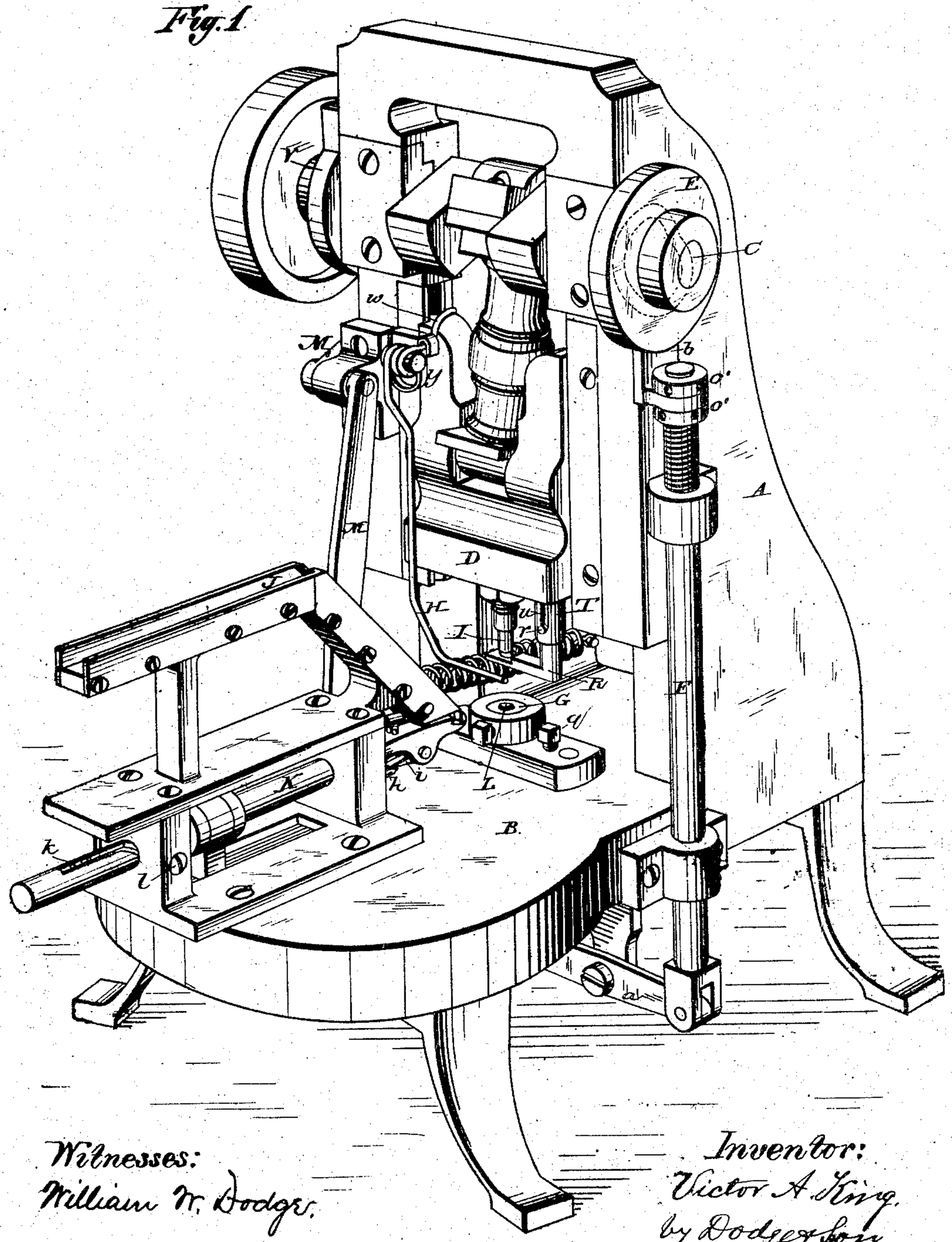
4 Sheets—Sheet 1.

