(No Model.)

J. STACKER.

MACHINE FOR HEADING BOLTS.

No. 312,399. Patented Feb. 17, 1885.

Fig. 1.

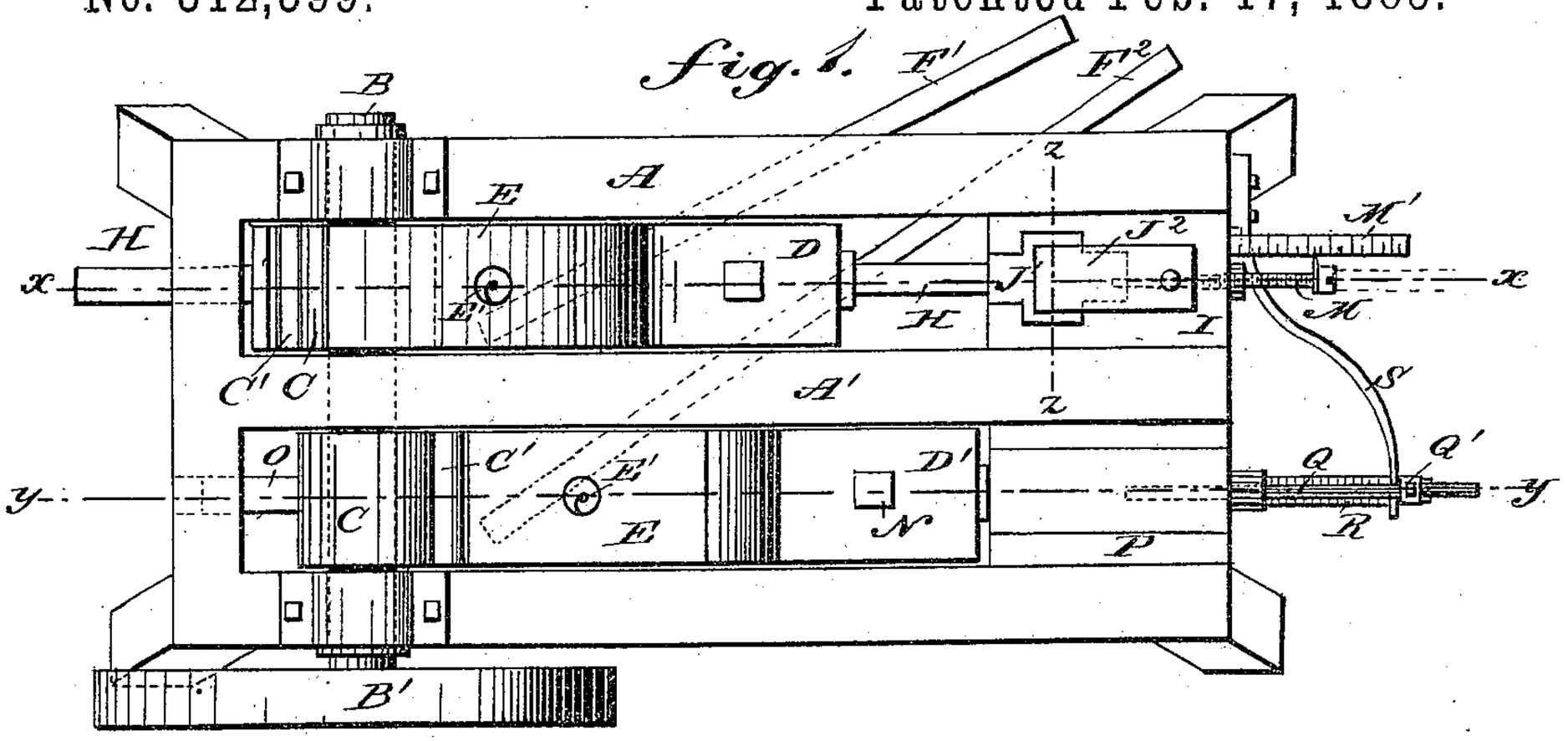


Fig. 2.

