(No Model.) 4 Sheets—Sheet 1.

F. B. MANVILLE.

MACHINE FOR DRAWING SHELLS.

No. 427,435. Patented May 6, 1890.

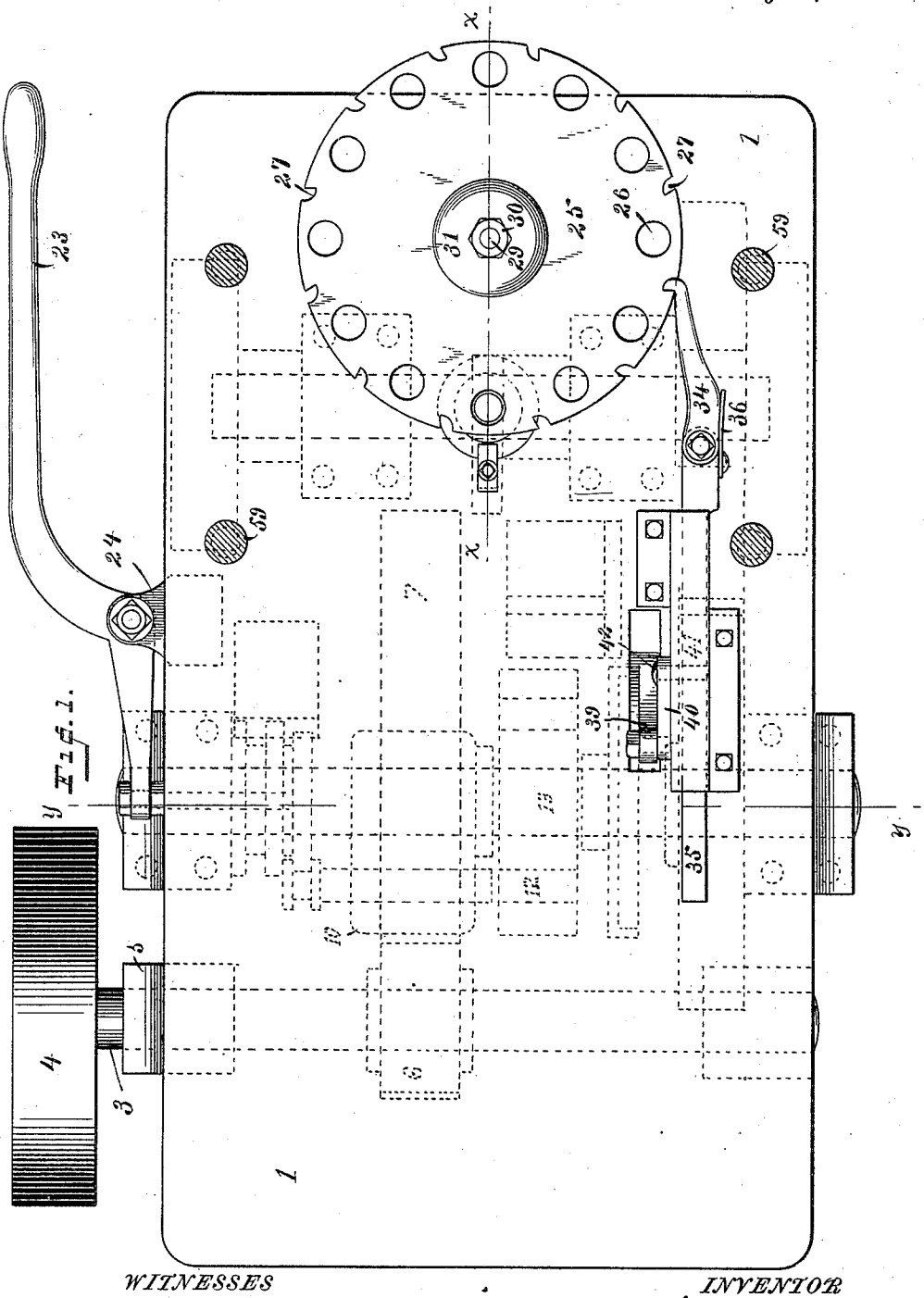


Fig. 1.