V. A. KING.

Machine for Heading Cartridge Shells.

No. 230,638. **Patented Aug. 3, 1880.**

Fig. 1



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4 Sheets—Sheet 2.

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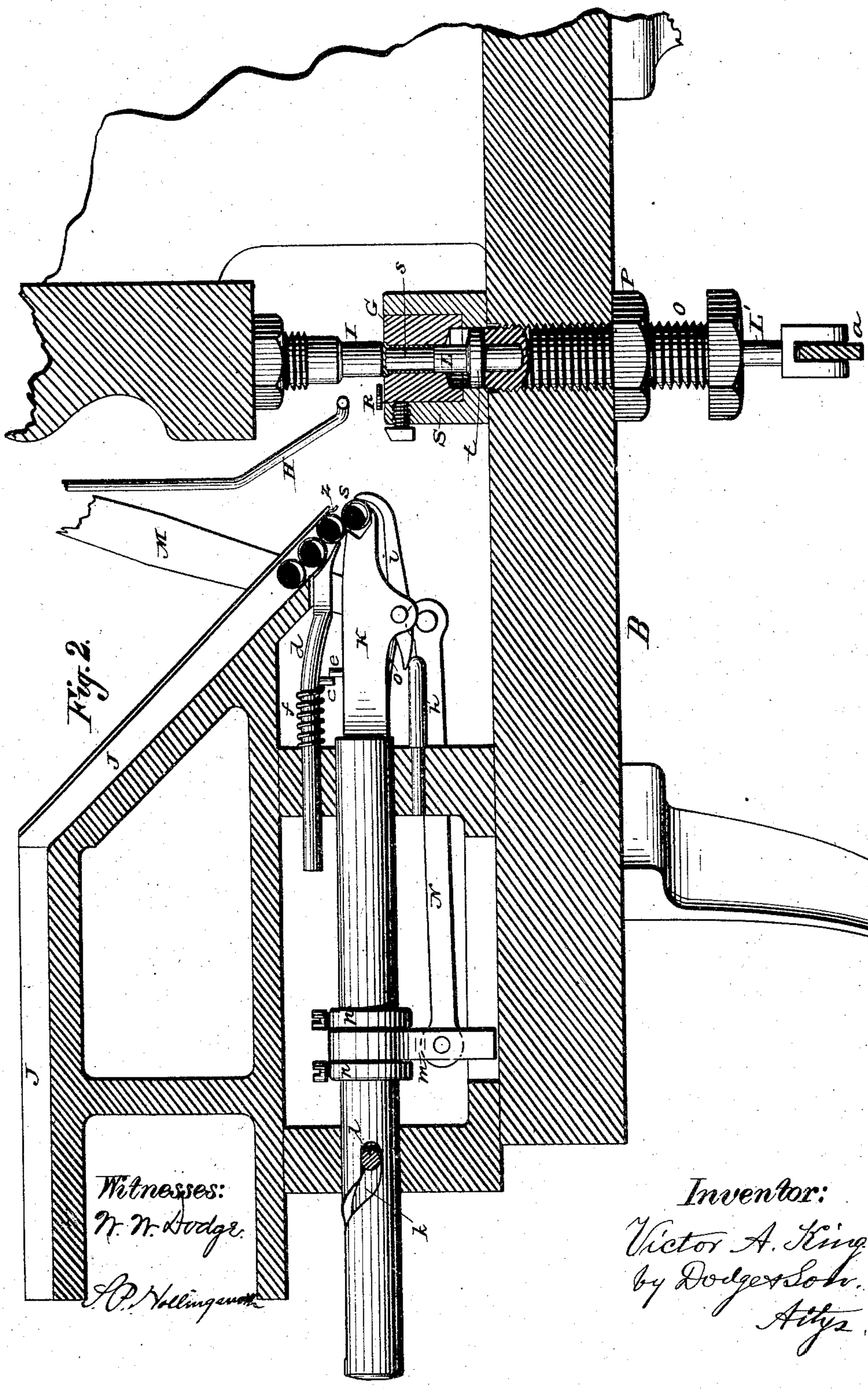
Machine for Heading Cartridge Shells.