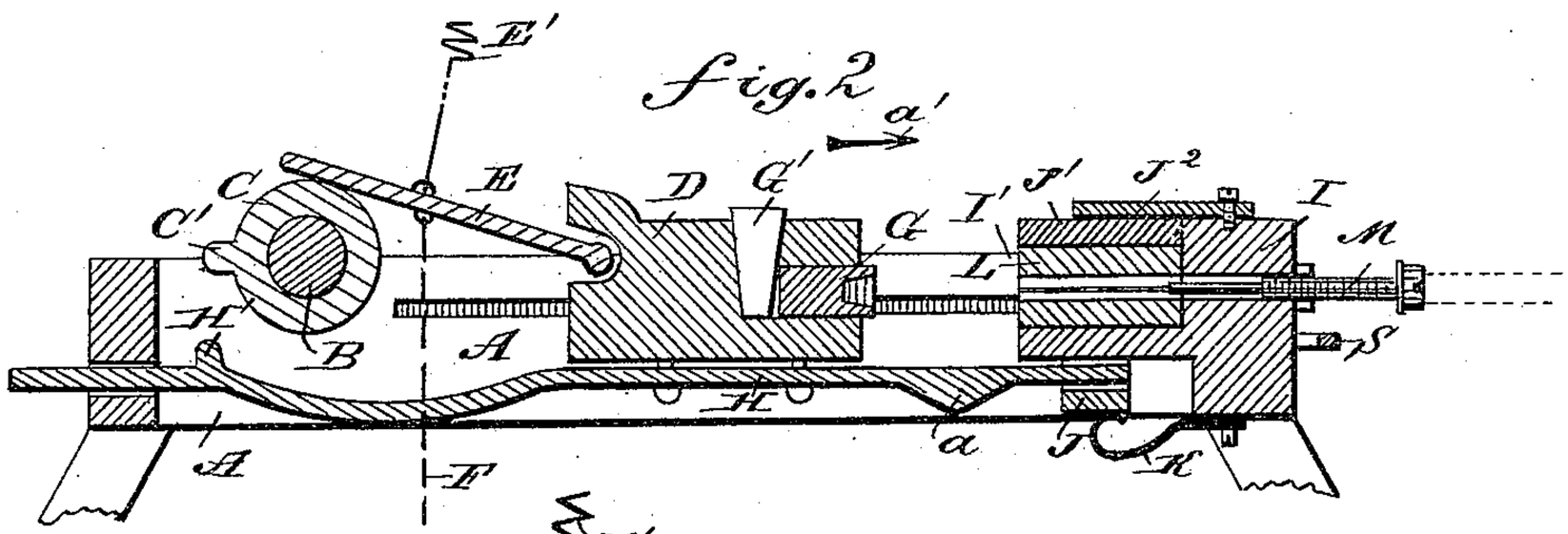


Fig. 3.

