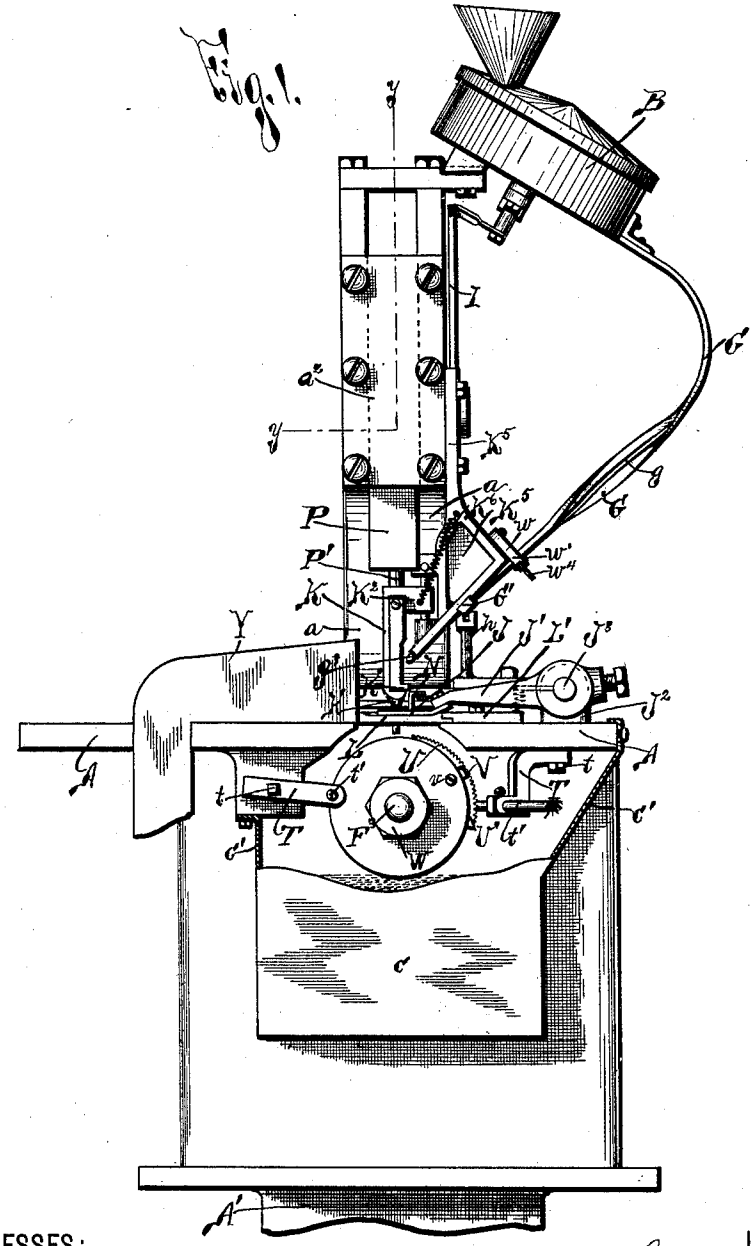
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J. L. THOMSON & J. J. UNBEHEND.

RIVET SLOTTING MACHINE.

No. 434,894. Patented Aug. 19, 1890.

Fig. 1.



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Fig. 2.