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Fig. 3.

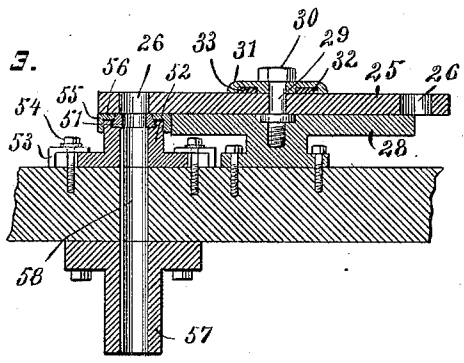


Fig. 2.

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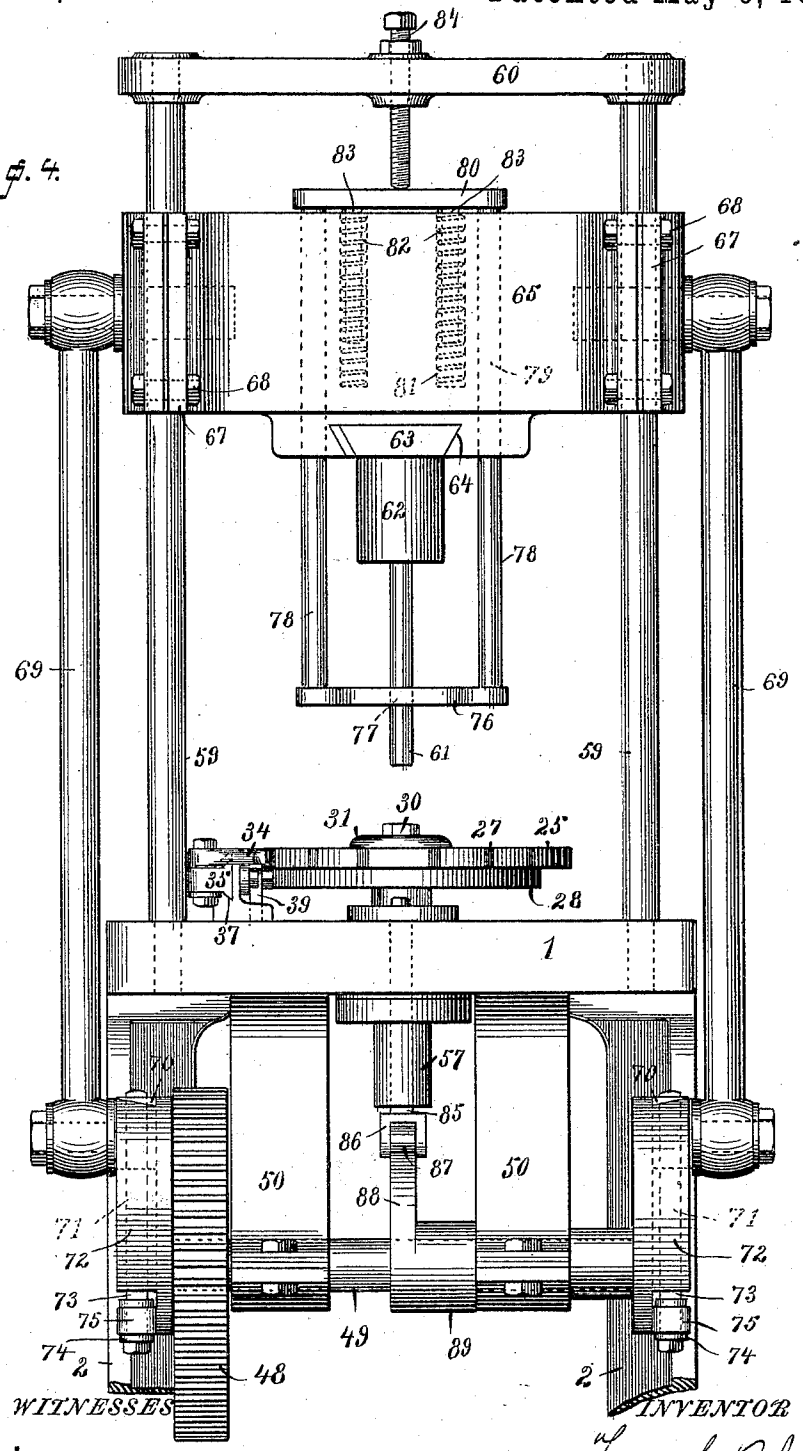
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MACHINE FOR DRAWING SHELLS.

