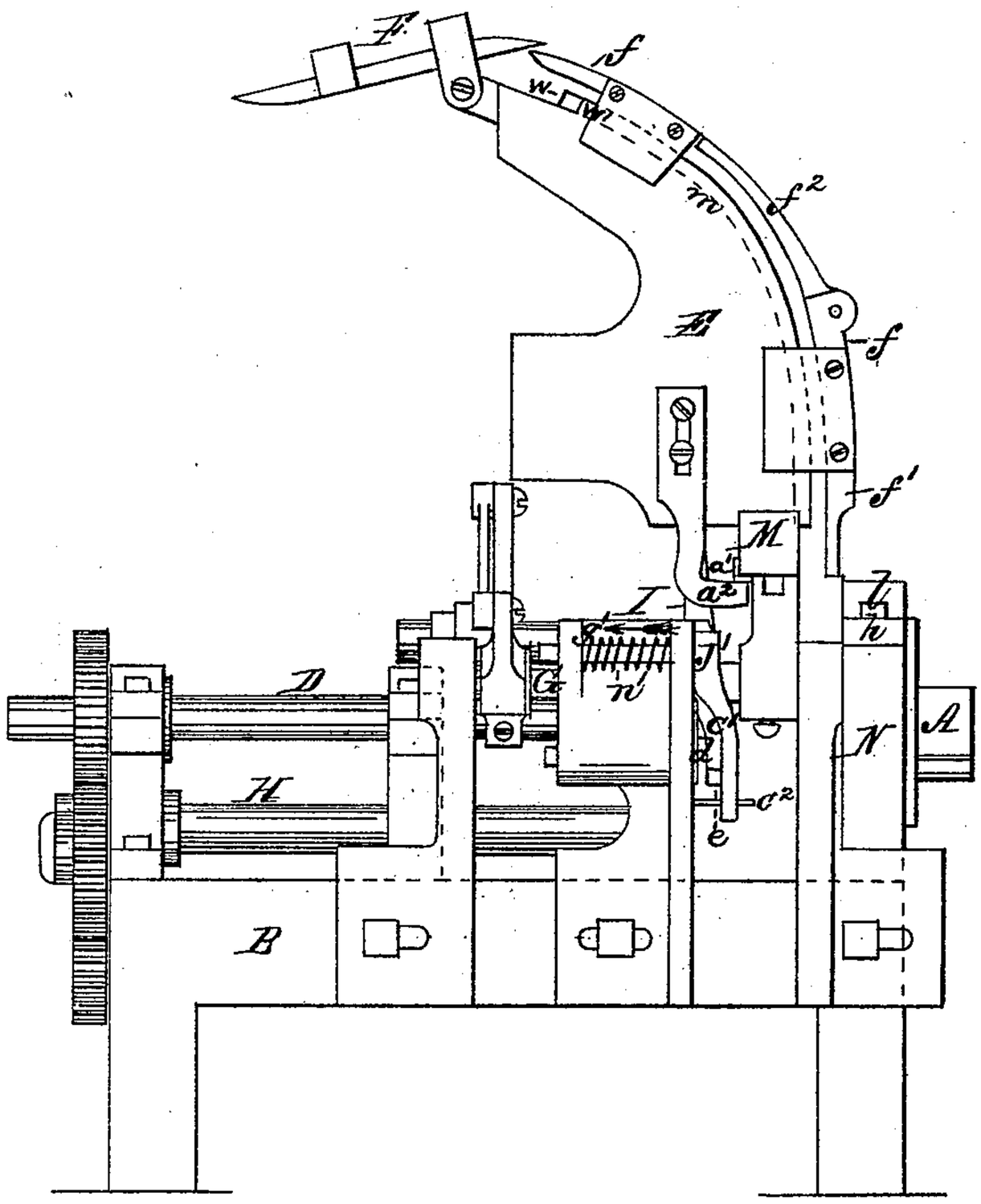
(Model.) 3 Sheets—Sheet 1.

S. L. WORSLEY.

MACHINE FOR FEEDING SCREW BLANKS.