No. 230,638. **Patented Aug. 3, 1880.**



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Machine for Heading Cartridge Shells.

No. 230,638. Patented Aug. 3, 1880.

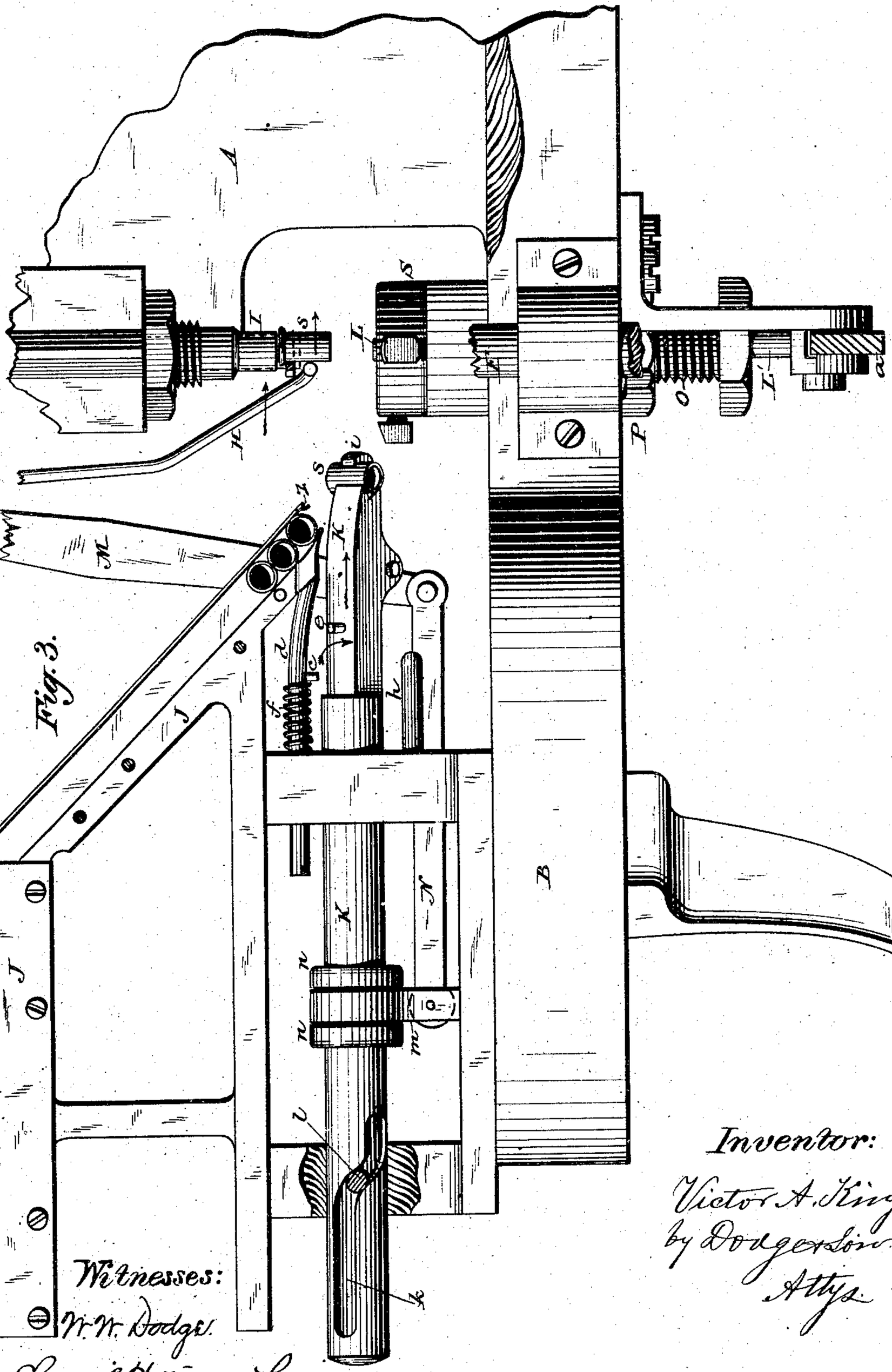

Fig. 3.