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Fig. 4.



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MACHINE FOR DRAWING SHELLS.

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Fig. 6.

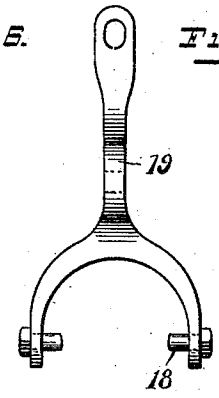


Fig. 7.

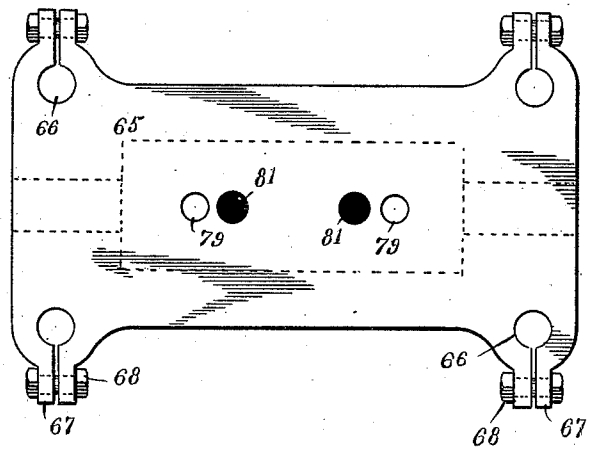
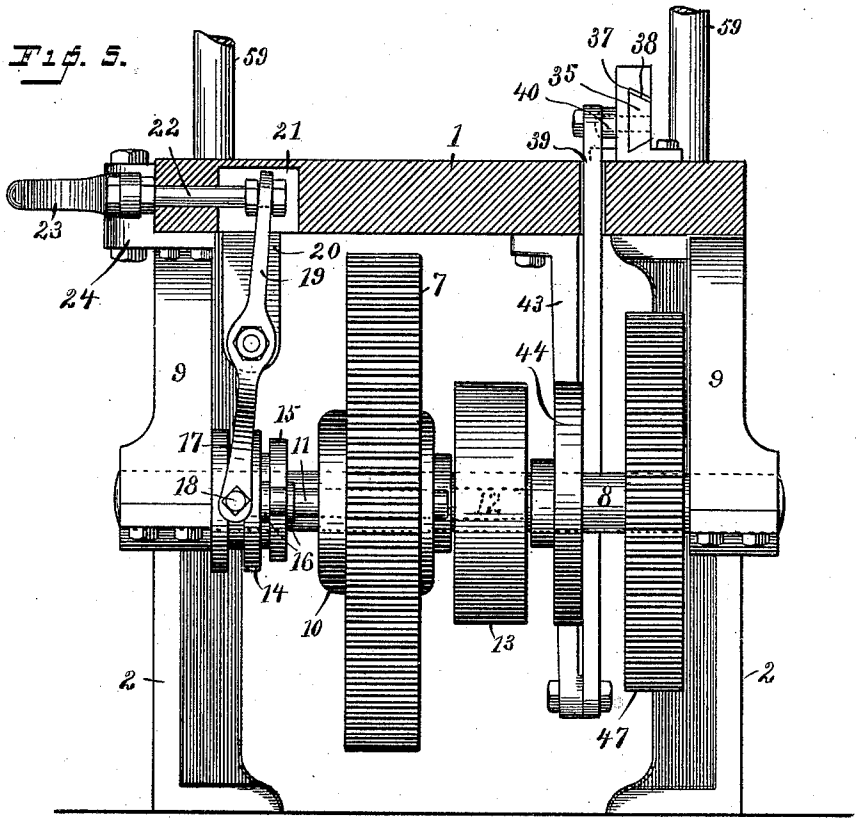


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

FRANK B. MANVILLE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO BLAKE & JOHNSON, OF SAME PLACE.

