

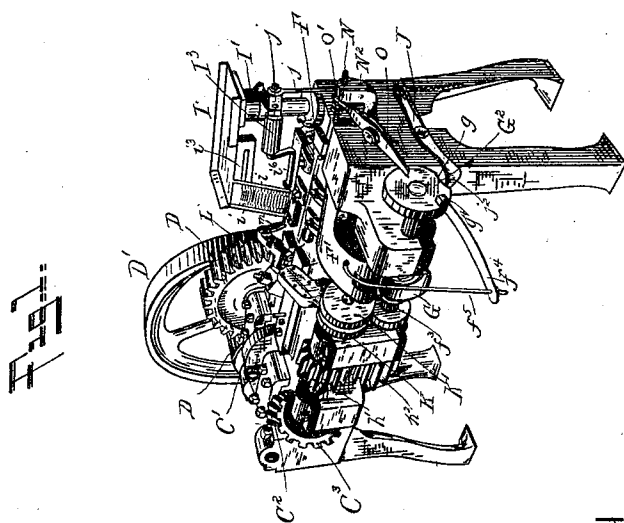
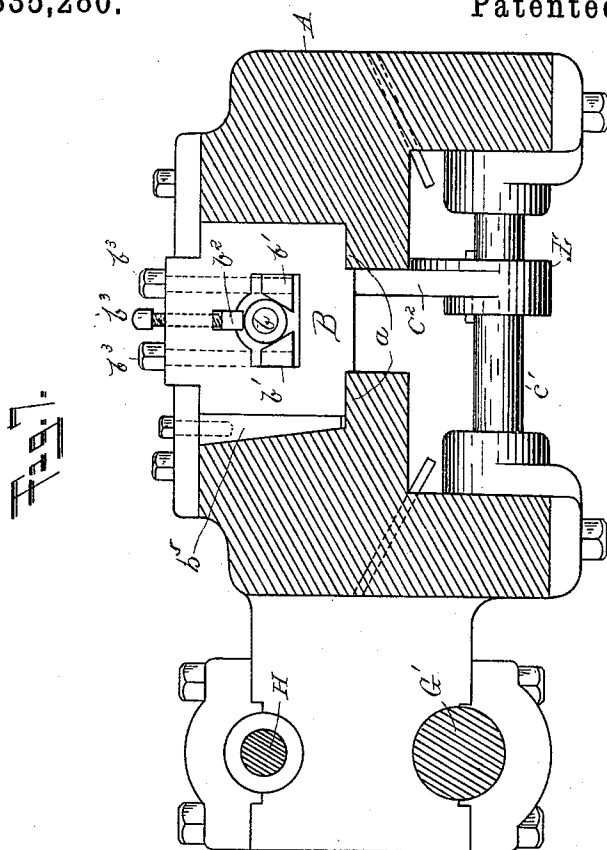
(No Model.)

6 Sheets—Sheet 1.

A. B. GLOVER.
MACHINE FOR HEADING BOLTS.

No. 335,280.

Patented Feb. 2, 1886.



Attest.
Wm. T. Norton.
H. A. Lamb.