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4 Sheets—Sheet 4.

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Machine for Heading Cartridge Shells.

No. 230,638. Patented Aug. 3, 1880.

Fig. 4.

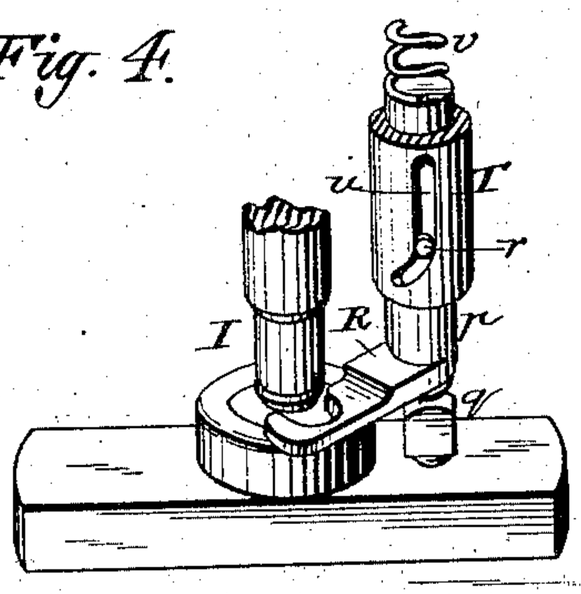


Fig. 5.

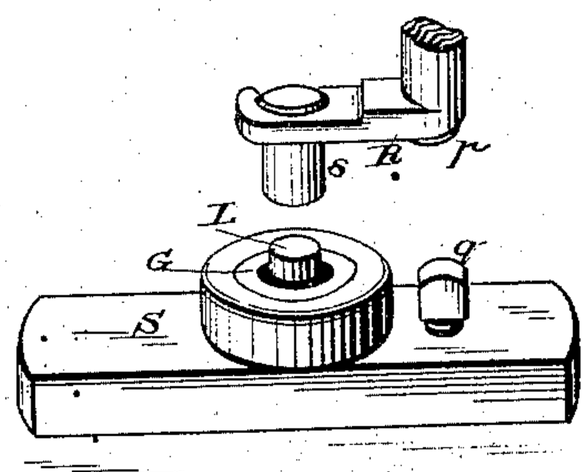
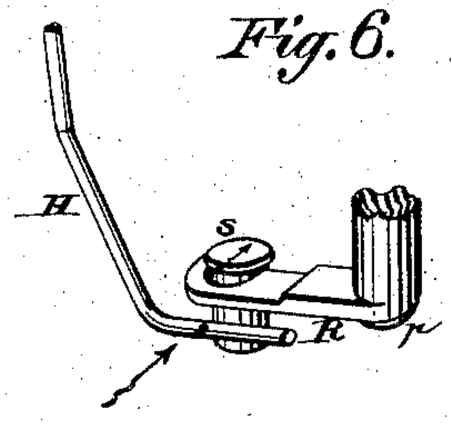


Fig. 6.



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UNITED STATES PATENT OFFICE.

VICTOR A. KING, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE WINCHESTER REPEATING ARMS COMPANY, OF SAME PLACE.

MACHINE FOR HEADING CARTRIDGE-SHELLS.

SPECIFICATION forming part of Letters Patent No. 230,638, dated August 3, 1880.

Application filed January 3, 1880.

To all whom it may concern:

Be it known that I, VICTOR A. KING, of New Haven, in the county of New Haven and State of Connecticut, have invented certain Improvements in Machines for Heading Cartridge-Shells, of which the following is a specification.