No. 246,933. Patented Sept. 13, 1881.

Fig. 1.



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(Model.) 3 Sheets—Sheet 2.

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Fig. 2.

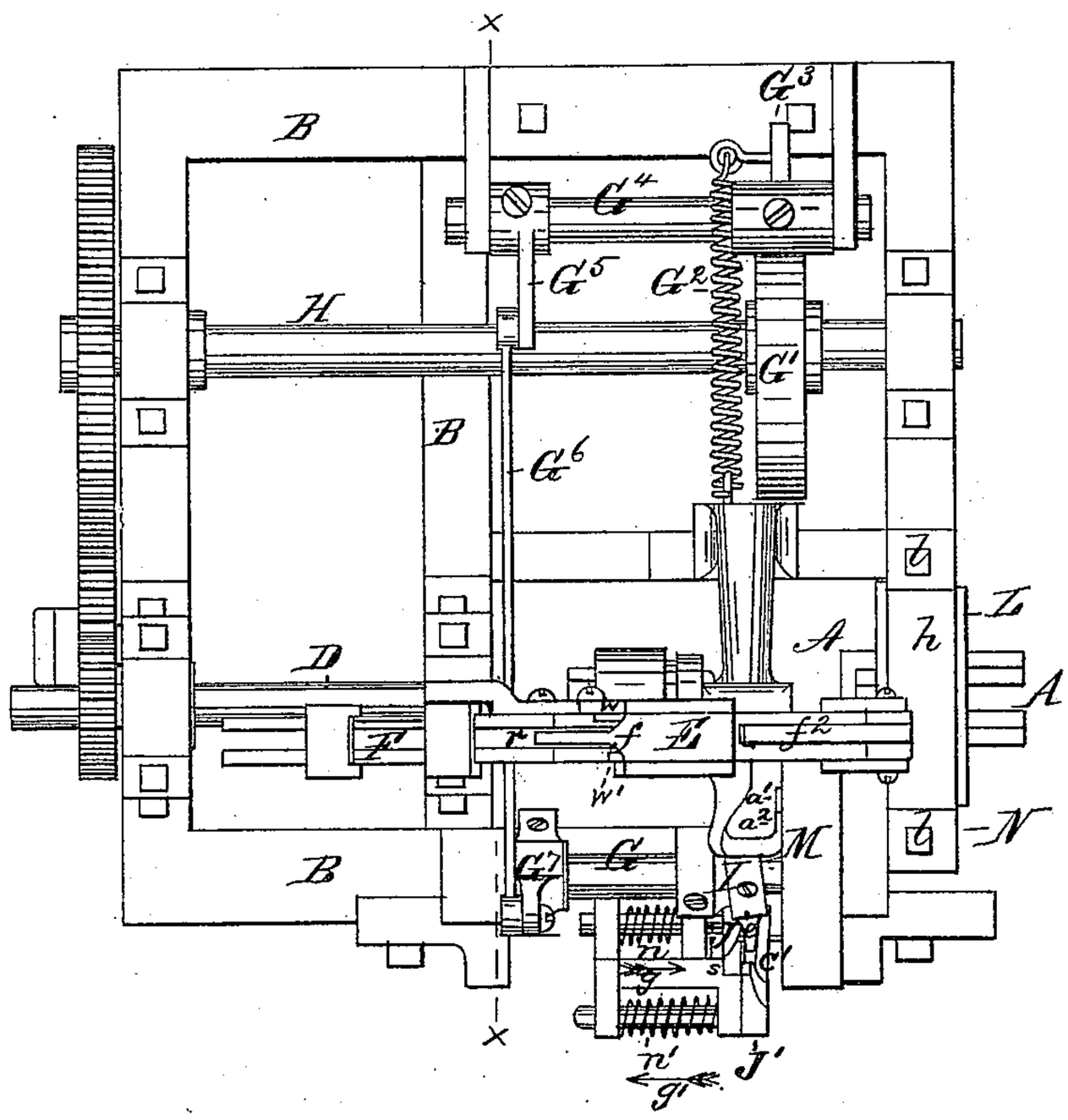

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Fig. 4.