Inventor:
Almon B. Glover.
By John J. Halsted & Son
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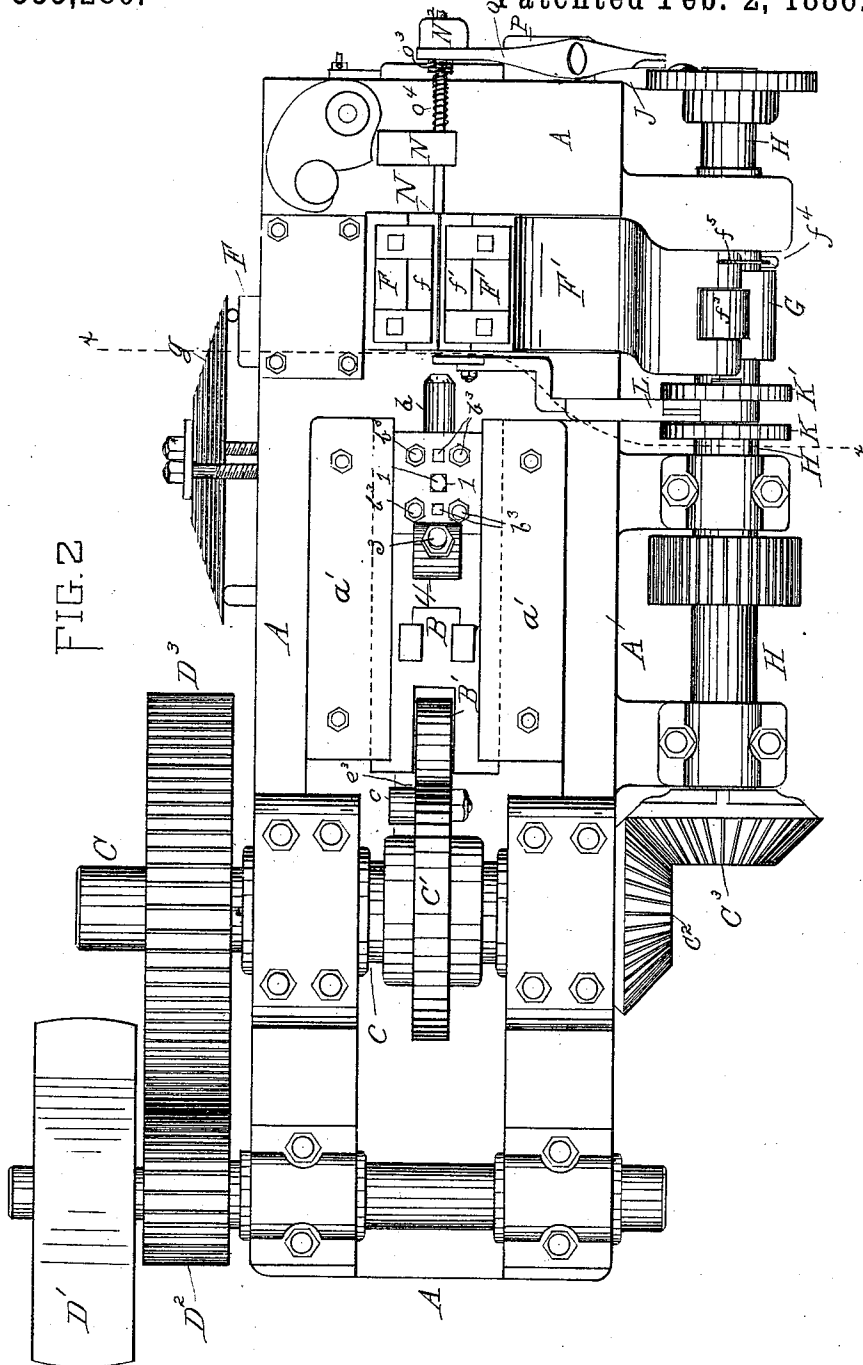
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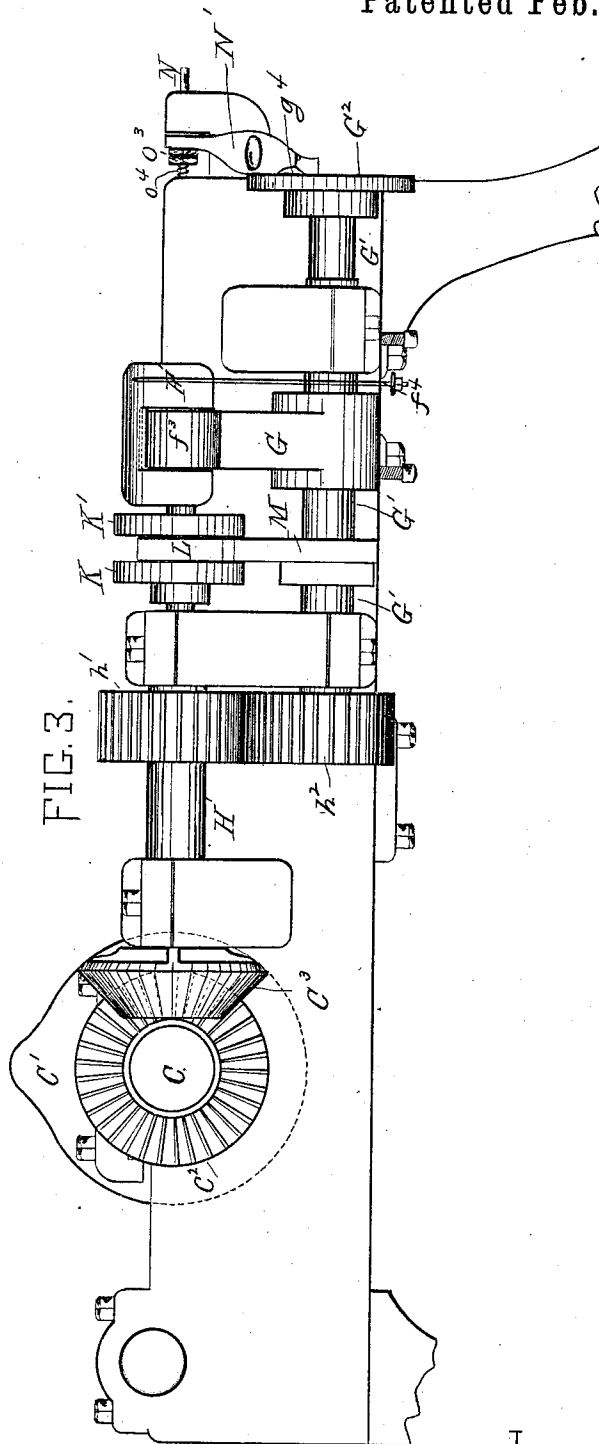
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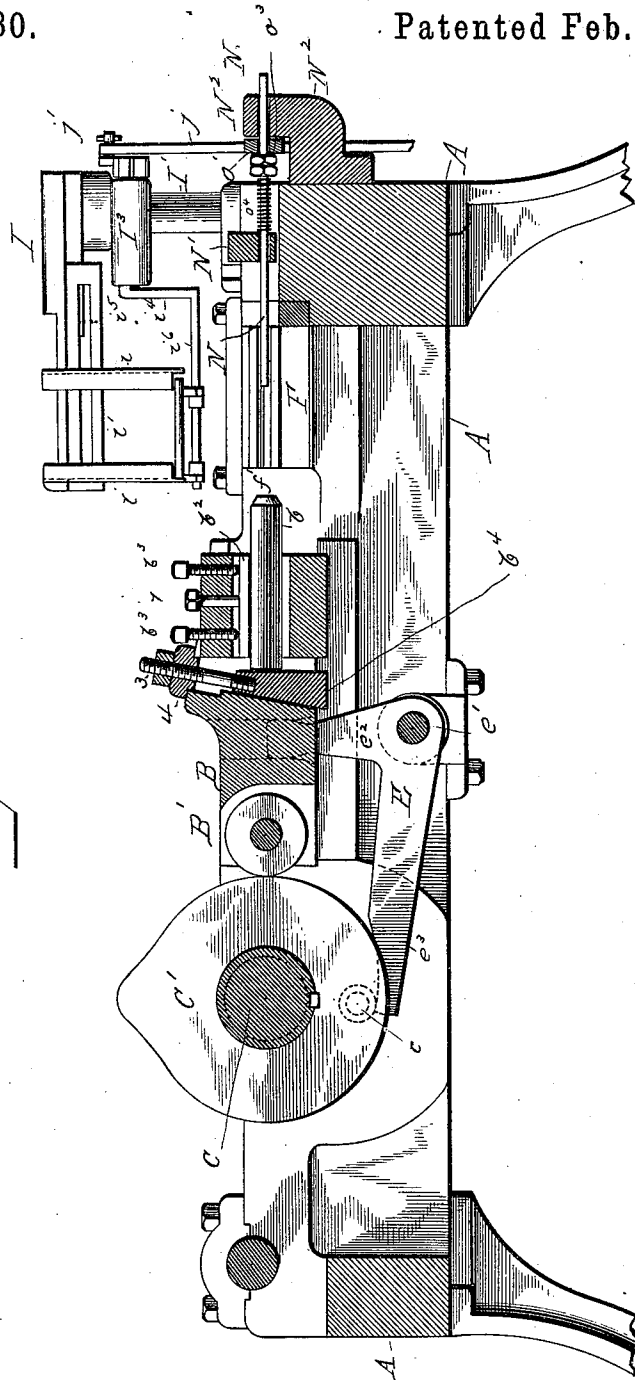
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Fig. 4.