My invention relates to machines for heading cartridge-shells; and the invention consists in a novel construction and arrangement of mechanical devices whereby the shells are automatically fed into the die, headed, and removed therefrom, all as hereinafter more fully set forth.

Figure 1 is a perspective view of a machine embodying my invention. Fig. 2 is a transverse vertical section, and Fig. 3 a side elevation, of the lower portion of the machine, with the parts enlarged, to more clearly illustrate the operation of the various devices; and Figs. 4, 5, and 6 are perspective views of portions shown detached and more in detail.

Cartridge-heading machines are usually made with a series of dies mounted in a dial-plate arranged to rotate at intervals, and thus bring the dies successively under the heading-punch.

The object of my invention is to dispense with this dial-plate, with its series of dies, and to substitute therefore a single stationary die, and to provide means by which the shells shall be taken from a trough, carried to and inserted into the die, then headed, and removed therefrom automatically.

In the drawings, A represents the upright frame of the machine, which may be made of any size and style required, and B is the bed of the same. Across the upper part of the frame is mounted a crank-shaft, C, connected by a pitman to a cross-head, D, in which is mounted the heading-punch or bunter I, as usual. On the right-hand end of this shaft C is secured a wheel, E, which has on its inner face a cam-groove, as represented in dotted lines in Fig. 1, in which a stud or pin projecting from the face of a rod or plate, *b*, engages, this latter being connected by a collar to a vertical rod, F, which at its lower end is connected to a pivoted lever, *a*, the inner end of which lever is brought directly under the die G, where it is connected to a vertical rod, L′, which, as shown in Fig. 2, extends up through a tubular bolt, O, screwed into the bed B. Upon the upper end of this vertical rod L′ rests the mandrel L, which supports the shell within the die while being headed. This mandrel L, as shown in Fig. 2, is provided with an enlarged head, *t*, at its lower end, so that when not raised by the rod L′ it will rest firmly on the end of the tubular support O, which, being threaded on its exterior and provided with a jam-nut, P, can be adjusted and held at any desired height, so as to hold the mandrel L at the exact point desired in order to properly head the shell.

The cam-groove of the wheel E is to be so constructed and adjusted as to cause the mandrel L to rise and shove the headed shell part way out of the die, as the bunter I rises after it has operated on the shell, and to let the mandrel L rest stationary on its support O while the heading operation is being performed, as in Fig. 2.

Upon the left-hand end of the crank-shaft is secured a cam-wheel, V, as shown in Fig. 1, for the purpose of imparting motion to the feeding devices, this cam V operating a pivoted crank-lever, M, which, as shown in Figs. 2 and 3, is connected by a rod, N, to a reciprocating feed-bar, K, which is mounted in suitable bearings in such a position that when moved forward its inner or front end shall be brought exactly in line with and directly over the die G, the latter being secured in a die holder or plate, S, in such a manner that it can be adjusted accurately in relation to the bunter I.

This feed-bar K has its front end made concave or notched to properly receive and center the shells, which are delivered to it, one at a time, from an inclined trough or guide, J, arranged directly over it, as shown in Fig. 2, and to its under side there is pivoted a lever or finger, *i*, which, as shown, has its outer end bent so as to grasp the shell *s* firmly between it and the end of the feed-bar K, there being a spring, *o*, arranged to bear upon this lever *i*, and make it press upon the shell, and hold it secure while being carried forward to the die G. A stationary pin, *h*, is so located that as the

feed-bar K is brought back with its front end under the mouth of the trough J, in position to receive a shell therefrom, the rear end of lever *i* will strike upon the side of this pin *h*, and as their inclined surfaces move one upon the other, thereby force down the front end of the lever *i* and open the space between it and the end of bar K, so as to permit a shell to enter without obstruction.