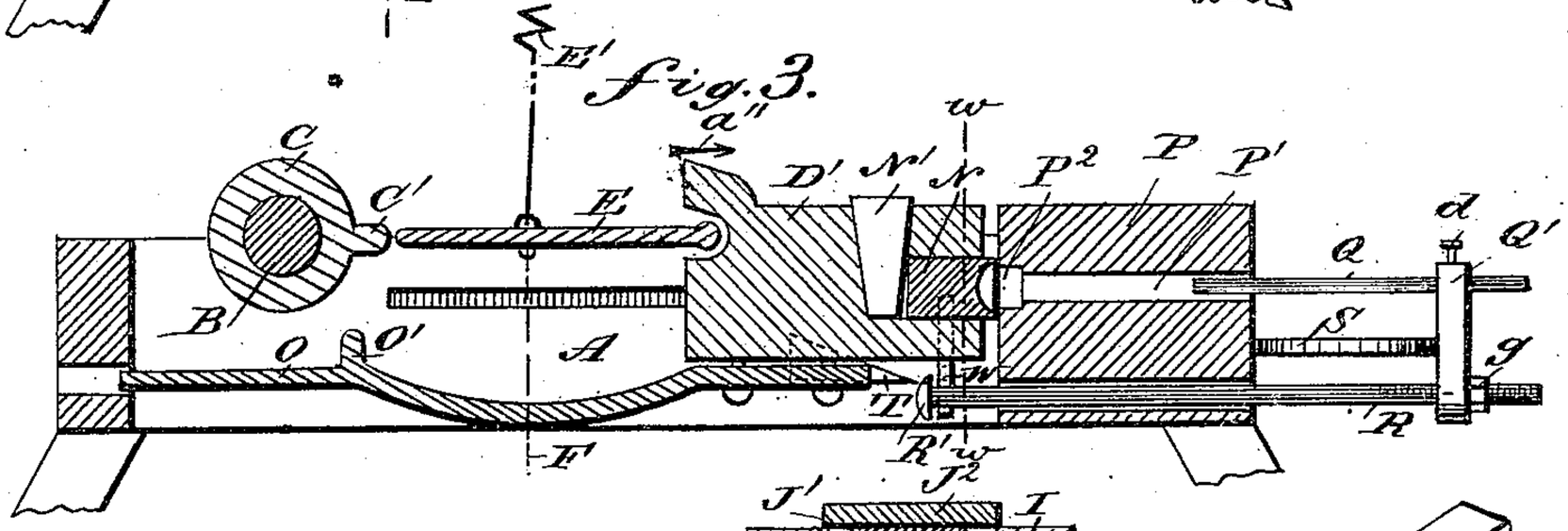
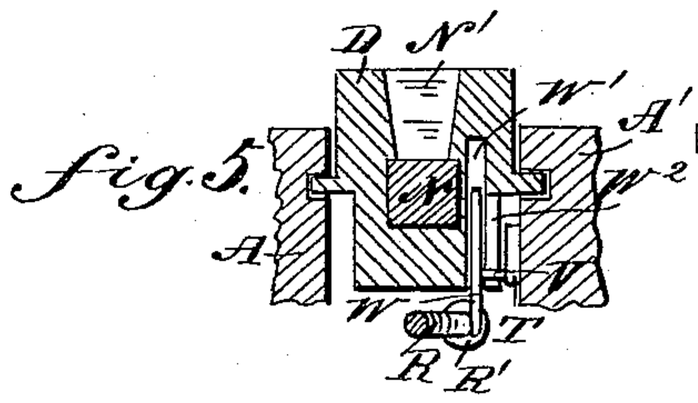


Fig. 5.



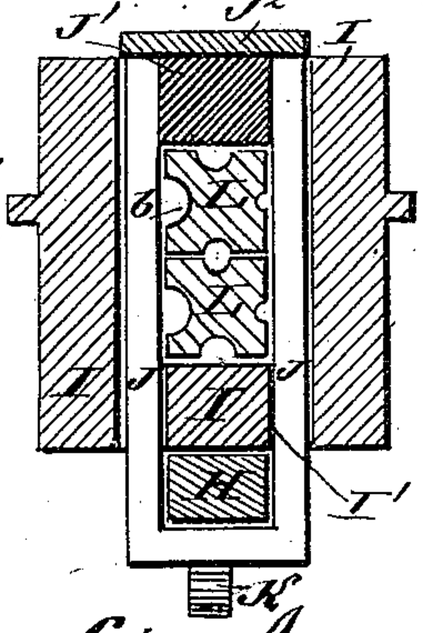


Fig. 6.

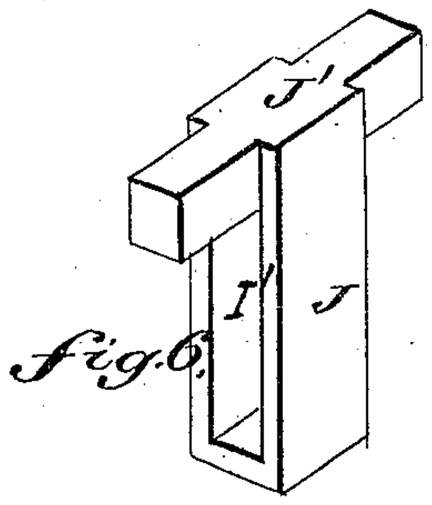


Fig. 7

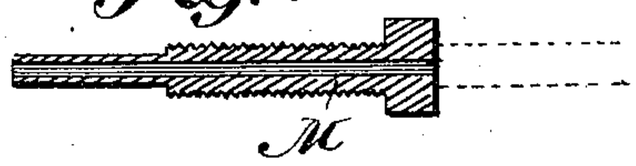


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN STACKER, OF WEST WINSTED, CONNECTICUT, ASSIGNOR TO THE WINSTED NORWAY BOLT COMPANY, OF SAME PLACE.