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(No Model.)

6 Sheets—Sheet 5.

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Fig. 6.

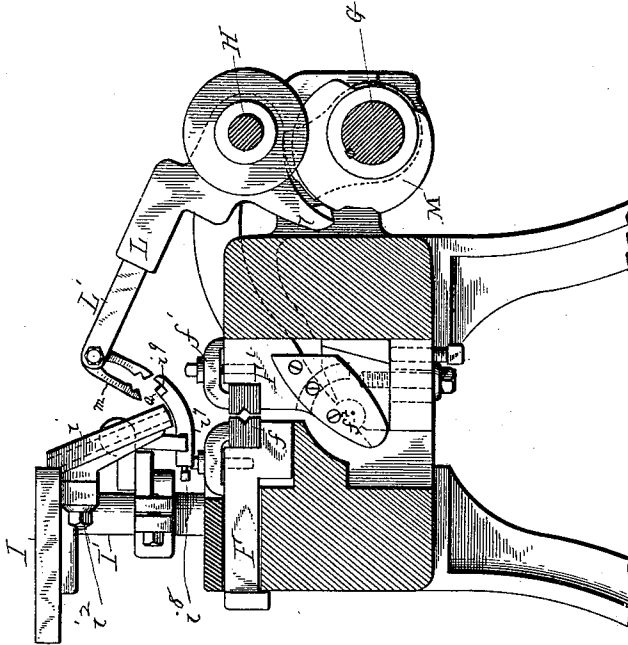
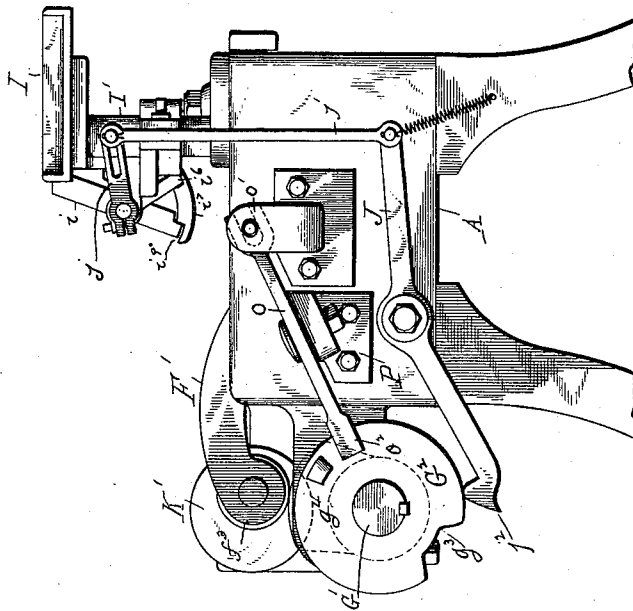


