2 Sheets--Sheet 1.

JOHN R. ABBE.

Improvement in Bolt Heading Machines.

No. 115,555. Patented June 6, 1871.

Fig. 1.

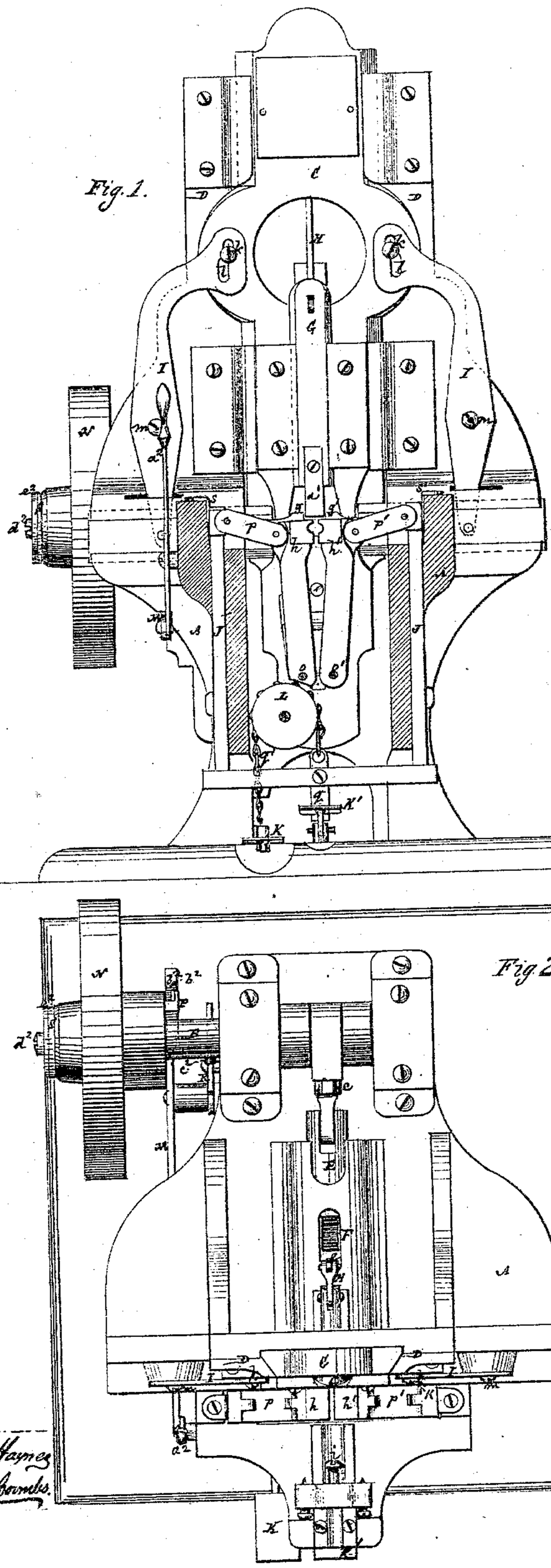

Fig. 3.

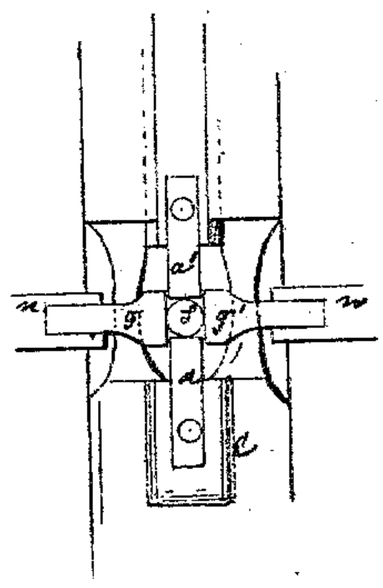

Fig 2

Witnesses: J. Haynes, J. Combs.

Inventor: J. R. Abbe, by Munn & Co, Attorneys.