MACHINE FOR HEADING BOLTS.

SPECIFICATION forming part of Letters Patent No. 312,399, dated February 17, 1885.

Application filed February 9, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN STACKER, of West Winsted, in the county of Litchfield and State of Connecticut, have invented a new and Improved Machine for Making Bolts, of which the following is a full, clear, and exact description.

This invention relates to machines for making and heading carriage-bolts which are provided with a square part directly below the head.

The object of the invention is to facilitate the upsetting of the end of the wire or rod from which the bolt is made, and then forming the head and square part on the bolt, all in one heat.

The invention consists in a bolt-making machine provided with devices for upsetting the wires and devices for forming the head on the same, whereby the wires can be upset and the head formed on the same in one heat.

The invention further consists in devices for automatically pressing and pinching together the dies for holding the wire while the same is being upset, and in devices for separating the dies after the wire has been upset.

The invention further consists in a device for pushing the completed bolt out of the die after forming the head on the same, and in devices for withdrawing this pushing-rod after the bolt has been thrown out.

The invention further consists in devices for engaging the rod for pushing out the bolt, and in devices for automatically releasing the same after the bolt has been thrown out.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of my improved bolt-heading machine. Fig. 2 is a longitudinal sectional elevation of the same on the line *x x*, Fig. 1, showing one of the sliding or reciprocating die-holding carriages drawn from the fixed die-holding block. Fig. 3 is a longitudinal sectional elevation of the same on the line *y y*, Fig. 1, showing the other sliding die-holding carriage pressed against the other fixed die-holding block. Fig. 4 is a detail cross-sectional elevation of the machine on the line *z z*, Fig. 1. Fig. 5 is a cross-sectional elevation of the same on the line *w w*, Fig. 3. Fig. 6 is a detail perspective view of the frame holding the dies for upsetting the wire or rod. Fig. 7 is a longitudinal sectional elevation of the adjusting-screw in the open die for upsetting the bolts.

My improved machine is provided with two mechanisms—one for upsetting the wire or rod from which the bolt is to be made, and the other for forming the head and the square part below the head on the bolt after the same has been upset; and these two mechanisms will be described successively.

The frame A is provided with a longitudinal central rail, A′, which, with the side rails of the frame, form tracks for the sliding carriages holding the dies, these sliding carriages being provided with lateral guide-ridges entering horizontal grooves in the sides of the rails of the frame A. A transverse shaft, B, is journaled in one end of the frame A, and has mounted thereon at one end a combined fly-wheel and belt-pulley, B′, and between the rails of the frame A two collars, C, are rigidly mounted on the said shaft, each collar being provided with a tappet, C′, which is parallel with the shaft B, the tappets of the two collars C being one hundred and eighty degrees from each other—that is, they project in opposite directions. Both of the sliding die-holding carriages D and D′ are provided at their rear ends with a hinged wing, E, which wings are drawn upward by springs E′. Each wing E is connected by a separate cord or wire, F, with a separate treadle, F′ or F², which treadles are so located that their free ends project from the side of the machine near the rear end, at which the heated wire is first introduced into the machine, the cords or wires F being attached to these treadles between the fulcrums and the free ends of the treadles, so that when the treadles are depressed the cords or wires F and the wings E to which they are attached will be drawn downward. The sliding die-holding carriage D is provided in the end farthest from the shaft B with a horizontal opening adapted to receive the upsetting-die G, which is provided with a tapering end aperture. The sliding carriage D is provided