Fig. 5.



Witnesses
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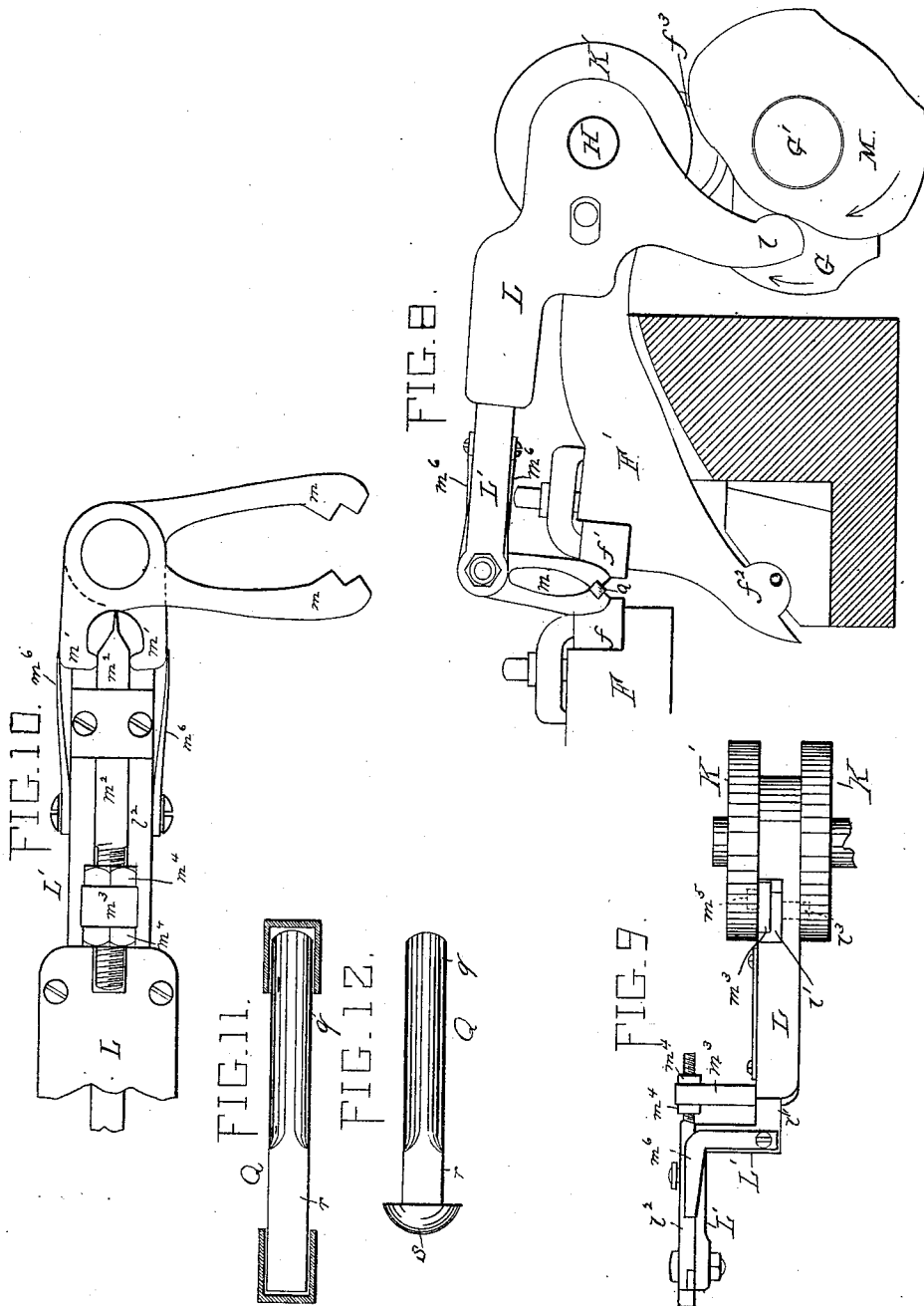
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6 Sheets—Sheet 6.