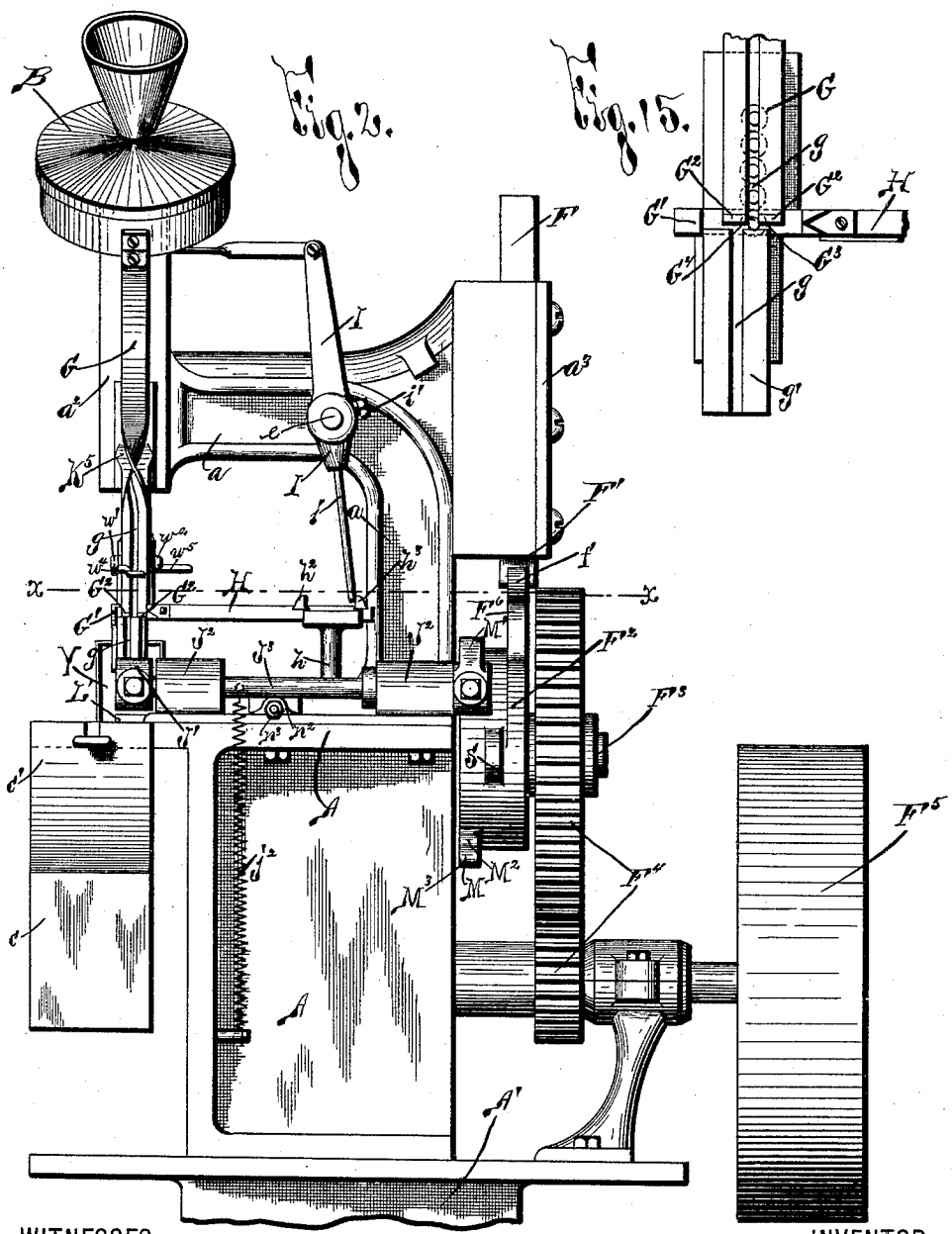


Fig. 15.

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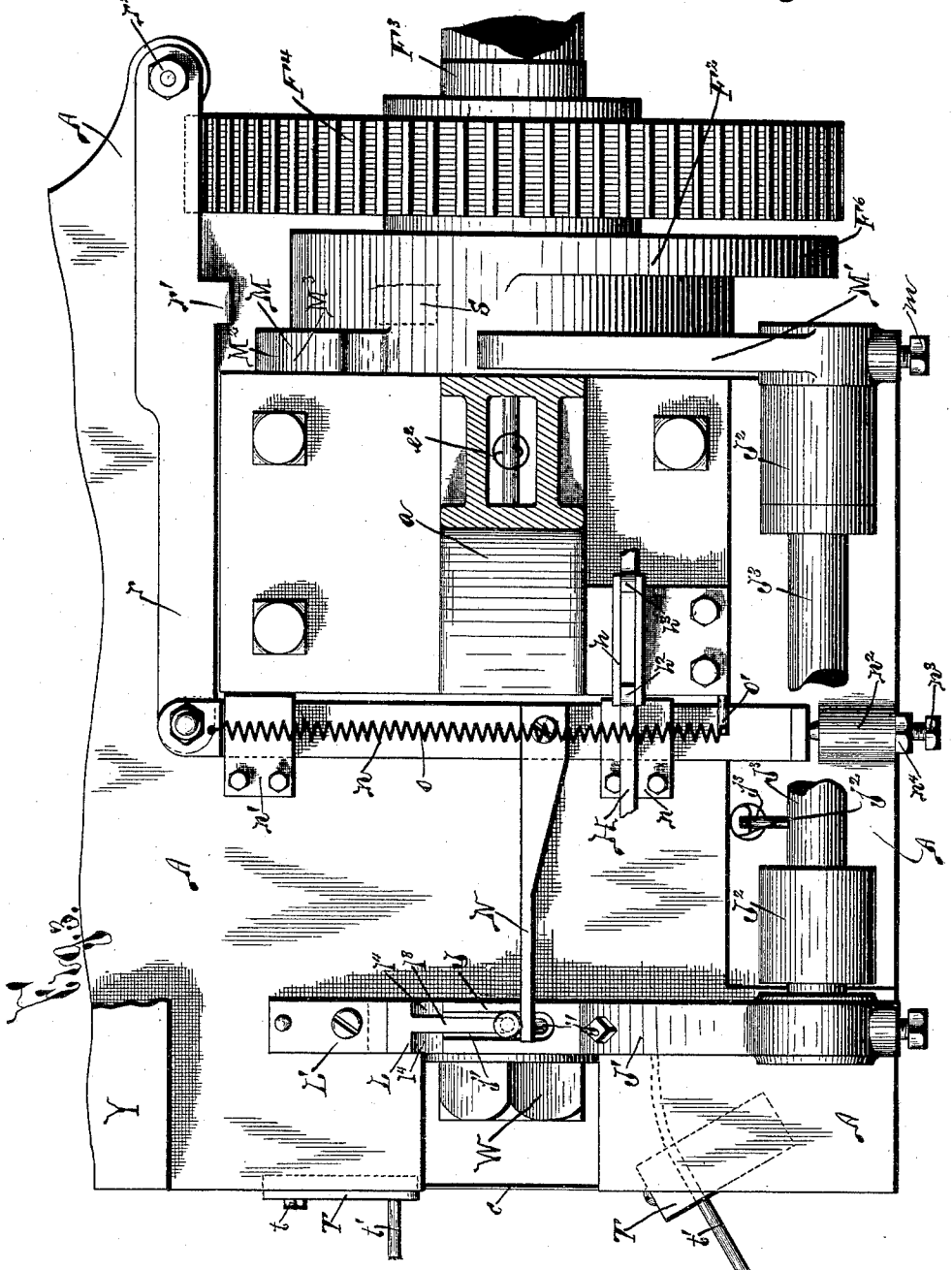
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(No Model.) 5 Sheets—Sheet 3.