with a vertical aperture terminating in the inner end of the end aperture in the carriage D, which vertical aperture is adapted to receive a wedge, G′, for adjusting the position of the die G. A bar, H, is attached to the under side of the sliding carriage D, and is guided in the end of the frame A, so as to move longitudinally with the carriage D. The said bar H is provided with a transverse tappet, H′, and between this tappet and the carriage D it is curved downward, so that in case the wing E drops, its free end can descend so low that the tappet C′ will not strike and break the wing E. The fixed die-holding block I is provided with a recess, I′, adapted to receive a vertical frame, J, which is attached to a longitudinal head, J′, fitting in a recess in the top of the fixed block I and held down in the same by a plate, J², held at one end to the fixed block I. The lower end of the frame J projects below the fixed block I, and through this lower projecting part the end of the bar H passes, which bar H is provided in its under side with a beveled lug, *a*. A spring, K, attached to the frame A and to the bottom of the frame J, presses this frame J upward. Between the head J′ and the bottom of the recess I′ two dies, L, are held, which are provided in each side with a groove, *b*, so as to adapt these dies to be used for wires of different diameters. The gaging-rod M, part of which is threaded, projects from the end of the fixed block I into the longitudinal aperture formed by two grooves, *b*, and by means of the screw-thread on this rod M the same can be adjusted to project a greater or less distance into the aperture formed by the grooves *b*. A graduated scale, M′, projects from the rear end of the fixed block I, and by means of this graduated scale the position of the rod M within the aperture formed by the grooves *b* is shown, and the adjustment of this rod M is greatly facilitated. The sliding carriage D′ is provided in the end farthest from the shaft B with a recess adapted to receive the head-forming die N, which is provided in its outer end with a recess having the shape of the head desired, and the said sliding carriage D′ is also provided with a vertical aperture terminating in the inner end of the end recess of the sliding carriage D′, which vertical aperture is adapted to receive a wedge, N′, for adjusting the position of the die N. A bar, O, is attached to the under side of the sliding carriage D′, so that it can move longitudinally with this carriage, and the end of this bar is guided in the end of the frame A. The bar O is provided with a transverse tappet, O′, against which the tappet C′ of the corresponding collar C strikes to pull the sliding carriage D′ back. The fixed die-block P is provided with a longitudinal aperture, P′, in the inner end of which the die P² is held, which die is adapted to form the squared part of the bolt directly below the head. A rod, Q, enters the longitudinal aperture P′ at the outer end, and passes through an eye at the end of a vertical arm, Q′, in which it can be locked in the desired position by means of a screw, *d*, which vertical arm Q′ is held adjustably on a rod, R, passing longitudinally and loosely through the lower part of the fixed block P, on which rod the arm Q′ can be locked in the desired position by means of the nut *g*. The spring S is attached to the frame A, and has its free end attached to the arm Q′, whereby this arm Q′ will be pressed from the end of this frame A. The rod R is provided at its inner end with a rounded or beveled head, R′. A wedge-shaped plate, T, is attached to the side of the middle rail, A′, in such a manner that the point projects toward the inner end of the block P, and the lower edge of this wedge-shaped plate will be horizontal. A pin, W, is held vertically movable in a vertical recess, W′, of the sliding carriage D′, and the said pin W is provided with a short lateral arm, V, which projects from the side of the sliding carriage, and through a vertical slot, W², in the same in such a manner that the end of this lateral arm V can rest on the tapering plate T. The adjusting-screw M in the open die is provided with a longitudinal aperture, as shown in Fig. 7, and its outer end is connected with an air-forcing apparatus, so that air can be forced through the screw M into the open die, which wind removes the scale from the die, so that the sections of the open die can close perfectly together. Any suitable air-forcing apparatus can be used, and the wind can be admitted into the open die at suitable intervals by the attendant.