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UNITED STATES PATENT OFFICE.

ALMON B. GLOVER, OF BIRMINGHAM, CONNECTICUT.

MACHINE FOR HEADING BOLTS.

SPECIFICATION forming part of Letters Patent No. 335,280, dated February 2, 1886.

Application filed September 14, 1885. Serial No. 177,107. (No model.)

To all whom it may concern:

Be it known that I, ALMON B. GLOVER, of Birmingham, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Machines for Heading Bolts; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention consists in a machine for heading bolts, which is fully and particularly described as follows:

In the accompanying drawings, Figure 1 is a perspective view of the entire machine on a smaller scale than the other figures. Fig. 2 is a plan of the machine with the feeding devices removed. Fig. 3 is a side elevation of the same. Fig. 4 is a vertical longitudinal section. Fig. 5 is an end view showing the devices for feeding the blanks to the dies. Fig. 6 is a vertical transverse section on the line $x x$ of Fig. 2. Fig. 7 is a vertical section on nearly the same line of Fig. 2, but looking in the opposite direction from Fig. 6. Figs. 8, 9, and 10 are details showing the manner of feeding the blanks to the dies. Fig. 11 is a section illustrating the blank in the guides of the blank slide. Fig. 12 illustrates a blank as headed by my machine.

Similar letters represent like parts in all the figures.

A is the frame or bed-piece of the machine, having longitudinal ways a' , in which a carriage, B, may slide. To the forward end of this sliding carriage B the hammer b , for upsetting the end of the bolt-blank and heading the same, is firmly secured.

I have shown a simple and efficient manner of effecting the same, as follows: In the forward end of the carriage B is a recess large enough to admit the hammer b and two wedge-shaped blocks, b' b' , beneath it, an oblong rectangular block, b^2 , above it, and with still enough space to allow said hammer and blocks to have a slight up-and-down play. The oblique side of each of the wedge-shaped blocks

b' b' forms a bearing for the hammer b , and each of the blocks b' b^2 is attached to adjusting-screws b^3 , which pass up through the top of the carriage B. The rectangular block b^2 is also provided with a vertical guide, 1, which is adapted to slide up and down in a corresponding hole in the carriage B. b^3 b^3 are adjusting-screws passing through the top of the carriage and adapted to press against the top of the block b^2 .

The above devices allow of the hammer b being tightly held by the upward pressure of the blocks b' and the downward pressure of the blocks b^2 .

b^4 is a wedge inserted in an opening of the carriage B back of the hammer b , to adjust said hammer longitudinally. To accomplish this object the wedge b^4 has attached to its upper end an adjustable screw, 3, which passes up through a bushing, 4, on top of the carriage.

b^5 is another wedge, similar to b^4 , for adjusting the carriage laterally.

B' is a roller attached to the back end of the carriage B, and B^2 is a vertical opening or mortise in said carriage, for purposes herein-after explained.

C is the main shaft of the machine, which operates all the mechanism, and this is operated by means of the driving-wheel D' and the two gears D² and D³.

Attached to the main shaft C, near its center, is a cam, C', having a small roller, c , on its side near its periphery and opposite to the enlarged portion of the cam. (See Figs. 2 and 4.)

E is a two-armed lever, with its arms nearly at right angles, fulcrumed upon the shaft e' , which has its bearings in the under part of the frame A. The end of the short arm e^2 enters the opening or mortise in the under side of the carriage B, while the end of the long arm e^3 rests upon the under side of the roller c .

F and F' are the die-holders for holding the dies $f f'$. These dies have oblong triangular openings in their adjacent sides, and are secured to their respective holders in any appropriate manner, so that when said openings come together they will form a rest or box equivalent to a solid or single die, diamond-shaped or square in cross-section, to grip and hold the bolt-blank firmly while being oper-

ated upon by the hammer *b*. The holder *F* is secured upon the frame *A*, practically stationary, but having a slight lateral play upon the frame *A* and against the spring *g*, to prevent such holder and die being broken by too great a strain while the machine is in operation. The spring *g* is secured upon the side of the frame *A*, with one end bearing against the die-holder *F* and forcing the same inward toward the other die-holder, *F'*. (See Fig. 2.) When some obstruction—a bolt-blank, for example—comes between the dies, the spring *g* yields a little to allow the die-holder *F* to recede enough to prevent the machine from breaking. The die-holder *F'* is movable, and is pivoted at *f*² upon the frame *A*. It is in the form of a lever of the second class, with its fulcrum at *f*², its weight being the die *f*¹. This lever has a long arm extending to the side of the frame *A*, with a roller, *f*³, attached to the outer end of said arm. The power is transmitted to this roller *f*³ on the lever by means of a cam, *G*, on the shaft *G'*.