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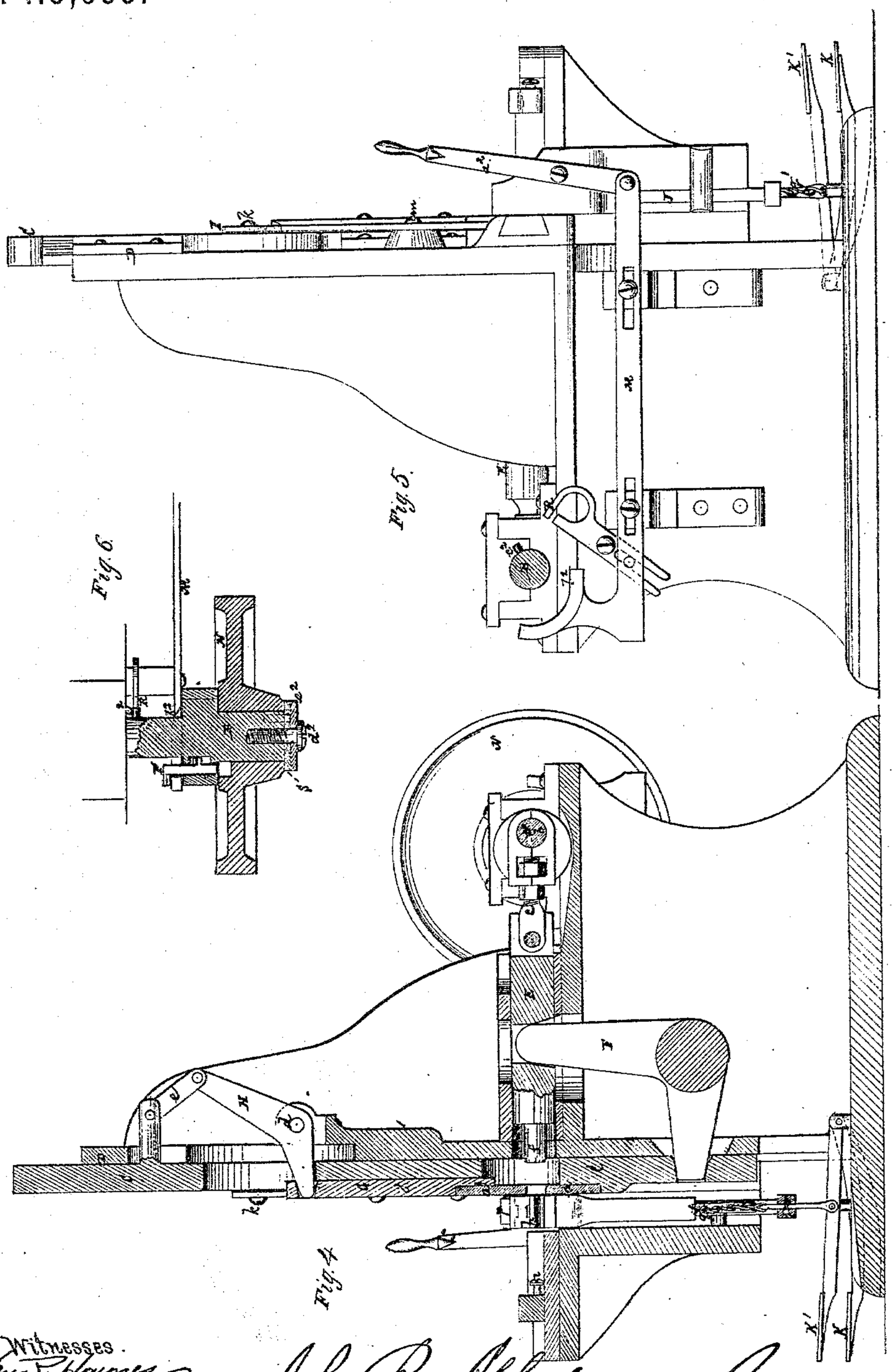

Fig. 5.

Fig. 6.

Witnesses.
Fred. Haynes
D. McComb.

John R. Abbe
per Brown Combs & Co Attorneys

UNITED STATES PATENT OFFICE.

JOHN R. ABBE, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN BOLT-HEADING MACHINES.

Specification forming part of Letters Patent No. 115,555, dated June 6, 1871.