The operation is as follows: When the sliding carriage D has been withdrawn from the fixed block I, the heated rod or wire is passed into the aperture formed by two grooves, *b b*, of the dies L in such a manner that the heated end projects from the end of this aperture and the inner end of the heated wire rests against the end of the rod M, which has been previously adjusted according to the desired length of the bolt. The operator then depresses the treadle F′, thereby lowering the corresponding wing, E, which is struck by the corresponding tappet, C′, whereby the sliding carriage D will be moved in the direction of the arrow *a′* until the die G strikes the projecting heated end of the wire held between the dies L and upsets the same, forming a slightly-tapered head. The treadle is then released and the spring E′ draws the wing E upward. Before the die G strikes the projecting end of the wire, the beveled projection *a* will be forced into the lower projecting end of the box or frame J, and will draw the same downward, thereby firmly pressing the two dies L upon each other, so that the wire between the same will be held firmly when the die G strikes the end of the wire, and at the same time the spring K is compressed. Before the shaft B completes its revolution, the tappet C′ strikes the tappet H′ on the bar H, and thereby withdraws the sliding carriage D in the inverse direction of the arrow *a′*. The

beveled projection *a* will be moved out of the lower end of the box J, and the spring K will press the box or frame J upward, thereby releasing the dies and permitting the upset wire to be withdrawn from the same. The operator then seizes the heated wire by means of tongs and places it in the die P^2 and aperture P′ of the fixed blocks P, and then depresses the treadle F^2, so that the corresponding tappet, C′, strikes the corresponding wing, E, and forces the movable die-carriage D′ in the direction of the arrow *a″* until the die N strikes the upset end of the wire and forms the desired head. The treadle is then released and the wing E is drawn upward by the spring E′. During this movement of the carriage D′ the lateral arm V of the pin W passes from the beveled upper edge of the plate T, allowing the pin W to pass behind the head R′ of the rod R. Before the shaft B completes its revolution, the tappet C′ strikes against the tappet O of the bar O′ and withdraws the sliding carriage D′ in the inverse direction of the arrow *a″*. The pin W is held in the carriage D′, and said pin W catches on the head R′ of the rod R and draws this rod R in the inverse direction of the arrow *a″*. As the rod Q is connected with the rod R, the rod Q will move in the same direction and will push the completed bolt out of the aperture P′ and the die P^2. During the movement of the carriage D in the inverse direction of the arrow *a″*, the arm V slides up the edge of the plate T and is raised, and thereby the lower end of the pin W is raised above the upper edge of the head R, whereby the rod R will be released, and the spring S will immediately throw it back in the direction of the arrow *a″*, ready for the next bolt. The arm Q′ and the rod Q must be adjusted according to the length of the bolt, so that the bolt can be inserted into the aperture P′ as far as is necessary, and so that as soon as the rod Q moves in the inverse direction of the arrow *a″* it will immediately press against the inner end of the bolt and push this bolt out of the aperture P′. The completed bolt then drops into a suitable receptacle, and is then turned and finished in the usual manner. The bolt is thus upset and headed in two operations, but in one heat only. The dies L L, which hold the wire while the upset part is being formed, consist of two parts which are clamped together; but the upset part always remains outside of these dies. The die P′, which forms the squared part of the bolt directly below the head, is a solid die, and is not pinched together, whereby the squared part will always be true, and will be perfect in all bolts, and the radial seams on the under side of the head, which are formed if the bolts are headed in machines with pinched dies, are entirely avoided in the bolts made in my machine, and the under side of the head will have a perfect finish. The dies for receiving the bolts during the operations always remain stationary—that is, they are not moved vertically or laterally for receiving the bolt and raising it to be struck.

The machine only operates when the wings E are lowered, and thus the operator can regulate the machine as may be desired.

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

1. In a bolt-making machine, the fixed die-holding blocks, one block having bolt clamping or holding dies, and the other block having a square or angular ended aperture, in combination with the reciprocating or sliding die-holding carriages, one carriage having an upsetting-die and the other carriage having a heading-die, and the successively-actuated wings or cams acting upon the sliding or reciprocating die-holding carriages, substantially as and for the purpose set forth.

2. In a bolt-making machine, the fixed die-holding blocks, one block having bolt-clamping dies, and the other block having a square or angular ended aperture, in combination with the reciprocating or sliding carriages, one carriage having an upsetting-die and the other carriage having a heading-die, a sliding rod having a cross-head provided with a piston moving in the aperture of the heading-die, a pin pendent from one of the said carriages and acting upon said rod, and the successively-actuated wings or cams acting upon said carriages, substantially as and for the purpose set forth.