The main shaft *C* is provided with a miter-gear, *C*², which engages with another miter-gear, *C*³, upon the longitudinal shaft *H*. This shaft *H* is also provided with a gear, *h*¹, which engages with another gear, *h*², on the shaft *G'*, suspended in bearings immediately below and parallel with said shaft *H*.

The cam *G*, for transmitting power to the roller *f*³ of the lever die-holder *F'*, is operated by the main shaft *C*, through the miter-gears *C*² *C*³, shaft *H*, gears *h*¹ and *h*², and shaft *G'*.

Attached to the under side of the frame *A*, and extending out from the same, is a spring, *f*⁴, and to the outer end of this spring is attached a curved rod, *f*⁵, the curved part of which bears against the upper part of the holder *F'* and serves to keep the roller *f*³ against the cam *G*.

Upon the forward end of the shaft *G'* is attached a cam, *G*², having a recess, *g*³, and a stud or projection, *g*⁴, for purposes hereinafter to be explained.

I is a horizontal bed or table supported by an upright or column, *I*¹, on the frame *A*, for holding the bolt-blanks previously to their being operated upon by the machine, and *i* *i* are two straight grooved inclined guides (for the blanks to slide down) adjustably attached to the edge of the table *I*, with their upper ends flush with the same, by means of a slotted bar, *i*¹, and adjusting-screws *i*². This allows the guides *i* to be adjusted relatively to each other, and also allows of the blanks being slid one after the other from the table down the slides to the supporting-arcs.

*I*³ is a horizontal bearing secured by the upright *I*¹ to the frame *A*, for holding a vibrating device. This device has a vertical portion, *i*⁴, and two horizontal arms, *i*⁵ and *i*⁶, one of which, *i*⁵, passes through the bearing *I*³, in which it may turn, and the other end, *i*⁶, extending in the opposite direction, and upon which the arcs or fingers *i*⁷ *i*⁸ are adjustably attached by screws *i*³. The outer ends of the arcs

*i*⁷ have a triangular depression or cut, *i*⁹, for a purpose hereinafter to be explained. The outer end of the arm *i*⁵ is connected to the long vertical rod *j* by means of a short arm or link, *j*¹. (See Figs. 4 and 5.) The lower end of the rod *j* is pivoted to a lever, *J*, fulcramed upon the front end of the frame *A*, the free end of said lever having a projection, *j*², being adapted to be operated by the cam *G*². One end of a coiled spring, *j*³, is attached to the lever *J*, near its connection with the rod *j*, and its other end is attached to one leg of the frame *A*. The object of this spring is to keep the free end of the lever *J* continuously pressed against the under side of the cam *G*². The arcs *i*⁷ while at rest have their depressions *i*⁹ directly under the lower ends of the guides *i*, so that said depressions will receive and hold one blank; but the arcs during their vibratory motion carry the blank forward in front of the guides.

Upon the shaft *H* are attached two grooved cams, *K* and *K'*, and between said cams is an arm, *L*, which has a loose bearing upon the shaft *H*. This arm *L* has a downward projection or toe, *l*, for engaging with a cam, *M*, upon the shaft *G'*.

L is a movable device, of the shape of a double *L*, the longer arm *l* of which is adapted to slide in grooves in the arm *L*, and it has a stud, *l*², on its end, which passes through a mortise in the arm *L* and into a cam-groove in the cam *K*. The shorter arm *l*¹ bears the pivoted nippers *m* upon its outer end, and the parts *L* *L'* form an extensible arm or bearing for the nippers. These nippers (which are for taking the blank from the arcs *i*⁷ and placing it in the dies) are provided with backward extensions having toe-pieces *m'* *m'*. A wedge-shaped piece, *m*², is adapted to slide in grooves in the arm *l*¹, and is adjustably attached to a right-angled piece, *m*³, by its screw-threaded end and nuts *m*⁴ *m*⁴. The right-angled piece *m*³ is also adapted to slide in grooves in the arm *l*¹, and is provided with a stud, *m*⁵, at its outer end, for entering and working in the cam-groove in the cam *K'*. The wedge-shaped piece *m*² and the right-angled piece *m*³ can thus slide together.

*m*⁶ *m*⁶ are two springs for pressing the toe-pieces *m'* *m'* toward each other. When the wedge *m*² is between the toe-pieces *m'* *m'*, they and the nippers are held apart, but as soon as the wedge is withdrawn from the toe-pieces the springs *m*⁶ *m*⁶ will bring the toe-pieces and nippers together.

N is a horizontal rod or plunger for driving the headed blank from between the dies *f* *f'*. This plunger is loosely supported in suitable bearings, *N*¹ *N*², attached to the frame *A*, and the forward end of the same rests in the grooves of the gripping-dies *f* *f'*.