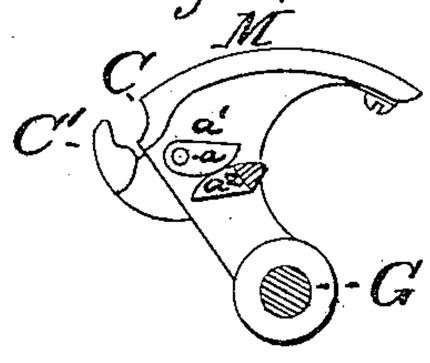


Fig. 5.

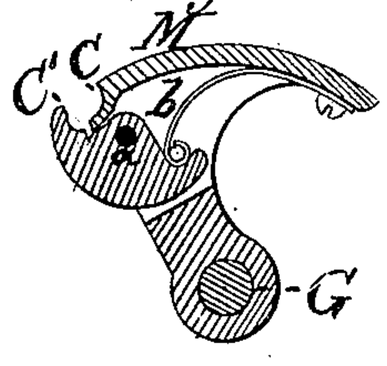


Fig. 9.

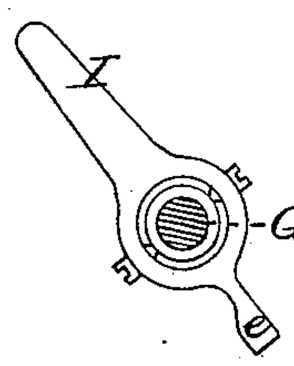


Fig. 6.

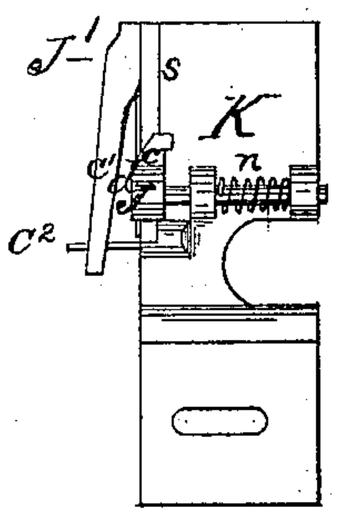


Fig. 3.

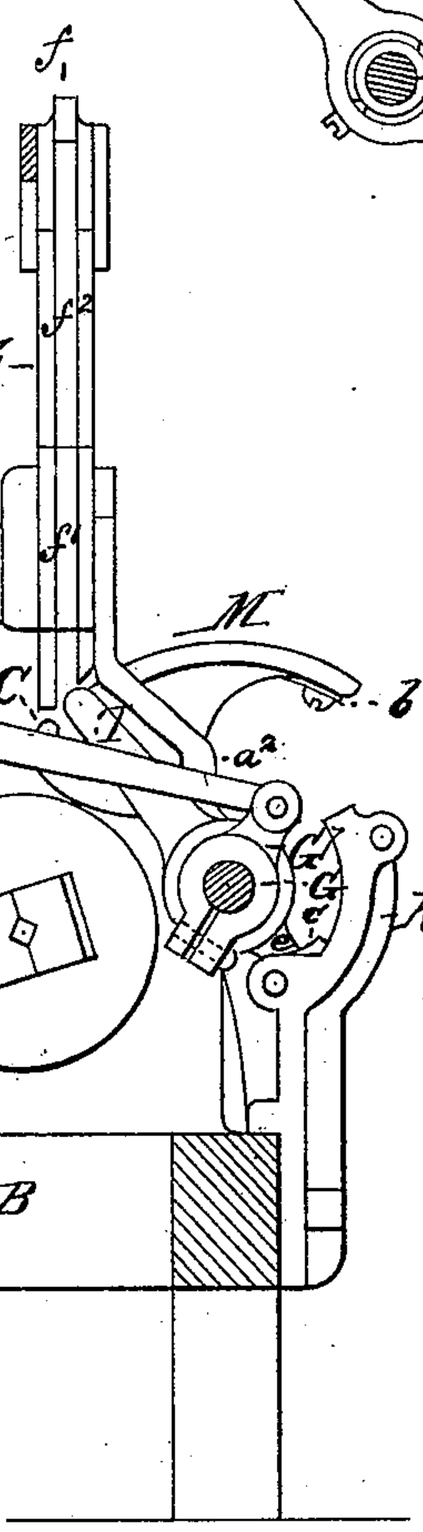


Fig. 8.