MACHINE FOR DRAWING SHELLS.

SPECIFICATION forming part of Letters Patent No. 427,435, dated May 6, 1890.

Application filed March 26, 1890. Serial No. 345,307. (No model.)

To all whom it may concern:

Be it known that I, FRANK B. MANVILLE, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Machines for Drawing Shells; 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.

My invention has for its object the general improvement of this class of machines.

With this end in view I have devised the simple and novel construction of which the following description, in connection with the accompanying drawings, is a specification, numbers being used to denote the several parts.

Figure 1 is a plan view of the bed of the machine, the uprights being in section and the position of the parts under the bed being indicated by dotted lines; Fig. 2, a side elevation, certain parts being broken away to show the details of construction; Fig. 3, a detail sectional view of the bed, the dial-stand, dial, die, &c., on the line *x x* in Fig. 1; Fig. 4, a front elevation of the entire machine, the legs only being broken away; Fig. 5, a section on the line *y y* in Fig. 1, showing the second shaft and the parts carried thereby in elevation; Fig. 6, a view of the operating-lever detached; and Fig. 7 is a plan view of the cross head or gate detached.

1 denotes the bed, which is supported by suitable legs 2; 3, the driving-shaft, to which power is applied by a belt (not shown) running over a pulley 4.

5 denotes brackets on the under side of the bed, in which shaft 3 is journaled.

6 denotes a pinion on shaft 3, which engages a gear 7 on a shaft 8, journaled in brackets 9, depending from the bed. Gear 7 is loose on shaft 8, and is provided with a heavy solid hub 10. This hub may be either concentric with or eccentric to said shaft. I have shown it in the drawings as eccentric to the shaft. (See Fig. 1.)

11 denotes a heavy pin adapted to slide in an opening through hub 10 and engage an opening 12 (see dotted lines, Fig. 1) in a heavy disk 13, which is rigidly secured to shaft 8, two or more openings being preferably provided in said disk.

All the operative parts of the machine are driven from shaft 8. It will thus be seen that as soon as pin 11 is placed in engagement with the disk the entire operating mechanism will be set in motion, and that when said pin is withdrawn the operating mechanism will stop instantly. The driving-shaft and gear 7, however, do not have to be stopped to stop the operation of the machine.

14 denotes a sleeve, which slides freely on shaft 8, and may or may not turn therewith. This sleeve is provided with a flange 15, which lies between flanges 16 on the head of pin 11, as is clearly shown in Fig. 2, and with a groove 17, which is engaged by pins 18, extending inward from the branches of an operating-lever 19. This lever is pivoted to a bracket 20, which projects downward from the bed of the machine. The upper end of this lever lies in a recess 21 in the bed and is loosely connected to a rod 22, which passes outward through the side of the bed, sliding freely therein, and is connected to one arm of a hand-lever 23, the latter being pivoted to a bracket 24, extending outward from the bed. The construction and operation of these parts are clearly illustrated in Fig. 5.

It will be seen that the inward movement of the free end of the hand-lever will swing the operating-lever inward and force pin 11 into engagement with one of the openings in the fixed disk on shaft 8, and will thus instantly communicate motion to the operative parts of the machine. The machine is stopped as quickly by moving the hand-lever outward to the position shown in Figs. 1 and 5. The reverse position of these parts is not shown, as the operation is so simple that it is not thought to require further illustration.

Turning now to Figs. 1, 2, and 3, 25 denotes the dial, which is provided with holes 26, the purpose of which will presently be explained, and in its edge with undercut notches 27. The dial rests on a dial-stand 28, which is rigidly bolted to the bed (see Fig. 3) and turns on a screw-pin 29, extending upward from the stand. A nut 30, engaging the screw-pin, holds the dial in position. 31 denotes a washer

interposed between the nut and the dial. This washer is provided in its under side with a circular groove 32 to receive a friction-washer 33, ordinarily made of leather, which acts to retain the dial just where it is placed and to prevent movement either forward or backward, except as it is actuated in the operation of the machine.

