(No Model.)

5 Sheets—Sheet 1.

J. J. UNBEHEND.

RIVETING MACHINE.

No. 436,447. Patented Sept. 16, 1890.

Fig. 1.

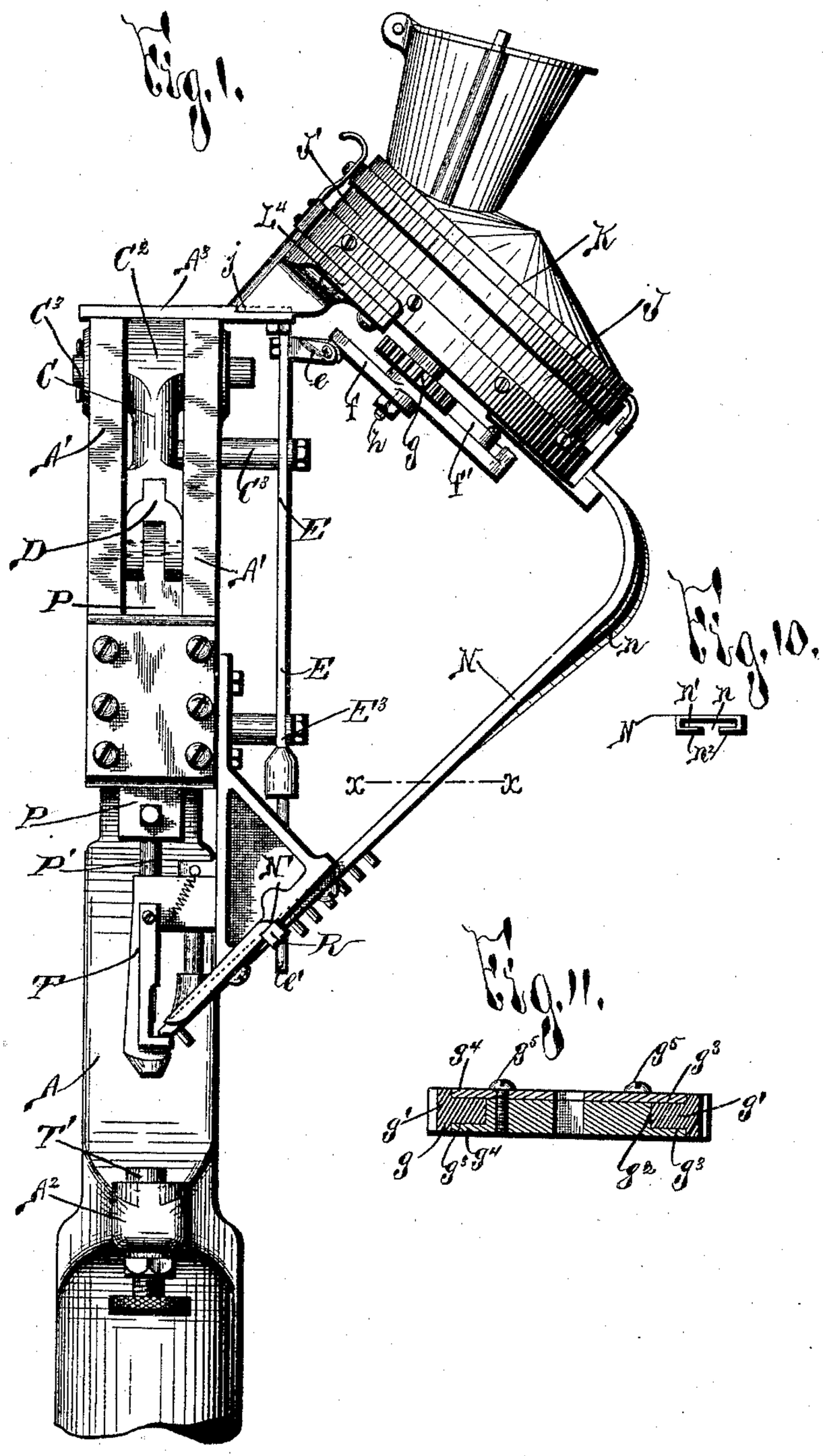

Fig. 10.

x — x

Fig. 11.

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Inventor
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(No Model.)