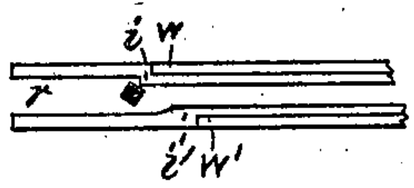
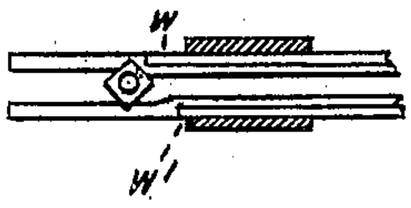


Fig. 7.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR FEEDING SCREW-BLANKS.

SPECIFICATION forming part of Letters Patent No. 246,933, dated September 13, 1881.

Application filed August 9, 1880. (Model.)

To all whom it may concern:

Be it known that I, SAMUEL LORD WORSLEY, of Buffalo, in the county of Erie and State of New York, have made an invention of certain new and useful Improvements in Machinery for Feeding Screw-Blanks; and I do hereby declare that the following, taken in connection with the accompanying drawings, is a full, clear, and exact description and specification of the same.

The object of the improvements which constitute the subject-matter of this patent is to feed screw-blanks, bolt-blanks, and similar articles to the mechanism for threading them or for performing other operations upon them; and the improvements consist of certain combinations of mechanical devices, which are set forth in detail in the claims at the close of this specification.

In order that the invention may be fully understood I have represented in the accompanying drawings and will proceed to describe portions of a machine for threading bolts with my improvements applied thereto in the best form in which I have embodied them at this date, it being understood that the said form may be varied as circumstances or the views of users render expedient, and that the combining mechanism, by which the members of the combinations are held in their proper operative relationship and have the proper movements imparted to those which move, may also be varied.

Figure 1 of said drawings represents a side view of said portions of the machine. Fig. 2 represents a plan of the same. Fig. 3 represents a transverse section at the line *x x* of Fig. 2. Figs. 4 to 9, inclusive, represent views of parts of the machine detached from the residue.

In the machine, parts of which are represented in the said drawings, the bolt-blank, during threading, is held firmly by a pair of jaws, A, which are supported by the main frame B, and which may be closed and opened at the proper times to grasp and release the bolt-blanks in succession by any suitable means. The die by which the screw-thread is cut upon the blank is carried by the mandrel D, which is supported in suitable boxes, and is constructed to revolve and also to move longitudinally. As, however, the mechanism for operating such griping-jaws and the die is well-known and constitutes no part of the improvements recited in the claims, and as a representation of it would make the drawings more complicated, it has not been deemed necessary to describe said mechanism.

The blanks to be fed to the jaws are held in an upright column in a magazine or blank-holder, E, into the upper end of which they may be inserted by hand, but to which it is preferred to supply them by an oscillating fork, F, that picks them out of a revolving hopper in the usual manner. The blank-holder E is composed of two side pieces, connected together at their upright edges, with the requisite space between them for the stem of the blanks, but so close together that the heads of the blanks ride upon the curved edges of said side pieces, which are indicated in Fig. 1 by the dotted lines *m*. This blank-holder is supported above the position of the jaws A for holding the bolt-blank during the operation to be performed upon it. In order that the blanks may be fed one at a time from the blank-holder to the jaws the traveling clamps C C′ are provided. These clamps consist of two members, one of which, C, called the "fixed clamp," is secured to the rock-shaft G, while the other, C′, called the "movable clamp," is constructed to move toward and from the first by having its shank pivoted to the body of said fixed clamp. The clamp rock-shaft G is caused to rock at the proper times by means of a cam, G′, and spring G^2, which operate antagonistically upon one arm, G^3, of a counter-shaft, G^4, and the reciprocating movement thus imparted to the said arm G^3 is transmitted to the clamp rock-shaft G by means of the counter rock-shaft G^4, its second arm, G^5, the connecting-rod G^6, and an arm G^7, projecting from the clamp rock-shaft.