J. L. THOMSON & J. J. UNBEHEND.

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No. 434,894. Patented Aug. 19, 1890.



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J. L. THOMSON & J. J. UNBEHEND.

RIVET SLOTTING MACHINE.

No. 434,894. Patented Aug. 19, 1890.

Fig. 4.

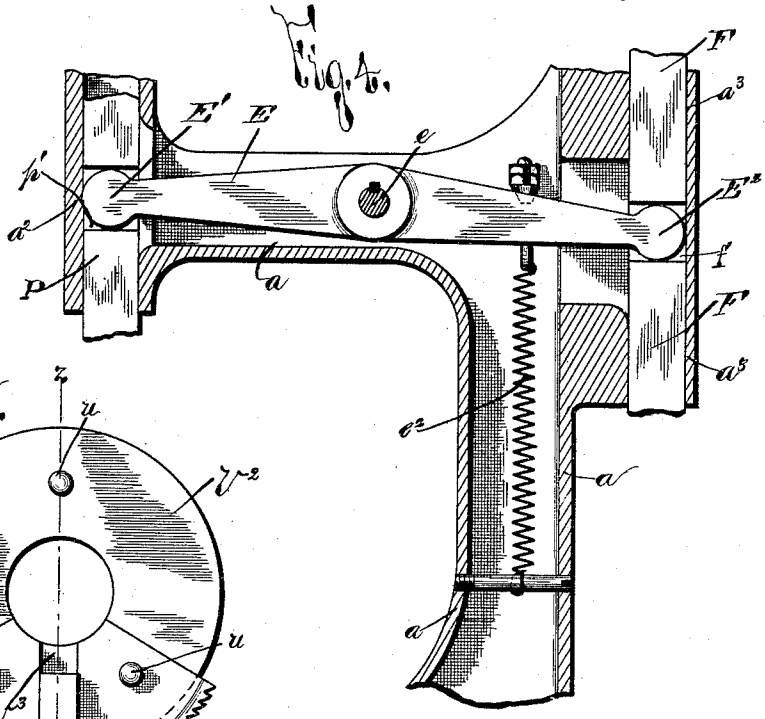


Fig. 5.

Fig. 6.

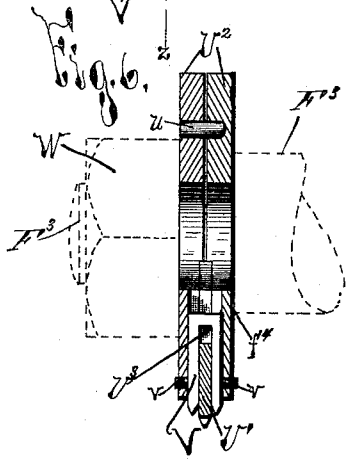


Fig. 7.

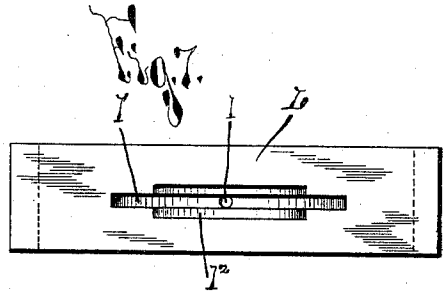
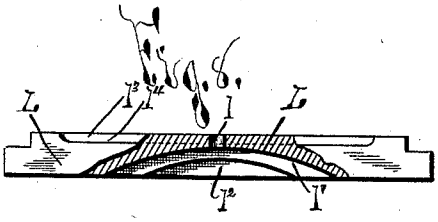


Fig. 8.