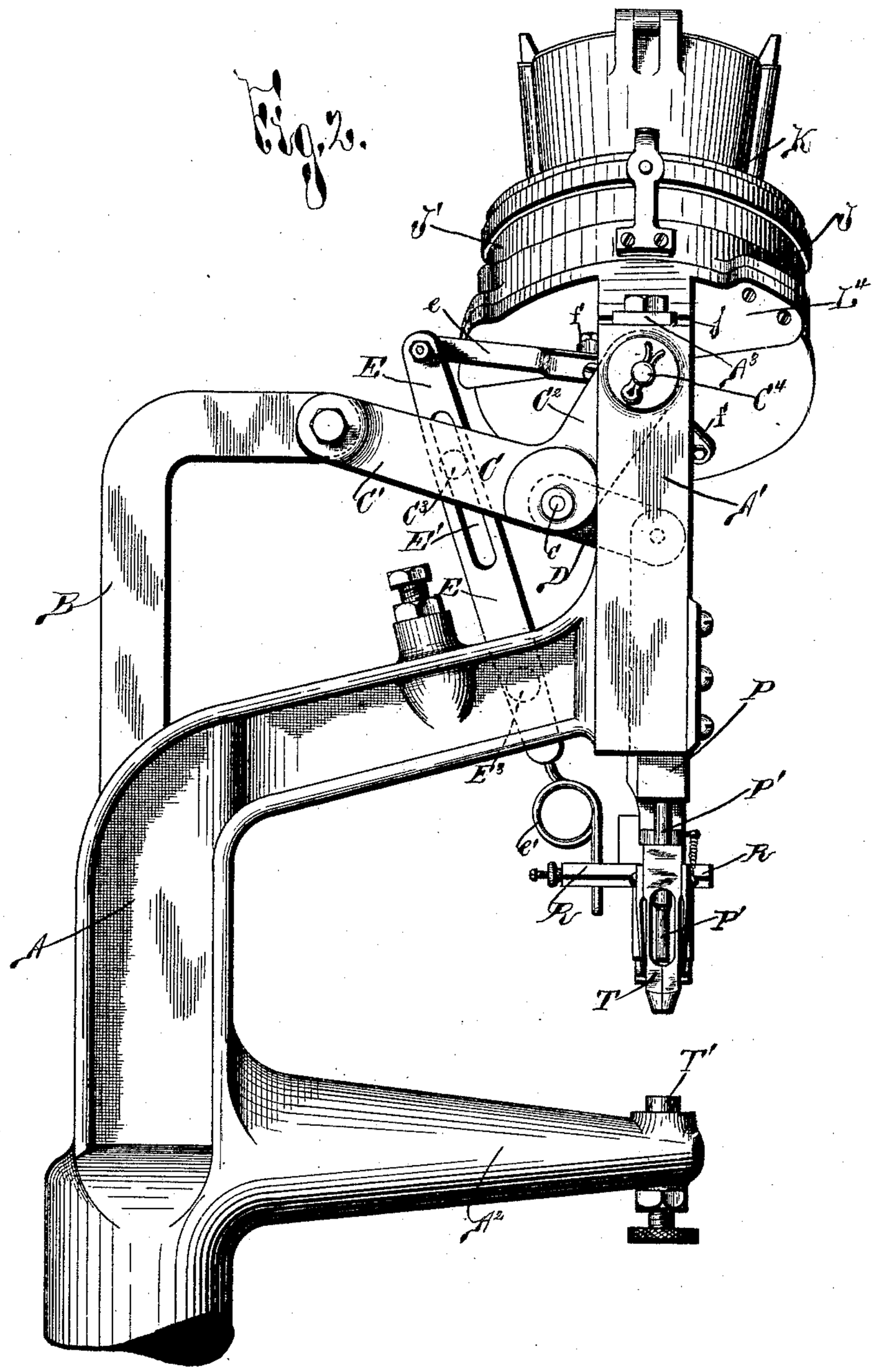
5 Sheets—Sheet 2.

J. J. UNBEHEND.

RIVETING MACHINE.

No. 436,447. Patented Sept. 16, 1890.

Fig. 2.



