a spring adapted to retain the trip in its operative position to retain the arm until tripped in the ordinary manner, or the same may be tripped by a device operated by the withdrawal of the piston-rack.

34 is a pin in the plate 11, projecting a short distance below it and adapted to come into contact with the stops 35 35 of the arm. Any ordinary projection may be used on this plate for the purpose of furnishing means for limiting the swing of the plate 11 and the jaws attached thereto.

The main frame is supported upon an adjustable support 24, which permits the device to be adjusted vertically, and said support has a horizontal adjustment 33 on the base 25.

In the drawings, I have shown a single trap;

but instead of using a single trap a plurality of traps may be used, operated from a single fluid compressing device by means of suitable connections to the compression-cylinder, which operate the traps singly, and in case of a plurality of traps they may be connected together, so that by a single operation each trap may be set to any desired angle, the plurality of traps being set at the same angle or different angles, as may be desired.

The operation of my invention is as follows: Let the throwing-arm be extended in the position shown in Fig. 8, and let the magazine B B be filled with targets with the jaws D D' opened, the targets resting on the closed jaws F F'. Depress the plunger or piston in the cylinder 27 and the fluid will be forced through the connecting-pipe 26 and other conduits into the cylinder 15, which will force the rack 17 outwardly, thereby turning the gear 19 until the pin 20 comes in contact with the arm 21, thereby transmitting circular motion to the shaft 22, swinging the throwing-arm 3, and with it the carrier, until the pin 14 of the carrier comes in contact with the cam M, which forces the lever Q and the lever J backward with the throwing-arm, thereby closing the jaws D D' upon the targets so as to support all excepting the lower target. The effect of the contact of pin 14 with the cam M is first to turn the carrier-jaws until the pin 34 meets the stop 35, and this leaves the pin 14 in position for the further operation hereinafter described. The jaws D D' begin to close as the jaws F F' begin to open, the jaws D D' coming in contact with the targets so as to support all but the lower target just before the jaws F F' are opened enough to drop the lower target into the carrier-jaws, the lever Q (see Fig. 3) being connected to the jaw F' by link L and to the jaw F by link G', conveying the opening movement to the jaws F and F'. The contact of pin 14 with the cam M, as above described, moving J and Q a short distance, when the pin 6 of the carrier comes in contact with the abutment W, which abutment is supported from the main frame A, the forward motion of the jaw 4 is retarded and the outer end of the jaw 4 begins to move backward, turning on the pivot 14, and the pin 6 moving in slot 7, while the jaw composed of the two parts 12 and 13 being rigid with the plate 11 moves forward, thereby opening the carrier-jaws just as the target is dropped by the opening of the jaws F and F' into the carrier-jaws. The throwing-arm has now passed over the catch 30. The rack-piston now being withdrawn by the reverse motion of the plunger in 27, the arm moves forward until retained by the catch 30 and the spring 8 has closed the carrier-jaws upon the target. The motion of closing the jaws upon the target is as follows: When the pin 6 meets the abutment W in its forward motion, its forward motion is checked, but the arm 3 continues its motion and the pin 6 slides in the slot 7, giving to the outer end of

the jaw 4 the backward motion, but the arm 3 and the jaw 12 and 13 continue the forward motion, compressing the spring 8 between the nut on 8' and pin 9, thus opening the jaws, and the target falls upon them, resting upon the jaw 4 and upon the part 12 of the other jaw. The target is now located within the jaw, being between the jaw 12 and 13 on the one side and the pins 5 and 5' on the other side. The release-pressure which allows the arm to move backward until restrained by the catch allows the spring 8 to compress the carrier-jaws, and also allows the spring to open the jaws D and D', allowing the targets in the magazine to drop down so that the lower targets rest upon the flanges G G' of the jaws F and F'. By loosening the trip the spring 2 immediately swings the throwing-arm with its jaws, throwing the target and leaving the arm in position to again be set in the manner above described, the operation being such that every time the arm is swung into position beneath the magazine the jaws D and D' and F and F' are so operated as to deposit a single target into the carrier-jaws, and the jaws D D' always being in position to retain the targets in the magazine, while the lower target is dropped from the jaws F and F' into the carrier-jaws.

Having thus described my invention, what I claim to have invented, and desire to secure by Letters Patent, is—

1. In a target-trap, the combination with the magazine adapted to contain a vertical column of targets, of a movable support for supporting said targets, a pair of compressing-jaws, and means for closing said jaws to cause them to bear against the peripheries of the targets and hold all the targets, excepting the lower one, by pressure, substantially as described.

2. In a target-trap, the combination with a magazine, of a pair of jaws, means for closing said jaws to cause them to bear against the peripheries of the targets and hold all the targets, excepting the lower one, by pressure, and a supplementary set of jaws arranged beneath the retaining-jaws and operating to support the targets when the retaining-jaws are opened, and means for opening said supplementary jaws, when the retaining-jaws are closed, to drop the lowermost target, substantially as described.

3. In a target-trap, the combination of a magazine, a pair of compressing-jaws operating to bear against the peripheries of the targets and hold all the targets, excepting the lower one, by pressure, a pair of supporting-jaws arranged beneath the pressure-jaws and operating to support the targets when the pressure-jaws are opened, a carrier adapted to receive the target from the supporting-jaws, and means for simultaneously moving said pressure and supporting jaws in opposite directions, substantially as described.

4. In a target-trap, the combination with a magazine, of a pair of compressing-jaws D,

D', provided with projections adapted to bear against the peripheries of the targets and hold all the targets, excepting the lower one, by pressure, spring-actuated mechanism for holding said jaws closed upon the targets with a yielding pressure, means for opening said jaws to release the targets, and a movable support for supporting the targets when the jaws are open, substantially as described.