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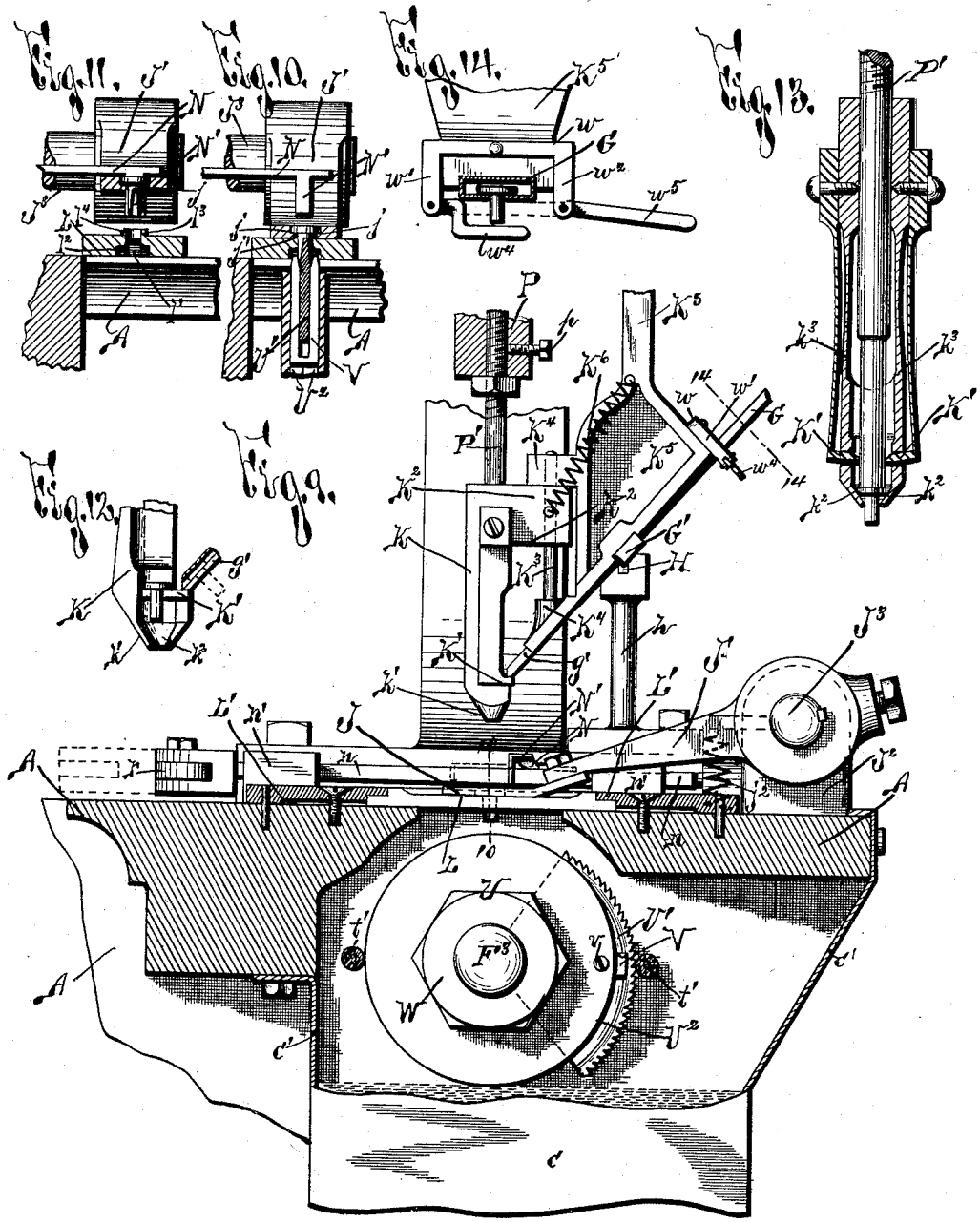
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UNITED STATES PATENT OFFICE.

JUDSON L. THOMSON AND JACOB J. UNBEHEND, OF SYRACUSE, NEW YORK, ASSIGNORS TO THE JUDSON L. THOMSON MANUFACTURING COMPANY, OF PORTLAND, MAINE.

RIVET-SLOTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 434,894, dated August 19, 1890.

Application filed December 31, 1888. Serial No. 295,043. (No model.)

To all whom it may concern:

Be it known that we, JUDSON L. THOMSON and JABOB J. UNBEHEND, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Rivet-Slotting Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

Our invention relates to an improved rivet-slotting machine, and has for its object the production of a simple and effective device which shall continuously and automatically feed the rivets or like articles to a cutter or broach, and shall discharge the same slotted or bifurcated to allow of their ready insertion when used, and the ready clinching or bending over of the bifurcated shank when the rivet is in the desired position.

To this end it consists, essentially, in a shaft to which is secured a cutter or broach, a feeder for continuously and automatically feeding the rivets to the cutter or broach, a die or other means for holding the same during the operation of the cutter or broach, and a discharge for discharging the rivet from the die into a suitable receptacle adjacent thereto after the shank of the rivet has been bifurcated by the broach.

It furthermore consists in the particular construction of cutter and the detail construction and arrangement of the parts, all as hereinafter more fully described, and pointed out in the claims.