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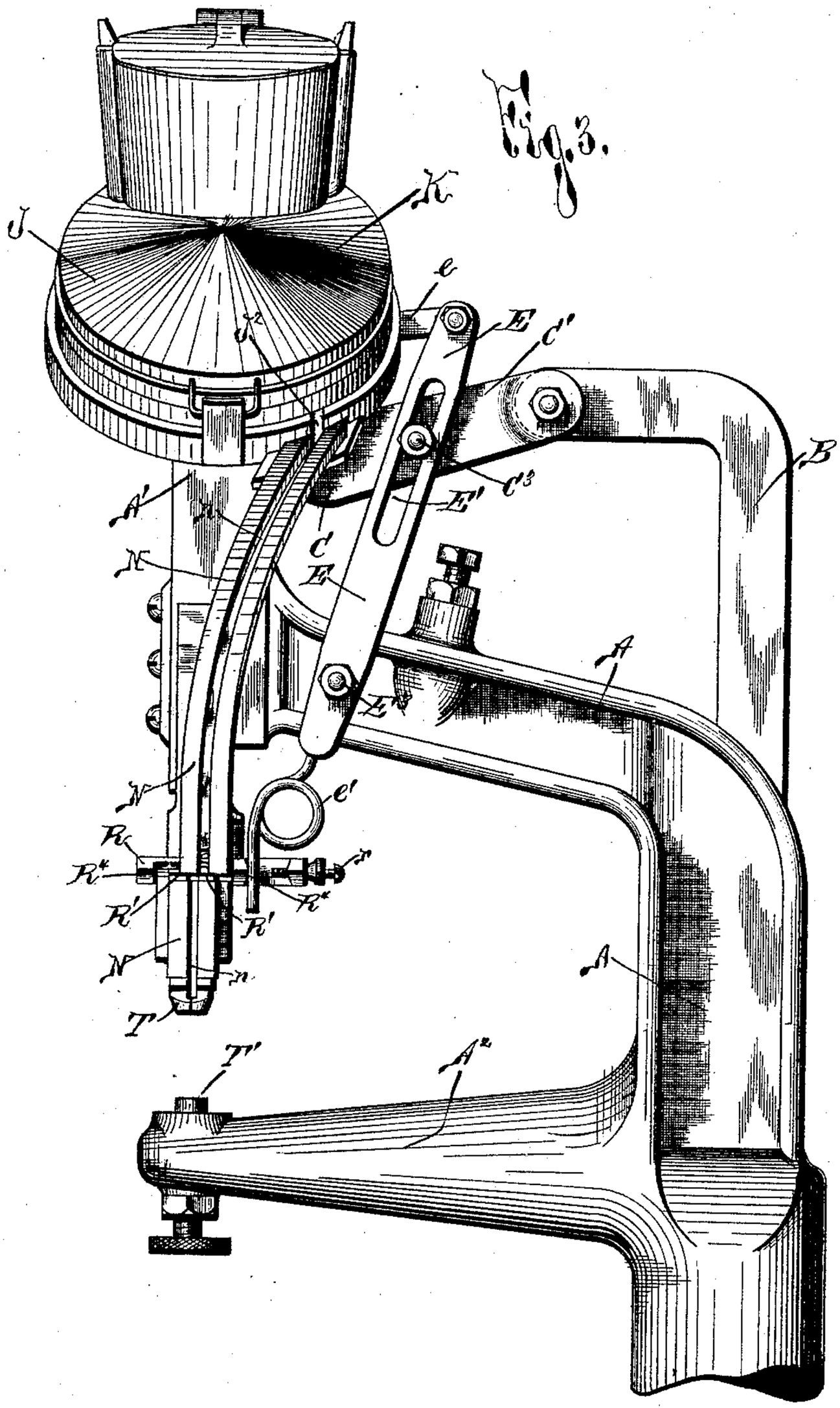
5 Sheets—Sheet 3.

J. J. UNBEHEND.

RIVETING MACHINE.

No. 436,447. Patented Sept. 16, 1890.

Fig. 3.



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5 Sheets—Sheet 4.

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RIVETING MACHINE.

No. 436,447. Patented Sept. 16, 1890.

Fig. 4.