The clamp-cam G′ is secured to and revolves with the usual cam-shaft H of the machine, and the action of this cam and the spring G^2 is to cause the clamps to oscillate, and thus travel from a position beneath the blank-holder to the position opposite the jaws A and back again, with intervals of rest between the operations. While the clamps are moving from the

position beneath the blank-holder to the jaws they hold the stem of the blank between them, and for this purpose the movable clamp C′ is pressed toward the fixed clamp C by means of a spring, *b*, Fig. 5, which operates upon the shank of the former. When the clamps are beneath the blank-holder they must be open to receive the stem of the blank, which drops from the blank-holder. In order that they may be opened for that purpose the pivot *a*, Fig. 4, of the movable clamp is fitted with an arm, *a′*, which, during the upward movement of the clamps by their rock-shaft G, is borne against a fixed cam, a^2, and is caused to rock the movable clamp away from the fixed clamp, thus leaving a space open between their faces to receive the stem of the blank. When, on the other hand, the clamps are moved downward from the blank-holder the said arm *a′* leaves the cam a^2, and the clamp-spring *b* causes the movable clamp to close upon the blank-stem, which is then carried downward by the simultaneous movement of the two clamps by their rock-shaft G.

The clamps above described have their adjacent faces (one or both) curved, so that they hold the blank from dropping between them. The clamps therefore not only move the blank, but they also support it (without the aid of any stationary device at its under side) while it is being moved or carried from the magazine or blank-holder to the jaws which receive it from the clamps.

As the clamps carry one blank away from blank-holder, it is important that the descent of the column of blanks in the blank-holder should be stopped until the clamps are returned in an upward direction to receive the lowest blank of the column. In order that such stoppage may be effected the movable cut-off M is provided. This cut-off has the form of a segment of the rim of a wheel which is concentric with the clamp rock-shaft G, and it moves with the movable clamp, of whose jaw, in the present case, the said cut-off is an extension, although it may be a separate piece. Hence, as the clamps pass from beneath the blank-holder the cut-off M follows them and cuts off and stops the downward movement of the column of bolt-blanks. As the clamps return in an upward direction the cut-off precedes them and passes from beneath the blank-holder as the clamps arrive there, whereupon the lowest blank drops into the space between the clamps.

When the clamps are in their lowest position opposite the jaws A, which hold the blank for the operation to be performed on it, it is expedient that the blank should be moved endwise through the clamps, so that its head may be received between the jaws. In order that this endwise movement may be effected the reciprocating blank-pusher I is provided. This blank-pusher has the form of a lever, perforated to fit loosely over a hub secured to the clamp rock-shaft G, and pivoted thereto, so that while the blank-pusher is carried to and fro with the clamps it is capable of being vibrated upon the clamp rock-shaft. The longer arm of this blank-pusher is arranged opposite to the end of the space between the clamps C C′, so that it may push endwise the blank held between them. The shorter arm or shank *e* of the blank-pusher is operated upon successively and in alternately opposite directions by two impellers, J J′, which, in this example, have the operation of pistons whose rods or shanks slide in bearings in a stock, K, and which are operated by springs *n n′*. In order that these impellers may act at the proper times, and also that the springs *n n′* may be strained for the purpose, a curved guide, *d*, is secured in such position relatively to the shank *e* of the blank-pusher that while the blank-pusher is rising with the clamps its shank is in contact with the side of said guide facing the impeller J′, and while the blank-pusher is descending its shank is in contact with the side of said guide facing the impeller J. The guide is shorter than the traverse of said shank, so that when the clamps reach their uppermost position the shank of the blank-pusher will be moved across the lower end of the guide *d* from one of its faces to the other, and when the clamps reach their lowest position the shank of the blank-pusher will be moved in the reverse direction across the upper end of the guide *d*. The guide thus prevents the movement of the blank-pusher except when it is at its uppermost and lowermost positions with the clamps or thereabouts. Each impeller J J′ is fitted with an inclined grade, on which the shank or short arm of the pusher operates. While the clamps and the blank-pusher are being raised the said shank is borne against the inclined grade *c* of the impeller J, thereby moving the impeller away from the adjacent face of the guide *d* and compressing or straining the impeller-spring *n*, and such straining continues until the shank passes by the lower end of the guide *d*, whereupon, the shank being no longer held by the guide, the force of the spring *n* is permitted to move the impeller J in the direction of the arrow *g*, Fig. 2, and the impeller vibrates the blank-pusher I, thereby removing its end from the vicinity of the clamps C C′ and out of the way of the end of the blank, which drops from the die-holder. While, on the other hand, the clamps and the blank-pusher are being depressed the shank of the latter bears against the inclined grade *c′* of the impeller J′, thereby moving the impeller away from the adjacent face of the guide *d* and compressing or straining the impeller-spring *n′*, and such straining continues until the shank passes by the upper end of the guide *d*, whereupon, the shank being no longer held by the guide, the force of the spring *n′* is permitted to move the impeller I in the direction of the arrow *g′*, Fig. 1, and the impeller vibrates the blank-pusher, thereby forcing its end against the end of the blank in the clamps and