In specifying our invention reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 is a front elevation of our machine, illustrating the relative construction and arrangement of the various parts thereof. Fig. 2 is a side elevation of Fig. 1, further illustrating the relative construction and arrangement of the parts. Fig. 3 is an enlarged horizontal section taken on line *x x*, Fig. 2, further illustrating the construction of the die for holding the rivet, the means for discharging the same therefrom, and the actuating-cams. Fig. 4 is an enlarged detached vertical section taken on line *y y*, Fig. 1, illustrating the manner of conveying motion to the plunger for inserting the rivets. Fig. 5 is an enlarged detached view of the broach for cutting the rivets and its carrying-collar secured to the shaft. Fig. 6 is an enlarged vertical section of the broach and collar, taken on line *z z*, Fig. 5, further illustrating the detail construction and arrangement of the same. Fig. 7 is an inverted plan view of the die for holding the rivet in the path of the cutter. Fig. 8 is an elevation of the same, partly in section, for the purpose of further illustrating the construction thereof. Fig. 9 is an enlarged detached view, partly in section, illustrating the conveyer for the rivets, the receiver for the same, through which is actuated the plunger-rod, the die for holding the rivets, the broach for cutting the same, and the discharge mechanism for discharging the rivet after the operation of the broach. Fig. 10 is an enlarged detached section taken on line 10 10, Fig. 9, illustrating the relative position of the parts illustrated in said Fig. 9, when the broach is cutting the rivet. Fig. 11 is a like enlarged section showing the rivet withdrawn from the die and on the point of being discharged by the discharge-finger. Fig. 12 is an elevation of the detached extremity of the receiver for the rivets and a portion of the conveyer, showing the interior of the split half of said receiver with a rivet in position therein in full lines, and a rivet shown in dotted lines in the conveyer in the position assumed by a rivet when being discharged into the receiver. Fig. 13 is an enlarged vertical section of the detached rivet-receiver, showing the rivet on the point of being discharged therefrom. Fig. 14 is an enlarged detached view of the conveyer and its supporting-bracket, taken on line 14 14, Fig. 9, illustrating the gages secured to said conveyer; and Fig. 15 is an enlarged detached view of the discharge end of the conveyer and a detached portion of the cut-off, illustrating the detail construction and arrangement of said parts.

A represents the frame of our machine, of any suitable size and form, mounted upon

any desirable brackets or standards A′, supporting the various parts of the machine—viz., a hopper B, a conveyer G, a receiver K, a die L, a plunger P, a fork J, a discharge-finger N, a cutter U, and the actuating mechanism for operating the various parts.

The hopper B may be of the construction described and claimed in our joint patent, No. 363,921, dated May 31, 1887, in which the rivets are fed continuously and automatically to the conveyer G with their shank downward, or, if desired, it may be of the kind described and claimed in the application of Jacob J. Unbehend, of even date herewith; but for the purpose of specifying our present invention it is unnecessary to describe the detail construction and arrangement of the hopper whereby the rivets are fed, as previously stated, except to say that it is suitably connected to the actuating mechanism of the machine.

When, as illustrated, a hopper is used which feeds the rivets shank downward, it will be observed from the peculiar construction and arrangement of our device that the conveyer G must be twisted in order that the rivet shall be shank downward when discharged into the receiver K, while when a hopper is used which discharges the rivets therefrom with their shank upward there is no necessity for twisting the conveyer G. The rivet is conducted from the hopper B to the receiver K by the conveyer G, which discharges the same from the end g' into the receiver in the position illustrated in Fig. 12, supported by yielding or spring-actuated shoulders K′ projecting therein. Guided through the receiver K is the plunger-rod P′, mounted on the plunger P, adjustable thereto, preferably with its upper end threaded and engaging like threads in the plunger P and secured thereto by the set-screw p. Provided on a bracket a, mounted upon the main frame A, is the guideway a^2, through which reciprocates the plunger P, provided with a slot p', in which is mounted the rounded end E′ of a lever or walking-beam E, having the pivotal pins e secured thereto and journaled in the bracket a. The opposite rounded extremity E^2 of this lever is mounted in a like slot f in a plunger F, reciprocating in a guideway a^3, also secured to said bracket a.

The lower end F′ of the sliding-rod F is provided with a roller f', which by means of a spring e^2, suitably connected to the pivoted lever E, is constantly contacted with a cam F^2, mounted upon the shaft F^3, to which motion is conveyed by suitable gearing F^4, connected to the driving-pulley F^5, actuated by any desirable mechanism. When the shaft F^3 is rotated, the cam-tooth F^6 of the cam F^2 contacts with the roller f', forcing the sliding rod F upward, elevating the extremity E^2 of the pivoted lever E and depressing the extremity E′ of said lever, thus forcing the plunger-rod P′ through the receiver upon the rivet previously inserted by the conveyer G.