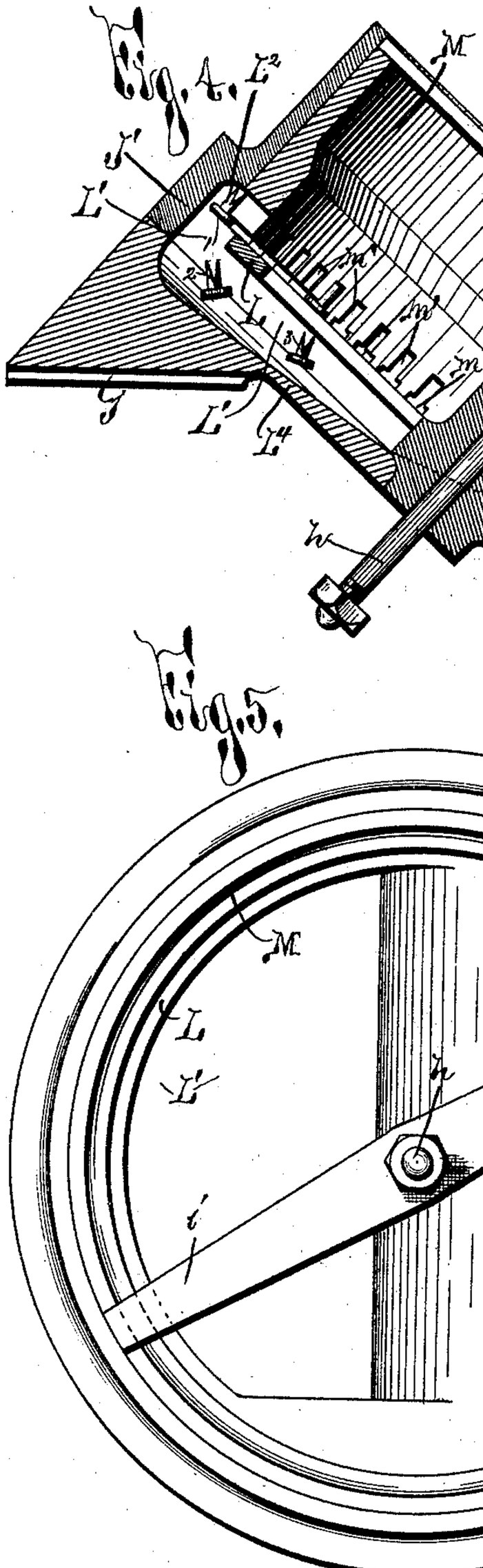


Fig. 6.

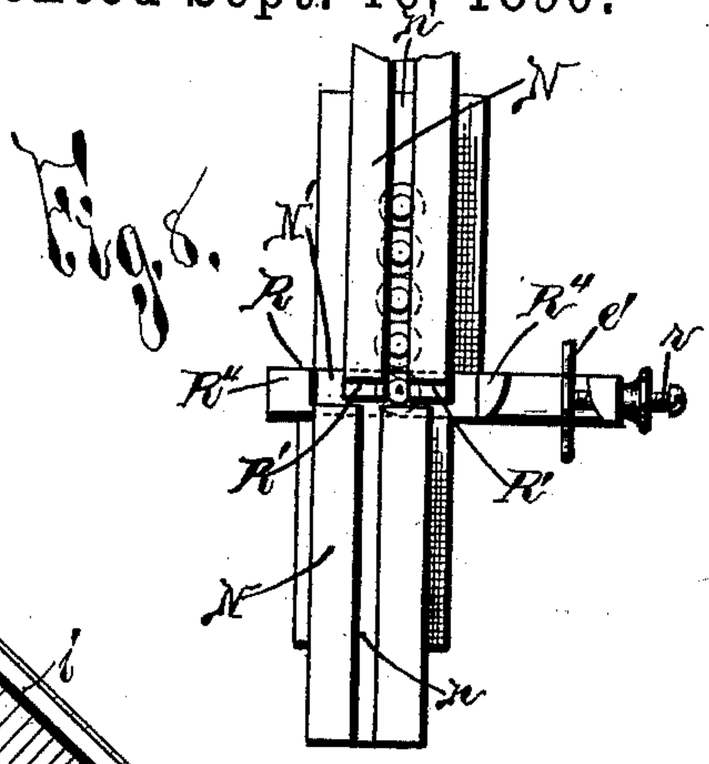
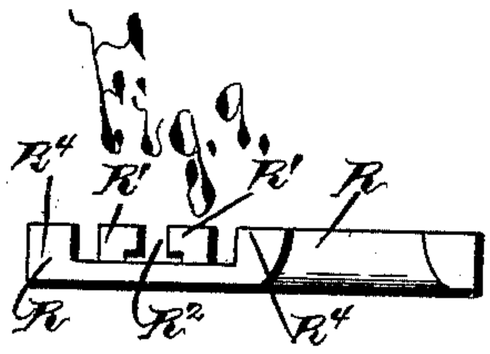


Fig. 5.