34 denotes a hooked pawl, the forward end of which is adapted to engage the undercut notches in the dial, as clearly shown in Fig. 1. This pawl is carried by a dovetail slide 35, and is held in operative position against the edge of the dial by a spring 36 on the slide. The slide reciprocates in suitable ways 37 in a plate 38, rigidly bolted to the bed. (See Fig. 1.) Reciprocatory motion is imparted to the slide by means of a lever 39, the upper end of which is pivoted to a link 40, the opposite end of said link being pivoted to the slide.

41 (see dotted lines, Figs. 1 and 2) denotes a slot in the inner side of plate 38, through which the pin 42 passes, which connects the link with the slide. The lower end of lever 39 is pivoted to a bracket 43, which extends downward from the bed.

44 denotes a disk on shaft 8, which is provided on its outer face with an eccentric groove 45. This groove is engaged by a roller 46 (see dotted lines, Fig. 2) upon lever 39. It will thus be seen that the rotation of shaft 8, roller 46 being in engagement with the groove, will oscillate lever 39, thereby imparting reciprocatory motion to the slide, and by means of the hooked pawl intermittent rotary motion to the dial.

47 (see Fig. 5 and dotted lines in Fig. 2) denotes a gear on shaft 8, which meshes with a corresponding gear 48 on a shaft 49 at the forward end of the machine, said shaft being journaled in brackets 50, depending from the bed.

51 denotes the die carried by a die-block 52, which rests upon the bed, to which it is secured by clamps 53, being locked in position by screw-bolts 54, passing through said clamps and engaging the bed. The die is held in place in the carrier by a nut 55, which is threaded to engage a corresponding thread upon the die-block, and is provided with a flange 56, which engages the die, holding it firmly in position, as is clearly shown in Fig. 3.

57 denotes a sleeve rigidly secured to the under side of the bed, which serves as a guide for an extractor, presently to be described.

58 denotes a continuous opening through the die-block, the bed, and sleeve 57, said opening being in line with the die and with the hole 26 in the dial that is in operative position. (See Fig. 3.)

59 denotes standards, which project upward from the bed and engage a top cross-piece 60, by which they are braced and strengthened, rendering this portion of the frame-work equally rigid with the bed.

61 denotes a punch, which is rigidly secured to or made integral with a block 62, at the upper end of which is a dovetail slide 63. This slide engages ways 64 on the under side of a cross-head or gate 65, which is adapted to reciprocate vertically on the standards. I preferably construct the cross-head substantially as shown in Fig. 7. It will be noticed that holes 56 are provided to receive the standards, and that the metal at the corners is so shaped as to form lugs 67, which inclose the standards. Each pair of lugs is connected by a bolt 68, so that the lugs may be closed together about the standards to take up lost motion in use. The cross-head is reciprocated by means of connecting-rods 69, the upper ends of which are pivoted to opposite ends of the cross-head and the lower ends to dovetail block 70, lying in dovetail grooves 71 in crank-plates 72 at the opposite ends of shaft 49.

73 denotes an adjusting-screw for block 70, there being one of said screws on each side of the machine, one end of said screw engaging said block, (see Fig. 2 and dotted lines in Fig. 4,) the other end being provided with flanges 74, which engage the opposite sides of a lug 75 on the crank-plate. It will be seen that by rotation of these screws block 70 may be raised or lowered, thereby changing the radius of the curve described by the crank-pin and lengthening or shortening the reciprocation of the cross-head.

76 denotes a stripper, which is provided with a central opening 77, (see dotted lines, Fig. 4,) through which the punch passes, and the opposite ends of which are secured to rods 78, which are adapted to slide freely in holes 79 in the cross-head, the upper ends of said rod being connected by a cross-piece 80 above the cross-head.

81 denotes sockets in the cross-head leading from the top, which receive coil-springs 82.