O is a lever pivoted obliquely to a bracket, *P*, on the front end of the machine, and having a yoke, *o*¹, which loosely embraces the plunger *N* just inside the bearing or bracket *N*². The lower end, *o*², of the lever *O* rests against the outside surface of the cam *G*², and

is adapted to be operated by the lug g^4 on said cam. Part of the length of the plunger N, near its forward end, has a screw-thread, and an adjusting-nut, o^3 , just back of the yoke o' , is adapted to regulate the length of that portion of the plunger between the dies. A coiled spring, o^4 , encircles the plunger between the bearing N' and nut o^3 , and tends continually to press the yoke o' out against the inside of the bearing N², and thus force the lower end, o^2 , of the lever O against the outside of the cam G², so that said lever can be operated by the stud g^2 .

Fig. 11 shows the blank Q previously to its being operated on by the machine, with a round portion, q , at one end and a square portion, r , at the other end. Fig. 12 shows the blank Q after having been headed by the machine, the head s being on the square portion of the blank.

The operation is as follows: The operator takes the blanks Q from the fire in any convenient number, places them upon the table I parallel to each other, with all the square ends r pointing toward the nippers m , or back end of the machine. He then slides the blanks over the edge of the table into the inclined guides, with their ends in the grooves of the guides. The blanks Q will then slide down said guides until the bottom one rests in the depressions i^2 of the arcs i' , the parts being in the position shown in Fig. 5, with the projection of the lever J free of the recess in the cam G, said cam being turned by the shaft G', the projection of the lever J will drop into the recess and through the lever J, rod j , link j' , and reciprocating device will force the arcs i' with their bolt forward in front of the guides in a position for the nippers to take hold of said blank. The arcs being always in close contact with the lower ends of the guides will prevent the remaining blanks from dropping out.

The positions of the parts will be as shown in Fig. 6. The arm L, with its attachments, will be in a raised position, and the nippers m will be open, (see Fig. 6,) by reason of the enlarged portion of the cam M, through the shaft G', having raised the toe-piece l of the arm L, the wedge m^2 will be between the toe-pieces m' m' , the movable device l' will have been drawn back into the arm L by means of the grooved cam K and stud l^3 , and the right-angled piece m^3 , to which the wedge m^2 is attached, will have been drawn forward by means of the grooved cam K' and stud m^5 . The dies f f' will also be closed, as the roller f^3 of the holder F will have been raised by the enlarged portion of the cam G. Now, as the shaft H revolves, the grooved cams K K' on this shaft are turned, when by reason of the groove in the cam K and stud l^3 the movable device l' will be forced forward, and at the same time the arm will be lowered a little, by means of the cam M, in a position for the nippers to grip the blank, and by the same revolution of the shaft H the right-angled piece m^3 and its connecting-wedge m^2 will have been

drawn back by the grooved cam K' and stud m^3 , allowing the nippers to grip the end of the blank Q from the arcs or fingers i' . (See Figs. 1 and 6.) The shaft H continuing to revolve, the cam G is turned through the gears h' h^2 and shaft G' until the roller f^3 shall rest upon the narrow or smaller portion of the cam G, when the holder F', with its die f' , will have receded from the stationary die f . A little further revolution of the shaft G' will bring the narrow or smaller portion of the cam M into engagement with the toe l , causing said toe, its arm L, and its connected parts to drop, so that the grooves in the nippers, with their inclosed blank, are in a line with the grooves in the dies f f' , as shown in Fig. 8. The shaft H, still continuing to revolve, causes the movable device l' , through the cam K, to move forward in the direction of the arrow, (see Fig. 8,) so as to place the blank Q in the stationary die f , while at the same time the cam G will have turned so as to close the movable die f' against the blank, gripping it firmly, and also against the stationary die f . A further revolution of the shaft H, through the cam K', causes the right-angled piece m^3 and wedge m^2 to move forward, opening the nippers m , while at the same time the enlarged portion of the cam M will have raised the toe l , its arm L, and the nippers m , thus taking the nippers out of the way of the heading-hammer b , which is now driven forward through the instrumentality of the shaft C, the enlarged or wide portion of the cam C', and the roller at the back of the carriage B, thus upsetting the end of the bolt and heading it. A further revolution of the shaft C will immediately withdraw the hammer b , by reason of the roller c on the cam C' coming in contact with the upper end of the arm e^3 of the lever E. The cam C' will have continued to revolve until the holder F' and its die f' will have receded a little from the stationary die f , when the lug g^4 on the cam G² will have come in contact with the lever O, when said lever will drive the plunger N into the dies against the unheaded end of the bolt, and thus drive said bolt out of the dies. A slightly further revolution of the cam G² will free the lever O from the lug g^4 , when the plunger N will be made to recede into its former position.

The above operations may be repeated as long as there are any blanks to be headed.

In preparing the blanks for such bolts as are made from "square iron," they are first cut from the rod of iron the required length, then they are put through a machine that rounds one end, as shown in Fig. 11. They are then ready to be heated for heading in my machine; but bolts made from round iron and many other forms require only to be cut the required length before being heated for heading by my machine.