pushing said blank endwise into the holding-jaws A.

As the spring n' of the impeller J′ should be strong, it is found convenient in practice to make the inclined grade c' long enough to act on the shank e during the whole downward movement of the clamps, and the lower end of the incline is fitted to move on a guide-pin, c^2, which holds the incline in place. The other spring, n, may be weaker, and the incline grade c may be shorter that the other; but in order that the shank e may not be accidentally misplaced before it reaches this shorter grade c the stock K of the impellers is constructed to form a guard, s, which is at one side of said shank during its descent. After the blank has been seized by the jaws the clamps, with the blank-pusher, are raised or returned, as previously described. At the commencement of this rise the movable clamp C′ may be beneath some portion of the blank; but as the movable clamp is pressed toward the fixed clamp by a spring, b, this spring permits the movable blank to turn on its pivot during the first rise of the fixed clamp and to disengage from the bolt-blank. As soon, however, as the movable clamp passes by the bolt-blank the spring restores the movable clamp to its proper position.

Bolt-blanks are frequently made with angular or square heads or with angular or square shoulders, or with both angular heads and shoulders; and it is expedient that such blanks should be so presented to the griping-jaws A that their squared portions are not deformed by the action of said jaws. For griping such blanks the jaws have angular grooves formed to fit the heads or the shoulders of the blanks, and the blanks must be arranged in the blank-holder with one side of their angular heads or shoulders parallel in direction with the inner faces of the sides of the blank-holder.

The blanks delivered by the oscillating fork F may have the sides of their heads or shoulders more or less diagonal or crosswise of the faces of the sides of the blank-holder, and such blanks require to be turned axially. To accomplish such turning of angular-headed blanks the curved edges of the side pieces of the magazine or blank-holder E are surmounted by two projections, w w', Figs. 1, 2, 6, 7, whose inner faces are far enough apart to permit a bolt-head, when properly placed, to pass freely between them, but will not permit a bolt-head to pass diagonally between them, one, w, of said projections being nearer than the other, w', to the place at which the fork F supplies the blanks. Hence a bolt-head which is supplied with its head diagonally will come in contact with the nearer projection, w, as shown at Fig. 7, and will thereby be caused to turn axially as it passes said projection until the head stands properly to pass between the two projections, after which the blank-head will pass to the clamps C C′ with its head properly set. To accomplish the corresponding turning of a round-headed blank having angular shoulders beneath the head, the first portion, r, Fig. 8, of the space between the sides of the magazine or blank-holder is made wide enough to receive such shoulders diagonally, this portion being separated from the residue by two projections, i i', one of which, i, is nearer than the other, i', to the place at which the oscillating fork F delivers the blanks, and the opposing faces of the said two projections being too close to permit a bolt-shoulder to pass between them diagonally. Hence, as the blanks move along the bolt-holder, any one which has its shoulders diagonally placed will have one of its angles obstructed by the projection i, which will cause that blank to turn axially while it moves along the blank-holder, and will set the blank properly. When the blanks are thus set properly the narrowness of the space between the two side pieces of the bolt-holder will hold them in the same axial positions until they are dropped into the clamps.