83 denotes rods which extend downward from cross-piece 80 into openings 81, and which serve in the usual manner as guides for the springs and to prevent them from buckling or from getting out of place when the machine is in rapid motion.

84 denotes a set-screw extending downward from top cross-piece 60, which serves as a stop to limit the upward movement of the stripper. Springs 82 are compressed in their sockets when the punch is at the raised position, as shown in the drawings. It follows, therefore, that when the punch moves downward the stripper will not move with it, but will ordinarily retain substantially the position at which it is shown in the drawings, and that when the upward movement of the punch takes place, should the shell adhere thereto, it will be stripped off by the action of the stripper before the punch reaches the extreme of its upward movement.

85 denotes the extractor, which is adapted to reciprocate in opening 58 through the bed, sleeve, &c. This extractor is provided at its lower end with a yoke 86, in which is journaled a roller 87.

88 is an eccentric having a hub 89, which is

rigidly secured to shaft 49. The movement of the extractor will be clearly understood from Fig. 4. It will be seen that roller 87 rests on the periphery of the eccentric and that the extractor is raised and lowered once during each revolution of shaft 49. It will of course be understood that the parts are so timed that when the punch moves downward the extractor will move downward out of the way and that the upward movement of the punch and extractor will take place simultaneously. It will thus be seen that by means of the punch and extractor I provide for the removal of the drawn shell under all circumstances. Should the shell adhere to the die, it will be forced out by the extractor. Should it adhere to the punch, it will be removed therefrom by the stripper. The attendant is simply required to place suitable blanks over the holes 26 in the dial. Each movement, with the exception of the feed, is automatic.

The operation is as follows: Suppose the parts to be in the position shown in Figs. 1 and 5 and the machine to be connected with a main or counter shaft by a belt (not shown) running over pulley 4. The operator moves the free end of hand-lever 23 inward, which throws the lower end of the operating-lever inward and places pin 11 in engagement with one of the openings in the disk 13, thereby communicating motion to the operative parts of the machine. The operator is now simply required to feed suitable blanks to the openings 26 in the dial. At each rotation of shaft 8 the dial is moved forward one step and one of the holes 26 placed under the punch. The punch descends, forcing the blank down through the die, by which it is drawn, the extractor moving down simultaneously out of the way. The upward movement of the extractor begins simultaneously, or practically so, with the upward movement of the punch. Should the drawn blank adhere to the punch, it is removed by the stripper. Should it remain in the die, it is forced out by the extractor.

It will of course be understood that the details of construction may be varied to a reasonable extent without departing from the principles of my invention.

I claim—

1. The combination, with shaft 8, having a disk 13, with an opening 12, fixed thereon, and a gear 7, loose thereon, said gear having a solid hub, of a sliding pin in said hub, which is adapted to engage opening 12 and is provided with flanges 16, and a sleeve engaged by said flanges, which is adapted to slide on said shaft, so that inward movement of said sleeve will force the pin into the opening in the disk and impart motion to the machine, and outward movement of said sleeve will disconnect the operative parts of the machine.

2. Shaft 8 and disk 13, rigidly secured thereto and having an opening 12, in combination with gear 7, loose on said shaft and provided with a hub 10, a pin in said hub adapted to engage the opening in the disk, and means, substantially as described and shown, for moving said pin inward or outward to connect or disconnect said shaft and gear.

3. Shaft 8 and gear 13, secured thereto and having opening 12, in combination with gear 7, having hub 10 loose on said shaft, a pin in said hub adapted to engage opening 12, a sliding sleeve on said shaft engaged by the pin, and means—for example, an operating-lever engaging the sleeve—whereby said pin may be moved in or out to connect and disconnect said gear and shaft.

4. Shaft 8 and disk 13, fixed thereto and having opening 12, in combination with gear 7, having a hub 10 loose on said shaft, a pin in said hub adapted to engage said opening, a sliding sleeve on said shaft, which controls the movement of the pin, an operating-lever which controls the sleeve, and a hand-lever and rod 22, which controls the movement of the operating-lever.