Fig. 9.



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(No Model.)

5 Sheets—Sheet 5.

J. J. UNBEHEND.

RIVETING MACHINE.

No. 436,447. Patented Sept. 16, 1890.

Fig. 6.

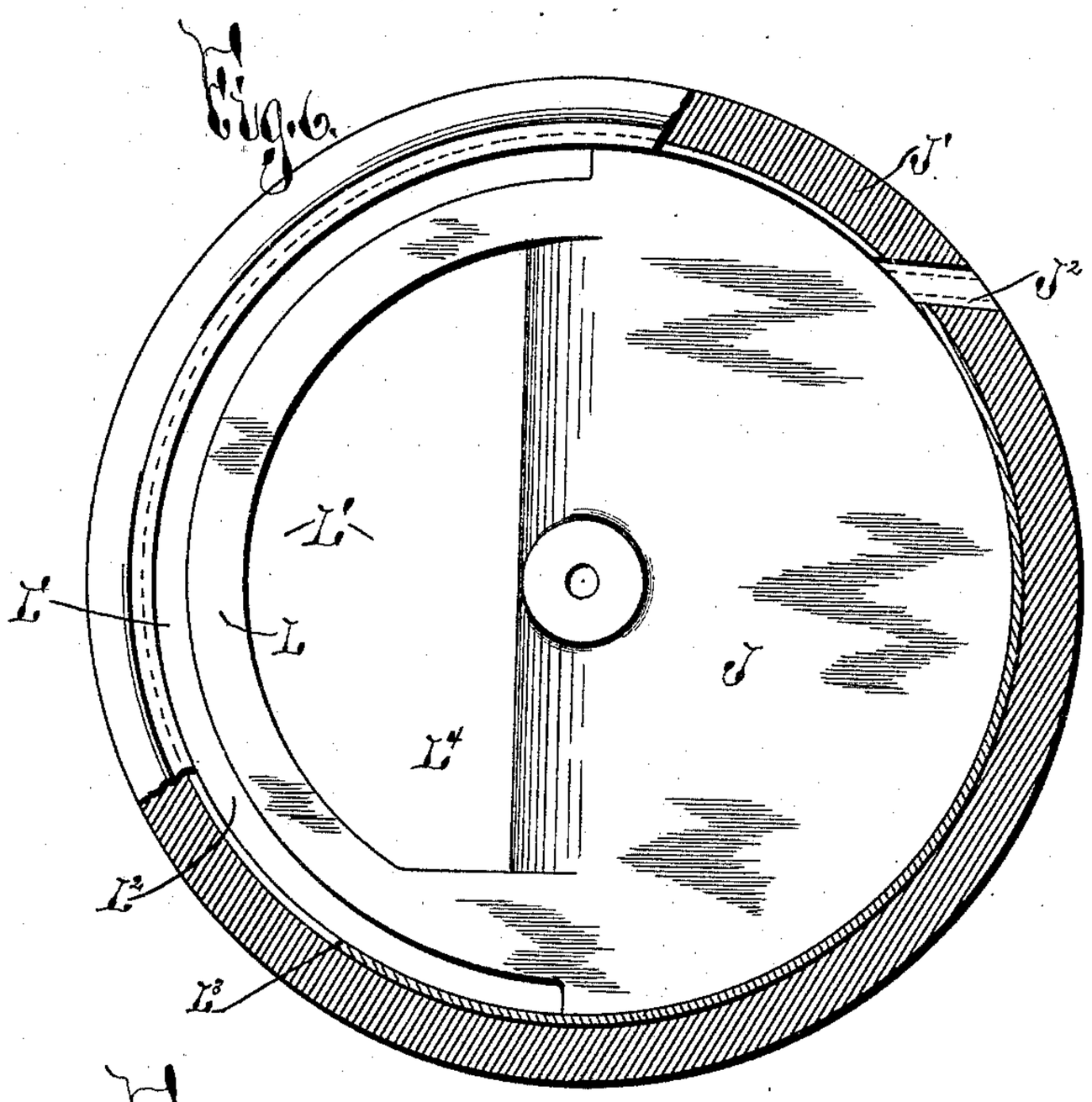
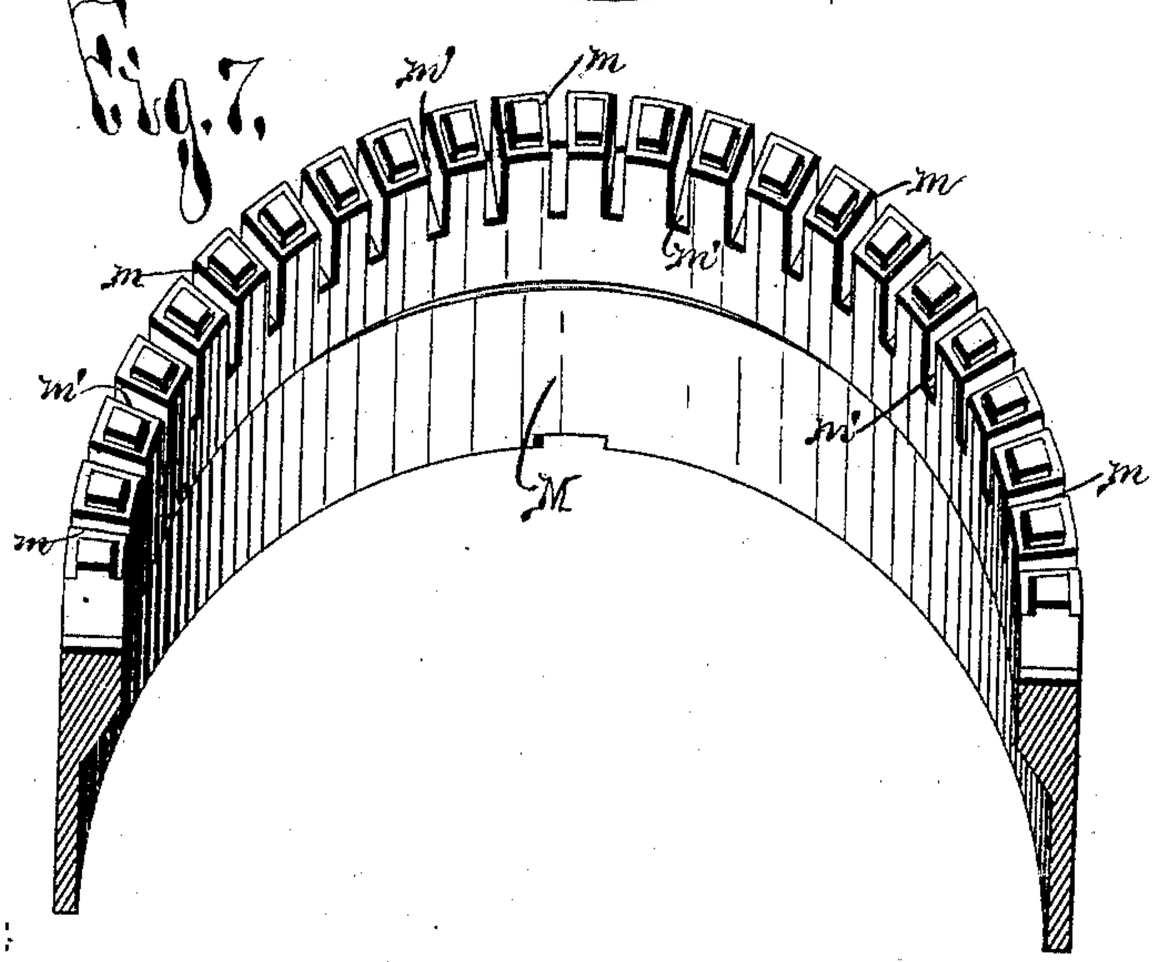


Fig. 7.



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UNITED STATES PATENT OFFICE.

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RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 436,447, dated September 16, 1890.

Application filed December 31, 1888. Serial No. 295,026. (No model.)