The ordinary method of heading such bolts is for the operator to take one blank at a time from the fire with suitable tongs, place it in the machine, start it, when it heads the bolt

and stops until the operator repeats the operation with another blank.

Heretofore, so far as I am aware, no machine has been built that will receive hot blanks upon a table, conductor, or receptacle of any kind, convey them to and place them automatically, one at a time, in dies, whereby they may be headed, the operation being automatic and continuous.

10 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a machine for heading bolts, in combination, the horizontal table I, the stationary straight inclined guides *i*, for holding a series of unheaded bolt-blanks longitudinally one over the other and feeding them continuously, a vibrating device adapted to select successively the lower one of such blanks and transfer it to another part of the machine for a further operation, all substantially as shown and described.

2. In a machine for heading bolts, in combination, the stationary straight inclined guides *i*, for holding a series of unheaded bolt-blanks longitudinally one over the other and feeding them continuously, a vibrating device adapted to select successively the lower one of such blanks and carry it forward, and the nippers *m*, attached to a pivoted and extensible arm, for taking up said blank and placing it in the dies, all substantially as shown and described.

3. In a machine for heading bolts, the combination of the vibrating device *i*⁴ *i*⁵ *i*⁶, link *j*⁷, rod *j*, lever J, and revolving cam G², all operating substantially as described, and for the purpose set forth.

4. In a machine for heading bolts, the combination of the arm L, nippers *m*, wedge *m*², springs *m*⁶, and its right-angled piece *m*³, stud *m*⁵, and revolving cam K', the mechanism described serving to open and close the nippers, substantially as described.

5. In a machine for heading bolts, the combination of the arm L, the movable device *l*, stud *l*³, and revolving cam K, the mechanism described serving to extend and draw back the nippers, substantially as described.

6. In a machine for heading bolts, the combination of the arm L, the movable device *l*, stud *l*³, cam K, and shaft H, with the cam K', stud *m*⁵, right-angled piece *m*³, wedge *m*², and nippers *m*, and springs *m*⁶, all operating substantially as described.

7. In a machine for heading bolts, the devices for holding the hammer securely in the carriage and for adjusting said hammer in the same, consisting of the blocks *b*¹ and *b*², adjusting-screws *b*³, and vertical guide 1, all combined and operating substantially as shown and described.

8. In a machine for heading bolts, in combination, the stationary inclined guides *i*, for holding a series of bolt-blanks longitudinally one over the other and feeding them continuously, a vibrating device adapted to select successively the lower one of such blanks and carry it forward, the extensible arm LL', nippers *m*, the means for opening and closing said nippers, and means for conducting them to and away from the dies, all substantially as shown and described.

9. In a machine for heading bolts, the combination of the vibrating device, link *j*⁷, rod *j*, lever J, cam G², cam M', shaft G', gears *h*¹ and *h*², shaft H, arm L and its toe *l*, movable device *l*³, right-angled piece *m*³, wedge *m*², and cams K and K', all operating substantially as shown and described.

10. In a machine for heading bolts, the combination of the vibrating device, link *j*⁷, rod *j*, lever J, shaft G', and cams G², G, and M on said shaft, gears *h*¹ and *h*², shaft H, arm L and its toe-piece *l*, movable device *l*³, right-angled piece *m*³, wedge *m*², cams K and K', and the pivoted die-holder F', adapted to be operated by the cam G, the combination being and operating substantially as described.

11. In a machine for heading bolts, the combination of the dies *f* *f*¹, holders F F', cam G, and shaft G', gears *h*¹ *h*², shaft H, miter-gears C² C³, shaft C, cam C', sliding carriage B, and hammer *b*, with the plunger N, coiled spring *o*⁴, yoked lever O, and cam G², and stud *g*⁴, all operating substantially as shown and described.

12. In a machine for heading bolts, the combination of the arm L and its toe-piece *l*, movable device *l*³, right-angled piece *m*³, wedge *m*², cams K and K', shaft H, gears *h*¹ *h*², shaft G', cams G, M, and G², dies *f* *f*¹, holders F F', miter-gears C² C³, shaft C, cam C', sliding carriage B, hammer *b*, plunger N, coiled spring *o*⁴, yoked lever O, and stud *g*⁴ on cam G, all operating substantially as shown and described.

13. In a machine for heading bolts, the combination of the vibrating device *i*⁴ *i*⁵ *i*⁶, link *j*⁷, rod *j*, lever J, cam G², shaft G', cams G and M, arm L, with its nippers *m*, and the toe-piece *l*, right-angled piece *m*³, wedge *m*², cams K and K', shaft H, gears *h*¹ *h*², dies and die-holders, miter-gears C² C³, shaft C, cam C', sliding carriage B, hammer *b*, plunger N, coiled spring *o*⁴, yoked lever O, and stud *g*⁴ on cam G, all operating substantially as shown and described.

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Witnesses:

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