5. The combination, with shaft 8, having gear 47, of shaft 49, having a gear engaged by gear 47, crank-plates 72 at the ends of said shaft, the cross-head, and connecting-rods between said crank-plates and cross-head, substantially as described.

6. The combination, with the cross-head and a connecting-rod 69, of shaft 49, a crank-plate on said shaft having a groove 71 and lug 75, a block in said groove, to which the connecting-rod is pivoted, and an adjusting-screw engaging said block and having flanges engaging the lug, so that rotation of said screw will move the block in or out, thereby changing the reciprocation of the cross-head.

7. Shaft 49, having crank-plate 72, provided with groove 71 and lugs 75, in combination with the cross-head, a connecting-rod, a block in said groove, to which the connecting-rod is pivoted, and a screw for adjusting the position of the block, as and for the purpose set forth.

8. The combination, with shaft 49, having crank-plates 72, and connecting-rods 69, pivoted thereto, of standards 59 and a cross-head to which the connecting-rods are pivoted, and which is provided with openings to receive the standards.

9. The combination, with the standard, of cross-head 65, having openings to receive the standard, lugs 67, and bolts 68, whereby said lugs may be closed about the standards to take up lost motion.

10. The combination, with the dial, cross-head, and punch, of a spring-actuated stripper acting to remove a drawn shell from the punch.

11. The cross-head having holes 79 and sockets 81 and springs in said sockets, in combination with the punch secured to the cross-head, the stripper, rods 78, connected to the stripper and passing through said holes, cross-piece 80 above the cross-head, and springs in the sockets bearing against the

cross-piece, which act to hold the stripper at the raised position.

12. The reciprocating cross-head, sockets 81, and the punch adjustably secured to said cross-head, in combination with the stripper through which the punch passes, rods connected to the stripper and passing through the cross-head, the cross-piece connecting said rods above the cross-head, and springs in said sockets acting against the cross-piece to hold the stripper at the raised position.

13. The cross-head having sockets 81 and the punch carried by the cross-head, in combination with the stripper, rods by which the stripper is carried and which pass through the cross-head, the cross-piece connecting said rods above the stripper and having downwardly-extending rods 83, and springs in the sockets surrounding the rods which act to hold the stripper at the raised position.

14. The combination, with the cross-head, punch, and stripper, of rods connected to the stripper and passing through the cross-head, a cross-piece 80, connecting said rods, springs acting against said cross-piece to hold the stripper at the raised position, and a set-screw 84, which is engaged by the cross-piece to limit the upward movement of the stripper.

15. The combination, with the reciprocating cross-head and the punch carried thereby, of the dial having openings through which the punch passes, a die under the dial, the bed and sleeve 57, having an opening registering with the opening in the dial and die, and an extractor reciprocating in said opening and acting to expel the drawn shells.

16. The punch, the dial having openings 26, the die, and the bed and sleeve 57, having an opening in line with the opening in the die, in combination with an extractor in said opening having a roller at its lower end, and a rotating eccentric engaged by said roller, by which the extractor is raised simultaneously with the return movement of the punch to expel the drawn shell.

17. The bed, the die-block, the die, and sleeve 57, said parts having an opening extending through them, an extractor lying in said opening, and an eccentric in which the lower end of the extractor rests, in combination with the rotating dial having openings adapted to register with the opening in the die, and a reciprocating punch which registers with the openings through the other parts.

18. The combination, with the bed having an opening through it, and a die-block threaded at its upper end, of the die adapted to rest thereon, and a flanged nut engaging the thread on the block.

19. The bed, the die-block threaded at its upper end, and clamps securing the die-block to the bed, in combination with the die resting on the die-block, and a flanged nut engaging the thread, whereby the die is locked in position.

20. The dial-stand and screw-pin 29, in combination with the dial turning on said pin, grooved washer 31, a friction-washer lying in the groove, and a nut engaging the screw-pin, whereby the dial is held in position.

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

FRANK B. MANVILLE.

Witnesses:
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STELLA A. BRONSON.