To prevent more than one of the shells from dropping from the trough at once, and to hold the shells therein while the feed-bar is carried forward, a sliding detent or rod, *d*, is arranged so that its front end shall enter a slot in the bottom of trough J far enough to prevent the lower shell therein from falling out, as shown in Fig. 2. This detent *d* is provided with a spring, *f*, arranged to press and hold it forward; and to retract it at the proper time, it has a pin, *e*, arranged to be hit by a pin or projection, *e*, on the bar K, as the latter comes back into position to receive another shell. The instant the feed-bar starts forward again the detent *d* is thrust forward by its spring, and by pressing against the lowermost shell in the trough holds it against a small projection, *z*, upon the upper side or flanges of the trough, thus preventing the shells from falling out until the detent is again forced back by the return of the feed-bar.

The trough J, as here shown, is composed of two parts—one horizontal, which is entirely open on its upper side, and an inclined part which has a narrow flange projecting inward from each side at its upper edge to hold the shells in position as they slide or roll down the incline. The horizontal portion is merely to enable the operator to conveniently arrange the shells transversely therein with their mouths or open ends all to one or the other side, according to the direction in which the feed-bar is made to rotate, as hereinafter explained. It is, however, obvious, that this horizontal portion of the trough may be dispensed with without affecting the operation of the machine, and that a hopper or platform may be substituted for it if desired, or be added to it, as may be found most convenient.

It will be seen that the shells, as they pass from the trough J to the feed-bar K, lie in a horizontal position, and that before they can enter the die G they must be turned to a vertical position; and to accomplish this result I cut a groove, *k*, in the side of the feed-bar, as shown in Figs. 2 and 3, in which the inner end of a guide pin or screw, *l*, rests, so that as the bar K moves toward the die it is caused to make a quarter turn in its bearings, and thereby turn the shell which it is carrying forward from the horizontal to the vertical position, it being represented in the act of thus turning the shell in Fig. 3. By this means the shell is transferred from the hopper to a position directly over the die G, where it is held by the feed-bar until the bunter I has descended far enough to press the open end of the shell into the die far enough to hold it secure, when the feed-bar is drawn back by means of the cam Y, as before described, the lever or finger *i* being made to yield by the backward pull on it, and thus made to slip off the shell and loose its hold on it, thus leaving the shell in the die. As this takes place the bunter I descends, pressing the shell down upon the mandrel L within the die, and heads it.

The shell, having been thus headed, must be taken out of the die to make room for the next one; and to effect this I provide a lifter, R, which, as shown in Figs. 4, 5, and 6, consists of a flat bar or plate having a circular notch or recess in one edge of such a size as to fit half-way, more or less, around the shell as the latter is raised from the die by the elevation of the mandrel L, as previously explained. This plate or lifter R is rigidly attached to a short vertical rod or stem which is fitted within a sleeve, T, secured to the cross-head D, as shown in Fig. 1, and, as shown in Fig. 4, the vertical stem of the lifter R has, bearing on its upper end within the sleeve, a spiral spring, *v*, and a pin, *r*, which works in a curved slot, *u*, in the side of the sleeve, protrudes from its side, as shown clearly in the drawings.

Upon the die-holder or bed of the machine, directly under the stem of the lifter R, is located a stop, *q*, which is made adjustable vertically, and so that as the lifter R descends its lower end, *p*, will strike or bear upon this stop *q*, which will thus hold it while the sleeve T continues its descent, and as the latter slides upon the stem of lifter R its curved slot *u* operates upon the pin *p*, and thereby causes the lifter R to swing away from the shell, as shown in Fig. 4, just before the shell is pressed completely into the die, thus getting out of the way of the descending bunter as the latter completes its stroke to make the head on the shell. As the cross-head and bunter rise again the mandrel L pushes the headed shell a short distance upward, when the lifter R, being operated upon by the spring *v*, has its pin *r* forced downward in the curved slot *u*, which causes the lifter to swing inward and engage under the head of the shell, as shown in Fig. 5, when, by the continued ascent of the cross-head, the lifter is drawn upward, thereby drawing the shell entirely out of the die and off of the mandrel L.