It is obvious that but one of the two projections w w' is essential to the axial turning of blanks; but it is expedient to have two, and also to continue both along the rims of the side pieces of the bolt-holder to its lower end. In order to hold the blanks endwise in their proper places the magazine or bolt-holder is fitted with fixed head-guards f and f', and also with a movable head-guard, f^2, which may be pressed against the blank-heads by a spring.

As the clamps C C′ are connected with the rock-shaft G they are caused to move in a curved path, and consequently the bolt is turned axially relatively to any fixed portion of the machine. The griping-jaws A should be so set as to have their angular grooves correspond with the positions of the angles of the heads or shoulders of the bolt-blanks when the clamps C C′ are opposite the said jaws. To facilitate such setting, and to enable the jaws to be readily adjusted, they are not pivoted directly to a fixed standard of the frame, but are connected with the frame through the intervention of a disk or large journal, L, to which they are pivoted. This jaw-journal is fitted to turn in a standard, N, which has the form of a pillow-block, whose cap h can be loosened or tightened by screws l l. Hence the jaw-journal L may be readily turned to adjust the jaws, and when adjusted may be securely clamped. The connection between the shanks of the jaws A and the mechanism which opens and closes them should, of course, be swiveling, to permit the jaws to be turned with their journal L.

In the above-described machine all the motions which are necessary to the feeding of the blank from the blank-holder to the griping jaws, including the cutting off of the descent of the column of blanks in the blank-holder, the descent of the column at the proper time, and the endwise movement of the blank into the griping-jaws, are derived from one cam, G′. The above-described mechanism, by which the results are accomplished, therefore admits of

great simplicity in the construction of the machine to which it is applied.

The griping-jaws to which the blank is delivered in the machine above described are stationary; but it is obvious that the jaws may be rotating jaws, and in such case it is better that their rotation should be stopped during the delivery of the blank to them. It is also obvious that the peculiarities of the blank-holder above described for turning the blank axially are not essential to operation of the traveling clamps and movable cut-off.

I claim as my invention—

1. The combination, substantially as before set forth, of the blank-holder, the traveling clamps, which both move and support the blanks, and the movable cut-off for the blank-holder.

2. The combination, substantially as before set forth, of the blank-holder, the traveling clamps, which both move and support the blanks, the movable cut-off, and the griping-jaws, to which the blank is presented by the traveling clamps.

3. The combination, substantially as before set forth, of the traveling clamps, which both move and support the blanks, the movable cut-off, and the blank-pusher.

4. The combination, substantially as before set forth, of the blank-holder, the traveling clamps, which both move and support the blanks, the cut-off, the blank-pusher, and the griping-jaws.

5. The combination, substantially as before set forth, of the traveling clamps, which both move and support the blanks, the cut-off, and the blank-pusher, with a single revolving cam.

6. The combination, substantially as before set forth, of the traveling clamps, which both move and support the blanks, the cut-off, and a fixed cam, which effects the opening of the movable clamp during its travel.

7. The combination, substantially as before set forth, of the blank-pusher, the guide thereof, the springs, and the impellers.

8. The combination, substantially as before set forth, of the blank-magazine with the projection, whereby the blank-head is operated upon and the blank caused to turn axially while in passage through such blank-magazine.

9. The combination, substantially as before set forth, of the blank-magazine with the projection, whereby the blank-shoulder is operated upon and the blank caused to turn axially while in passage through such blank-magazine.

In witness whereof I have hereto set my hand this 14th day of July, A. D. 1880.

SAMUEL LORD WORSLEY.

Witnesses:
A. B. SPRAGUE,
GEO. E. PLUMB.