To all whom it may concern:

Be it known that I, JOHN R. ABBE, of the city and county of Providence, in the State of Rhode Island, have invented a new and useful Improvement in Bolt-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a front sectional elevation taken as indicated by the line *x x* in Fig. 2, which is a plan of the machine. Fig. 3 is a front view of the forging-dies and upset in their relative positions. Fig. 4 is a vertical longitudinal section through the center of the machine; Fig. 5, a side view or partial section in illustration of the clutch, by which the machine is stopped without arresting the motion of the driving-pulley; and Fig. 6, a horizontal section through the driving-pulley and its clutch-operating mechanism.

Similar letters of reference indicate corresponding parts.

My invention has for its object the construction of an upright bolt-machine which shall combine efficiency with durability, and whereby the bearings or wearing-surfaces are raised above both the cinders which fall off from the work and the water used to keep the dies and upset cool. In this machine the bolt is formed or headed by the combined action of a vertical main slide provided with a lower die, an upper die operated in an indirect manner by the main slide conjointly with the lower die, two side dies also operated by the main slide through pins and slotted levers, and an upset likewise deriving its motion from the mechanism which operates the main slide. A novel and important feature in this arrangement or combination is the setting of the side dies while the top and bottom dies, passing in between them, perform their work. The invention also includes a treadle motion of a novel and advantageous construction for operating the vise which holds the work in its place relatively to the upset and forging-dies; likewise a friction-plate or disk, in combination with a loose driving-pulley, main shaft, and clutch for holding the shaft from reacting after it has been stopped by a spring-stud connected with the clutch, and whereby the caps of the shaft-bearings may be screwed down loose or easy without risk of the shafts bounding back when the clutch is operated to throw the driving-pulley out of gear with it. The invention also embraces a general arrangement and combination of parts or devices in or as relating to the entire machine, and whereby the efficiency of the whole is improved.

Referring to the accompanying drawing, A represents the frame and table of the machine, and B its main shaft, arranged to occupy a transverse relation in the rear. C is the main slide carrying the lower die *a*, and having a vertical reciprocating motion communicated to it, between uprights D D, by means of a crank or eccentric pin, *b*, on the main shaft, a pitman or link, *c*, a horizontal slide, E, and a bell-crank, F. The upper die a^1 simultaneously receives motion in reverse directions to the lower die *a* by means of a vertical slide, G, arranged on the face of the main slide, and operated by the latter through a two-armed lever, H, pivoted as at *d*, and in direct connection with the slide H, and by a link, *e*, with the main slide C. The slide E also serves to actuate the upset *f*, which is attached to it in front at the rear of the forging-dies. There are, in addition to these upper and lower dies $a\ a^1$, other forging-dies or hammers $g\ g'$, arranged to occupy a right-angled position to the upper dies, on either side of them. These side dies $g\ g'$ have an intermittent reciprocating horizontal action in reverse directions simultaneously. In the operation of the machine the bolt to be headed, which is held between jaws $h\ h'$ of a vise arranged in front of the forging-dies, and provided with a screw-gage, *i*, is first struck by the upset *f*, which then recedes, when the forging-dies come into operation on the bolt as follows, namely: first, the side dies $g\ g'$ strike and press on two of its sides, and remain pressing thereon free from all motion, while the upper and lower dies $a\ a^1$, passing in between the side dies, next act on other two sides of the bolt held for the time being as specified by the side dies, after which the several dies recede for a further operation of the upset and repeated action of the dies, if necessary. The set of the side dies $g\ g'$, to thus operate in timely relation with the upset and upper and lower dies, and to remain stationary while the upper and lower dies work in between them, is obtained by means of pins *k*