In order to remove the shell from the lifter after it has been thus drawn from the die, I arrange a knock-off, H, in such a position that as the cross-head has nearly completed its upstroke this knock-off will be moved suddenly at right angles to the line of movement of the cross-head, and by striking the shell with its bent end, as represented in Fig. 6, will knock it clear of the lifter. This knock-off may be constructed in any suitable manner, that shown in the drawings being a very simple method, though probably not exactly such as will be used in constructing full-sized machines. As shown in the drawings, it consists of a small rod or strong wire pivoted to the frame of the ma-

chine, as shown in Fig. 1, with its upper end bent inward, so as to be struck by the cross-head at the proper instant as the latter rises, thus causing its lower end to swing inward under the lifter and knock off the shell, as above described. A spring, *y*, Fig. 1, is arranged to operate upon the knock-off H in such a manner as to throw its lower end back out of the way the moment the cross-head has descended far enough to cease bearing against its upper arm.

As shown in Figs. 2 and 3, the feed-bar is connected to its operating pitman or rod N by means of a loose collar, *m*, which is held between two collars, *n n*, which are fastened by set-screws, so that by loosening them the feed-bar can be adjusted back or forward, as may be necessary to bring it to the exact position required for delivering the shells to the die G. So, too, by means of the nuts *o' o'* on rod F, Fig. 1, the stroke of the rod L' may be adjusted so as to raise the mandrel L and the shell upon it more or less out of the die, as may be required to enable the lifter to operate upon the shell, as described.

As previously described, the mandrel L can in like manner be adjusted by means of its screw-support O, as can also the lifter R by means of its screw-stop *q;* and thus it will be seen provision is made for accurately adjusting all these various parts so they can be made to operate at the exact times required and in perfect harmony.

From the foregoing description the operation of the machine will readily be understood by those skilled in the art. I desire, however, to add that, while the construction and arrangement of the machine, or of the devices composing it, as herein shown and described, are simple and compact, I do not wish to be understood as limiting myself to this precise construction or arrangement, as it is obvious that they may be varied without materially changing the machine or its operation.

From the description and illustration herewith given any mechanic skilled in the art can readily vary the details by substituting well-known mechanical equivalents for many of the connecting or operating devices or parts, and still have essentially the same machine.

In constructing full-sized machines they may, and probably will, be varied in their details from that herein described, this being designed to explain and illustrate the principle and mode of operation of a machine embodying my invention.

Having thus described my invention, what I claim is—

1. The combination, in a cartridge-heading machine, of a holding-die, G, a reciprocating heading bunter or punch, I, and a reciprocating feed-bar, K, arranged to receive the shells in a horizontal position and turn them to an upright position while carrying them to the die, substantially as described.

2. In combination with a holding-die and heading punch or bunter, the reciprocating mandrel L and shell-lifter R, arranged to operate substantially as set forth.

3. In combination with the die G, reciprocating mandrel L, and shell-lifter R, the knock-off H, arranged to operate substantially as described.

4. The combination, substantially as before set forth, of the shell-guide J, the spring-detent *d*, and the reciprocating shell-carrier K, all arranged to operate substantially as and for the purpose set forth.

5. The feed-bar K, provided with the spring lever or finger *i*, in combination with a stop or projection, *h*, arranged to operate upon said lever or finger, substantially as shown and described.

6. The shell-lifter consisting of the notched plate R, provided with a stem, *p*, carrying a pin, *r*, and the sleeve T, provided with the curved slot *u* and spring *v*, the whole being arranged to operate substantially as and for the purpose set forth.

7. The combination, substantially as before set forth, of the reciprocating and laterally-swinging shell-lifter R, and the adjustable stop *q*, for adjusting and regulating the movements of the shell-lifter, as set forth.

8. The reciprocating and turning shell-carrier K, adjustably connected to its operating mechanism, substantially as described.

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