For the purpose of inserting the rivets one by one at the desired time into the receiver K we interpose in the conveyer G a cut-off G′, illustrated in Fig. 15, and described and claimed in the application of Jacob J. Unbehend, (Case A,) of even date herewith. It will be seen by reference to Fig. 15 that the feeding-slot g is set off on either side of the cut-off G′, and that lugs G^2 are interposed in the conveyer G in a slot G^3, provided therein. The cut-off G′ is actuated by a rod H, supported in a standard h, secured upon the main frame A. Provided upon said sliding rod H are shoulders h^2 h^3, between which shoulders we provide the spring-rod i, supported in the pivoted lever I, secured by a set-screw i' to the pivot e of the lever E. Thus it will be seen that as the pivotal lever E is rocked and its forward extremity E′ forces downward the plunger-rod P′ through the receiver K the lever I, secured by the set-screw i to the pivot e of said pivoted lever E, is also rocked, and the spring-rod i contacts with the rear shoulder h^3, blocking the discharge of the rivets into the receiver and registering the slot G^4 between the shoulders G^2 of the cut-off with the slot in the upper part of the conveyer G, allowing the entrance of a rivet between said shoulders. When, after the passage of the cam-tooth F^6, the said lever is retracted with its end E^2 forced downward by means of the spring e^2, secured to said lever, the pivoted lever I is again rocked and the rod i secured thereto contacts with the forward shoulder h^2, secured upon the rod H, blocking the further feeding of the rivets into the cut-off, and registering the rivet now in the slot G^4 with the slot g of the discharge end g' of the conveyer, down which slot the rivet slides, and is thereby conducted into the receiver immediately upon the withdrawal of the plunger. Thus it will be seen that when the plunger-rod is discharging a rivet from the receiver the rivets in the upper part of the conveyer are blocked from entrance into said receiver, and that immediately upon the withdrawal of the plunger at every operation thereof the cut-off is actuated to feed a single rivet down the discharge end g' of the conveyer G, thus automatically feeding the rivets one by one to the receiver K previous to every operation of the plunger.

Directly beneath the discharge k' of the receiver K is the holder or die L, secured to the frame A by the plates L′, and provided with an aperture l, into which the rivet is inserted by the plunger-rod P′, which securely holds the rivet in the aperture l during the operation of the cutter in bifurcating the rivet-shank, as shown in Fig. 10.

In order to readily discharge the rivets from the die L, we provide the discharge mechanism presently described, and, as shown in Fig. 9, we support the discharge end k' of the receiver considerably above the die L, thus allowing of the operation of the discharge mechanism.

The receiver K is provided with an extending arm K^2, mounted upon a rod K^3, secured in hubs K^4, provided upon a supporting-bracket K^5, secured to the bracket *a*. After a rivet has been inserted into the receiver K it is caught by the spring-shoulders K′, and when the plunger-rod P′ is forced downward by its actuating mechanism, as previously described, the spring-shoulders K′ are forced apart, and the rivet is driven down until its head is contacted with the shoulders or jaws k^2 in the discharge end *k*′ of the receiver. When the rivet-head is contacted with said shoulders k^2, the receiver is forced downward upon its guide-rod K^3 against the action of the spring K^6, retaining the same in its normal position, thus approximating the rivet to the die L. After the receiver has reached the limit of its motion, by reason of the contact of the lower face of the extension K′ with the lower hub K^4 of the supporting-bracket K^5, the separate sides k^3 of the receiver, formed by a vertical slot or slit extending upwardly from the discharge *k*′, are forced apart, allowing the passage of the rivet-head and the plunger-rod P′.

Directly beneath the die L is the cutter U, which is actuated to bifurcate the shank of the rivet while the same is being held in the die by means of the plunger-rod P′, as shown in Fig. 10. The cutter U consists of a broach U′, interposed between two like collars U^2, mounted on the shaft F^3, and secured thereto by means of the nut W, impinging said collars against a shoulder f^4, provided upon said shaft, and shown in dotted lines in Fig. 6. The broach U′ is secured to these collars U^2 by dowel-pins *u*, and is preferably cam-shaped or eccentrical to said collars U^2, being formed with the cutting extremities of its teeth projecting one beyond the other and movable in planes one beyond the other, whereby its forward end only takes a small cut out of the rivet, and as the broach is rotated the cut is deepened until the rear end of the broach is reached, when the cut is of sufficient depth. By this peculiar form of cutter I enable the rivet to be easily cut without much strain upon either the rivet or the broach.

On either side of the broach for bifurcating the rivet we provide the cutter V, mounted in a slot U^3, provided, preferably, in the center of said broach. The cutter V, on the outside of the broach U′, bevels the outer face of the bifurcated extremities of the rivet-shank, and is secured to the broach by means of set-screws *v*, passing through the collars U^2 and bearing upon said cutter. In order to allow the broach U′ and cutter V to operate upon the rivet, it is necessary to provide slots *l*′ l^2 in the bottom face of the die, as illustrated in Figs. 7 and 8.

Mounted upon the frame A are brackets T, secured to said frame by bolts *t* or other suitable means, and carrying-brushes *t*′, the forward ends of which brushes are held in the path of the rotating cutter and serve to clean the same before a rivet is cut, thus preventing the clogging of the cutters by reason of accumulated cuttings.

To further insure the ready operation of the cutters, we secure beneath the same a can or other receptacle *c*, containing oil, through which the cutters are passed with every rotation thereof, which oil-receptacle is held in the desired position by means of a suitable bracket *c*′ bolted or secured to the main frame.