3. In a bolt-making machine, the combination, with a reciprocating carriage for holding the die for upsetting the wire, of a fixed die-holding block, two dies held therein, and a cam-slide actuated by the reciprocating die-carriage, and acting upon a clamp for pressing the dies together when the reciprocating die-holding carriage comes in contact with the fixed die-holding block, substantially as herein shown and described, and for the purpose set forth.

4. In a bolt-heading machine, the combination, with the reciprocating die-holding block D and the fixed die-holding block I, of the frame J, projecting vertically through and from the lower end of the fixed block I, the dies L within this frame, the bar H, attached to the bottom of the reciprocating die-holding carriage D, and the beveled projection *a* on the bar H, substantially as herein shown and described, and for the purpose set forth.

5. In a bolt-heading machine, the combination, with the reciprocating die-holding block D and the fixed die-holding block I, of the frame J, projecting vertically through and from the bottom of the fixed block I, the plate J^2, the dies L, held in the frame J′, the bar H, attached to the under side of the carriage D, and the beveled projection *a* on the bar H, substantially as herein shown and described, and for the purpose set forth.

6. In a bolt-heading machine, the combination, with the reciprocating die-holding carriage D and the fixed die-holding block I, of the frame J, projecting vertically through and from the bottom of the fixed block I, the plate

J², the dies L, held in the frame J, the bar H, attached to the under side of the carriage D, the beveled projection *a*, and a spring pressing the frame J upward, substantially as herein shown and described, and for the purpose set forth.

7. In a bolt-heading machine, the combination, with a reciprocating die-holding carriage and a fixed die-holding block, of a reciprocating rod for pushing the completed bolt out of the fixed die-holding block, and a projection or pin carried by said reciprocating die-holding carriage, and an arm acted upon by a fixed inclined plate or cam for releasing the said rod when the bolt has been pushed out, substantially as herein shown and described, and for the purpose set forth.

8. In a bolt-heading machine, the combination, with a reciprocating die-holding carriage and a fixed die-holding block, of a reciprocating rod for pushing the completed bolt out of the fixed die-holding block, a projection or pin carried by said reciprocating die-holding carriage, and an arm acted upon by a fixed inclined plate or cam for releasing the said rod when the bolt has been pushed out, and a spring for drawing back the said rod after it has been released, substantially as herein shown and described, and for the purpose set forth.

9. In a bolt-heading machine, the combination, with a reciprocating die-holding carriage and a fixed die-holding block, of a reciprocating rod for pushing the completed bolt out of the fixed die-holding block, a headed rod connected with a rod for pushing out the bolt, a vertically-movable pin in the reciprocating die-holding carriage, and a wedge-shaped track-plate attached to the frame of the machine, substantially as herein shown and described, and for the purpose of releasing the rod after pushing out the bolt, as set forth.

10. In a bolt-heading machine, the combination, with the reciprocating die-holding carriage D′ and the fixed die-holding block P, of the rod Q, projecting into an aperture, P′, in the block P, the rod R, having the head R′ and connected with the rod Q, the vertically-movable pin W in the reciprocating carriage D, the arm V, and the tapering guide-plate T, substantially as herein shown and described, and for the purpose set forth.

11. In a bolt-heading machine, the combination, with the reciprocating die-holding carriage D′ and the fixed die-holding block P, of the rod Q, entering the aperture P′ of the block P, the rod R, having the head R′, the arm Q′, connecting the rods Q and R, the vertically-movable pin W in the carriage D′, the tapering track-plate T, substantially as herein shown and described, and for the purpose set forth.

12. In a bolt-heading machine, the combination, with the reciprocating die-holding carriage D and the fixed die-holding block P, of the rod Q, entering the aperture P′ in the block P, the rod R, having the head R′, the arm Q′, held adjustably on the rods Q and R, the vertically-movable pin W in the block D, and the tapering track-plate T, substantially as herein shown and described, and for the purpose set forth.

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Witnesses:
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SIDNEY S. SUTTON.