5. In a target-trap, the combination with a magazine, of a pair of compressing-jaws which, when closed bear against the peripheries of the targets and hold the same by pressure, a pair of supporting-jaws arranged beneath the pressure-jaws and operating to support the targets when the pressure-jaws are open, an oscillating throwing-arm provided at its free end with a carrier adapted to pass beneath the supporting-jaws, mechanism operated by the throwing-arm for simultaneously closing the pressure-jaws and opening the supporting-jaws to drop a target upon the carrier, and means for oscillating said throwing-arm to cause the latter to engage said jaw-actuating mechanism and to swing the carrier beneath said jaws, substantially as described.

6. In a target-trap, the combination with a magazine for the reception of the targets, of a pair of compressing-jaws arranged at the lower end of the magazine and adapted, when closed, to bear against the peripheries of the targets and hold them by pressure, a lever pivotally connected to said jaws for opening and closing the latter, a spring for giving a yielding pressure to the pressure-jaws, a spring for normally holding said jaws open, means for actuating said lever, and a movable support for holding the targets when the pressure-jaws are open, substantially as described.

7. In a target-trap, the combination with a magazine, of a pair of compressing-jaws D, D', arranged at the lower end thereof and adapted, when closed, to bear against the peripheries of the targets and hold them by pressure, a pivoted lever J, a link K pivotally connected at one end to one end of the lever J and at its other end to the jaw D, a link H pivotally connected to the other end of said lever and to the jaw D', a lever Q connected to and operating said lever J, and a spring N for holding the lever J in position to normally maintain the jaws open, substantially as described.

8. In a target-trap, the combination with a magazine, of two sets of jaws arranged at the lower end of the magazine one above the other, the upper jaws operating to bear against the peripheries of the targets and hold the same by pressure, and the lower jaws operating when closed to support the targets when the pressure-jaws are open, and means for simultaneously operating said jaws in opposite directions, for dropping said targets one by one, substantially as described.

9. In combination with a thrower-arm, a plate pivoted thereto and having an oscillat-

ing movement thereon, a slotted jaw pivoted to said plate so as to move independently thereof, a link connection between said jaw and plate, a jaw rigid with said plate, suitable spring mechanism for closing said jaws, fixed stops carried by said arm, and a stop-pin projecting from said plate and adapted to positively limit the oscillating movement of the latter on the throwing-arm in both directions, substantially as described.

10. In a target-trap, the combination with the main frame and a magazine and target-dropping mechanism, of a thrower-arm pivoted to the main frame, a plate pivoted to the free end thereof and having a limited oscillating movement thereon, a rigid jaw carried by said plate, an opposing jaw pivoted to said plate, a spring for closing said jaws, a projecting pin carried by the pivoted jaw, an abutment carried by the main frame and arranged in the path of said pin, a projection carried by the oscillating plate on the end of the thrower-arm, and means for oscillating said thrower-arm to cause said projection to abut against the target-feed mechanism and swing the said jaws beneath the magazine and to cause the said projecting pin to engage said abutment and open the jaws, substantially as described.

11. In a target-trap, a magazine, a pair of compressing-jaws D, D', arranged at the lower end thereof, a pivoted lever J, links pivotally connecting said lever and jaws, a pair of supporting-jaws F, F', arranged beneath the compressing-jaws, a lever Q pivotally connected to said supporting-jaws and to the lever J, in combination with a thrower-arm, carrier-jaws arranged upon the free end of said arm, and a projection carried by one of said jaws and operating to abut against the lever Q and close the compressing-jaws and open the supporting-jaws, to drop a target in the carrier-jaws, substantially as described.

12. In a target-trap, the combination of a magazine, a pair of compressing-jaws D, D', arranged at the lower end thereof, a pivoted lever J, links pivotally connecting said lever and jaws, a pair of supporting-jaws F, F', arranged beneath the compressing-jaws, a lever Q pivotally connected to said supporting-jaws and to the lever J, a thrower-arm, a plate pivoted to the free end thereof, a carrier-jaw rigid with said plate, an opposing jaw pivoted to said plate, a stop on the thrower-arm for limiting the movement of the plate, a projection 14 carried by the said plate and adapted to engage the lever Q, a pin 6 carried by the pivoted carrier-jaw, an abutment arranged in the path of said pin, and mechanism for oscillating said thrower-arm to cause the projection 14 to engage the lever Q to swing the carrier-jaws under the magazine and simultaneously close the compressing-jaws and open the supporting-jaws, and also cause the pin 6 to engage said abutment W and open the carrier-jaws, substantially as described.

13. In a target-trap, the combination with

an oscillating throwing-arm and a trip for detachably holding it set, of means for throwing said arm in one direction for discharging the target, and a fluid-motor for swinging said arm in the reverse direction to set the same, substantially as described.

14. In a target-trap, the combination with a magazine and an oscillating throwing-arm, of a fluid-pressure cylinder, a piston arranged therein and having a piston-stem, mechanism actuated by said piston-stem for swinging said throwing-arm under the magazine to receive the target, and means for swinging said arm in the reverse direction to discharge the target, substantially as described.

15. In a target-trap, the combination of an oscillating throwing-arm rigidly mounted on a shaft, a laterally-projecting arm carried by

said shaft, a fluid-pressure cylinder, a piston arranged therein and having a piston-stem, a rack upon said stem, a gear-wheel loosely journaled upon the said shaft and meshing with said rack, a pin carried by said gear-wheel and adapted to engage the projecting arm on said shaft, means for supplying fluid under pressure to said cylinder to project the piston-stem and oscillate the throwing-arm in one direction, and means for oscillating the throwing-arm in the other direction, substantially as described.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

ALBERT L. DAVIS. [L. S.]

Witnesses:

EDWARD TAGGART,
CHRISTOPHER HONDELINK.