k secured to the main slide C, and working in crooked slots *l l* made in levers I I, which are pivoted, as at *m m*, to the uprights D D of the frame, and are connected at their lower ends with the slides *n n*, which carry the side dies. If desired, the slots *l l* may be shaped so as to give an alternate action to the side dies—that is, to make said dies strike four times (twice each) for each two blows (one each) of the upper and lower dies. The vise which holds the bolt has its two jaws *h h'* formed of levers suitably fitted with dies at their upper ends, and pivoted below, as at *o o'*. Said jaws are in jointed connection at their upper ends, by links *p p'*, with a vertically-sliding frame, J, that is raised or lowered to open or close the jaws, as required, by means of treadles K K', the one, K', of which is directly connected by a rod, *q*, with the frame, J, and serves, on pressure being applied to it, to lower said frame to close the jaws *h h'*, while the other treadle, K, is connected by a chain, *q'*, passing over a pulley, L, and attached to the rod *q*, so that on said treadle being depressed it elevates the frame and opens the jaws. By this arrangement the two treadles are automatically adjusted to their proper relative positions to actuate the frame and jaws connected by the links *p p* therewith. An important part of this combination is the sliding uprights of the frame J and toggles or links *p p*, together with the jaws *h h'*, said frame or sliding uprights being operated by other means than the treadles, if desired. At the back of said sliding uprights, immediately in rear of the links *p p'*, are arranged brass or other metal wedges *s s'*. These wedges serve to adjust the jaws *h h'* so that their dies occupy a central position in the machine, and whereby they are made to hold harder. The guides for the vise are upon the body of it, as formed by the uprights J J. M is a horizontal side slide, operated by a handle, a^2. This slide serves to disconnect the clutch which couples the loose driving-pulleys N with the main shaft B, for the purpose of stopping the machine without stopping or throwing off the belt from the pulley. To this end said slide M is of a curved-wedge shape at its rear end, as at b^2, so that on the slide being drawn forward the head or hooked end of a sliding spring clutch-bolt, P, is caught and drawn outward by the curved wedge b^2, and made to disconnect the pulley from the shaft, as clearly represented in Fig. 6. Connected with the slide M is a lever-spring, R, which, when said slide is adjusted to throw out the clutch, serves for a stud or stop, c^2, on the shaft B, to strike and arrest the shaft from continuing its motion. To prevent rebound of the shaft as thus arrested I arrange a friction-disk, S, of leather or other suitable material, against the outer ends of the shaft and pulley, the same being adjustable by a screw, d^2, and outer metal disk e^2, which latter is connected by a face-pin with the shaft so as to turn with it. This arrangement renders it unnecessary to screw down with an objectionable tightness the caps on the bearings of the main shaft. The slide M may be made automatic, so that it will stop the machine, after any desired number of blows have been given, by means of a ratchet and pawl, the number of blows being regulated by throwing out or adjusting the slide so that the pawl will have a greater or lesser number of teeth to travel over to bring the slide in drawing position, by its wedge b^2, on the clutch, and into its adjusting position of the lever-spring R, which latter is drawn out of the way of the stud c^2 when the slide M is released from its holding position on the clutch. By adopting an automatic arrangement to operate the clutch the machine may be made to stop after a given number of bolts have been made, thereby preventing an over-make, and registering, as it were, the number of bolts made.

In a machine constructed to operate as described the bolts are made or headed free from all pins, and to effectually secure this it is desirable to make the side dies *g g'* somewhat wider than the upper and lower dies *a* a^1. Various screw adjustments, both as regards the dies and other parts, may be provided, but it is not necessary here to describe them.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination of the levers I I, having crooked slots *l l* in them, with the pins *k k*, the slide C, and the dies *a* a^1 and *g g'*, essentially as shown and described.

2. The treadles K K', in combination with the chain *q'*, the pulley L, the sliding frame J, the links *p p'*, and the jaws *h h'*, essentially as described.

3. The lever-spring R, in combination with the stud or stop c^2, the main shaft B, the loose pulley N, and clutch for establishing and breaking connection between the said pulley and shaft, essentially as described.

4. The friction-disk S, in combination with the loose pulley N, the driving-shaft B with its stud c^2, and spring stop or lever R, substantially as specified.

5. The combination and arrangement of the dies *a* a^1 *g g'*, the main slide C, the levers I I with their crooked slots *l l* and pins *k k*, the slide E carrying the upset *f* and the bell-crank F, essentially as herein set forth.

JOHN R. ABBE.

Witnesses:
SANFORD C. HOVEY,
HENRY MARTIN.