Mounted upon a cross-shaft J^3, secured in suitable bearings J^2 upon the main frame, is an arm J′, carrying at its forward extremity a fork J, normally lying on either side of the rib l^3, formed by the cut-out l^4 on the top face of the die L. When the rivet is forced into the die L by the action of the plunger-rod P′ and the receiver K, the head of the rivet will rest upon shoulders *j* on either side of the opening *j*′ of said fork. After the broach has bifurcated the rivet, a cam M, secured upon the shaft F^3, contacts with a pivoted lever M′, secured to the shaft J^3 by the set-screw *m*, forcing upward the free extremity of said lever M′, rocking the shaft J^3, and elevating the fork J, secured on the free extremity of the pivoted lever J′, thus carrying the rivet upward and out of engagement with the die by reason of the engagement of the rivet-head with the shoulders *j* of the fork, as illustrated in Fig. 11 of the drawings. A discharge-finger N is normally held above the fork J, with a depending projection N′, held over the opening *j*′ of the fork and just back of the rivet-head. This finger is secured at one extremity to a sliding bar *n*, arranged transversely of the frame A at right angles to the shaft F^3. This sliding rod *n* is guided in ways *n*′, secured to the main frame A. A spring *o*, secured at one extremity to the sliding bar *n* and at its opposite extremity to a post *o*′, rigidly secured to the table, retains this bar in its normal position with the depending projection N′ of the discharge-finger N just back of the rivet-head.

Pivoted to the sliding bar *n* is a bar *r*, which projects at right angles therefrom in a line parallel with the shaft F^3, and is pivoted to the frame A at r^2. Provided upon the swinging bar *r* is the face *r*′, which is engaged by a cam S, secured to the shaft F^3. The cam S is so timed in relation to the cam M that when, as previously described, the said cam M has elevated the rivet clear of the die immediately the cam S contacts with the face *r*′ of the rod *r*, rocking the same on the pivot r^2 and forcing the sliding rod *n* against the action of its spring *o*. The depending projection N′ of the discharge-finger N is of slightly-less width than the width of the opening *j*′ in the fork J, and when, as previously described, the said fork is elevated, said depending projection N′ is forced into the opening *j*′ by the elevation of the fork J, and when the discharge-finger is actuated by the cam S it will be seen that this projection N′ has a bearing against the rivet just back of the same, and readily

discharges it into any suitable receptacle Y adjacent to said finger. After the elevation of the discharge-fork by the incline M^2 of the cam M the fork J is held up during the operation of the discharge-finger N by means of a concentric face M^3, starting from the hightest point of the incline M^2. This concentric face M^3 is only of sufficient length to retain the fork in its elevated position during the discharge of the finger N, and after such discharge passes by the pivoted lever M′, and the fork is retracted to its normal position by means of a spring j^2, secured to a pin j^3, provided on its actuating-shaft J^3. The rivet-discharge end of the discharge-finger N is considerably removed from the opposite end of said finger, which is secured to the sliding rod n, and we so relatively arrange said discharge-finger with the fork J that when elevating the rivet for the purpose of discharging the same the fork slightly elevates the discharge-finger N, which is of spring metal, thus slightly tensioning the same and further insuring the positive discharge of the rivets from said fork. After the discharge of the rivet the discharge-finger is immediately retracted by the spring o, whereupon the parts are in the desired position for the insertion of another rivet by means of the plunger-rod P′ and the receiver K.

Provided on the main frame A is a hub n^2, having a screw n^3 mounted therein and in alignment with the sliding rod n, allowing the movement of the sliding rod n to be adjustable by means of said screw or bolt n^3, in which position the said screw is retained by a jam-nut n^4.

Upon the bracket K^5 we provide the plate w, having arms w' w^2 projecting laterally therefrom on either side of the conveyer G. Pivoted in the arm w' is the lever w^4, projecting over the slot g of the conveyer G, with its inner edge sufficiently removed from said slot to allow the passage of rivets of the desired size to be operated in our machine. If a rivet larger than desired should be fed down the conveyer G, it will be seen that the broach U would be unduly strained when cutting the same, and there would be a liability of breaking the die or injuring the broach. By means of this stop w^4 we prevent the passage to said broach of any rivet the shank of which is longer than the regular rivet, thus stopping the further feeding of the same until the rivet is removed. On the opposite arm w^2 of the plate w we hinge a rod or bar w^5, which is normally swung out, as illustrated in Fig. 14, but which when it is desired to stop the feeding of the rivets is swung into the position illustrated by dotted lines in said figure, effectually stopping the feeding of the rivets until the withdrawal of said arm.

Upon reference to the drawings and the foregoing description it will be readily understood that the feeder consists of the hopper B, the conveyer G, the receiver K, and the plunger P, that the holder consists of the die L, and the discharge of the finger N.

The operation of our machine is as follows: The rivets are forced into the conveyer by the hopper, the cut-off feeds a single rivet down the discharge end of the conveyer into the receiver, the plunger forces the rivet through the receiver into the die, the cutter bifurcates the rivet-shank, the fork elevates the rivet out of engagement with the die, and the discharge-finger discharges the rivet from the fork into a suitable receptacle adjacent to said fork.

It will be understood that considerable change may be made in the relative construction and arrangement of the various parts of our machine, and that other constructions may be used for feeding the rivets to the die and for discharging the same therefrom; hence we do not limit ourselves to the precise form and construction of the different parts of our improved rivet-slotting machine.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a rivet-slotting machine, the combination of a holder or die for holding the rivet, and a cutter for slotting the rivet, said cutter being provided with cutting-teeth having their cutting extremities projecting one beyond the other, whereby the slot is gradually deepened, substantially as and for the purpose set forth.

2. In a rivet-slotting machine, the combination of a holder or die for holding the rivet, and a cutter for slotting the rivet, said cutter being provided with inclining teeth having their cutting extremities projecting one beyond the other, whereby the slot is gradually deepened, substantially as and for the purpose described.

3. In a rivet-slotting machine, the combination of a holder for holding the rivets, a feeder for feeding the rivets consecutively to the holder, a cutter for slotting the rivet, and cutting-teeth provided upon said cutter and having their cutting extremities projecting one beyond the other, whereby the rivet is slotted gradually, substantially as and for the purpose set forth.

4. In a rivet-slotting machine, the combination of a holder for holding the rivets, a feeder for feeding the rivets consecutively to the holder, a cutter for bifurcating the rivet-shank, and a discharge normally above the holder and movable therefrom for discharging the rivet, substantially as and for the purpose specified.

5. In a rivet-slotting machine, the combination of a holder or die for holding the rivet, a plunger for feeding the rivet to said die, a cutter for slotting the rivet, and a discharge for discharging the slotted rivet, substantially as and for the purpose set forth.

6. In a rivet-slotting machine, the combination of a receiver for the rivets, a conveyer for feeding the rivets to the receiver, a cut-off for admitting but one rivet at a time, a die for holding the rivets, and a cutter for

slotting the rivets, said cutter having teeth formed with their cutting extremities projecting one beyond the other, whereby the rivet is slotted gradually, substantially as set forth.

7. In a rivet-slotting machine, the combination, with a conveyer for feeding the rivets, of a receiver for receiving the rivets, a conveyer for admitting but one rivet at a time to the receiver, a reciprocating plunger, a cutter for slotting the rivets, and cutting-teeth provided upon said cutter and formed with their cutting extremities projecting one above the other, whereby the rivet is slotted gradually, substantially as described.

8. The combination, in a rivet-slotting machine, of a receiver for the rivets, a conveyer for conducting the rivets to the receiver, a cut-off for feeding the rivets at regular intervals, a plunger reciprocating through said receiver, a holder for holding the rivets, and a cutter for slotting the rivets, said cutter having cutting-teeth formed with their cutting extremities projecting one above the other, whereby the rivet is slotted gradually, substantially as described.

9. In a rivet-slotting machine, the combination of a reciprocating plunger, a receiver for the rivets, said receiver having a movement in line with the plunger, a holder for holding the rivets, and a broach for slotting the same, substantially as specified.

10. In a rivet-slotting machine, the combination of a die for holding the rivets, a receiver for the rivets having a movement toward and away from the die, a discharge for discharging the rivets from the receiver into the die, and a cutter for slotting the rivets, substantially as and for the purpose set forth.

11. The combination, with a feeder for feeding the rivets, of a holder for holding the rivets, and a pivoted cutter having a series of cutting-teeth arranged with their cutting extremities projecting one beyond the other, substantially as and for the purpose described.

12. In a rivet-slotting machine, the combination of a cutter for slotting the rivets, a holder for holding the rivets, and a feeder for feeding the rivets to the holder, with a fork for engaging the rivet after the operation of the cutter and disengaging the same from said holder, and a discharge-finger for removing the rivet from said fork, substantially as and for the purpose specified.

13. The combination of a holder or die for holding the rivets, a feeder for feeding the rivets to the die, a cutter having the cutting extremities of its teeth projecting one beyond the other for bifurcating the rivets, and cutters on either side of the former cutter for beveling the edge of the bifurcated shank, substantially as described.

14. The combination of a holder for holding the rivet-shank, a cutter for cutting the rivets, an adjustable plunger for inserting the rivet to said holder, and a discharge for discharging the rivet after the operation of the cutter, substantially as specified.

15. The combination of a die having a rib for holding the rivet and a fork at one side of said rib, with a cutter for slotting the rivet, and a discharge-finger for discharging the rivet from said fork, substantially as and for the purpose set forth.

16. In a rivet-slotting machine, the combination of a die for holding the rivet, a recess in the upper face of the die, a discharge movably mounted in said recess for removing the rivet from the die, a recess in the lower face of the die, and a cutter having teeth movable in said lower recess, substantially as described.

In testimony whereof we have hereunto signed our names, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 26th day of December, 1888.

JUDSON L. THOMSON.
JACOB J. UNBEHEND.

Witnesses:
CLARK H. NORTON,
A. E. PARSONS.