To all whom it may concern:

Be it known that I, JACOB J. UNBEHEND, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Riveting-Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to improvements in riveting-machines of the particular class which are designed to insert one or more rivets into articles for the purpose of facilitating their manufacture or firmly securing buttons, buckles, or clasps, &c., to coats, straps, arctics, clothing, and other like articles; and it has for its object the production of a simple, effective, and efficient device into which the rivets are inserted promiscuously and by which they are fed one by one to the plunger or other inserting mechanism.

To this end it consists, essentially, in a hopper of novel and peculiar construction, into which the rivets are emptied and from which they are discharged continuously and automatically by means of the peculiar construction of the hopper, a conveyer for conducting the rivets from the discharge of the hopper to the plunger, and a suitable cut-off interposed in the conveyer between the hopper and the plunger, and also worked automatically and continuously.

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

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

Figure 1 is a front elevation of the upper part of my rivet-machine, illustrating the relative construction and arrangement of the hopper, the conveyer, the cut-off, the plunger, and the actuating mechanism, only such parts of the latter mechanism being shown as are necessary to a description of my improvements. Fig. 2 is a side elevation of Fig. 1, more fully illustrating the actuating mechanism. Fig. 3 is an elevation of the opposite side of Fig. 1 to that illustrated in Fig. 2. Fig. 4 is a longitudinal vertical section of the hopper with the cover removed, illustrating the detail construction and arrangement of said hopper and showing the rivets in natural operation therein. Fig. 5 is a top plan view of Fig. 4. Fig. 6 is a like top plan view, partly in section, to Fig. 5, with the revolving agitator and feeder of the hopper removed therefrom, and illustrating more fully the detail construction of the hopper. Fig. 7 is an isometric perspective of one-half of the agitator and feeder of the hopper. Fig. 8 is a detached detail of the rivet-conveyer and the cut-off. Fig. 9 is an elevation of the detached cut-off. Fig. 10 is a transverse section of the conveyer, taken on line $x\ x$, Fig. 1; and Fig. 11 is a longitudinal section of a friction-ratchet conveying motion from the actuating mechanism to the hopper.

A represents the main frame of my machine, supported on which are the actuating mechanism, the hopper J, the conveyer N, the plunger P, and the cut-off R. I have only illustrated the upper part of the main frame or bracket A, in which slides the rod or connection B, pivoted to one arm C′ of the bell-crank C, the other arm C^2 of which is pivoted at C^4 in the head A′ of the main frame. At *c* the bell-crank C is pivoted by the connection D to the sliding block or plunger P, which is guided in the head A′ and carries the plunger-rod P′.

Motion is conveyed to the rod or connection B in any suitable manner by any desirable means, and it will be seen that when the same is forced downward the bell-crank C, by means of the connection D, forces the plunger-rod P′ down upon the rivet, which has been inserted into the feeding tube or pocket T in a manner presently described.

Provided upon the arm C′ of the bell-crank is a stud C^3, riding in a slot E′, provided in the lever E, pivoted to the frame A at E^3, which lever actuates the hopper by a connection *e*, pivoted at its upper extremity, and actuates the cut-off R by a connection *e′*, secured to its opposite extremity. As seen in Fig. 1, the connection *e*, pivoted to the upper extremity of the lever E, is hinged to the pivoted lever *f*, carrying a dog *f′*, engaging a ratchet *g*, mounted on the bolt or spindle *h*,

to which is secured an arm *i*, engaging the agitator or feeder M of the hopper. Thus it will be seen that the plunger-rod P′ is forced downward through the feeding tube or pocket T, inserting the rivet into the article interposed between the extremity of the feeding-tube and a suitable block or die T′, supported beneath said feeding-tube in an arm A^2 of the main frame. When, as described, the lever E is rocked to operate the plunger-rod P′, at the same time, by means of the connection *e*, this lever E rocks the lever *f*, causing the dog *f′*, secured on said lever *f*, to partly rotate the ratchet *g*, and also, by means of the connection *e′*, as presently described, it feeds a new rivet into the feeding-tube T after the plunger-rod has been retracted to its normal position.

In order to insert the rivets into the desired article, it is necessary that they shall be fed shank foremost into the feeding-tube T, beneath or in the path of the plunger-rod P′, and in order that the machine shall be continuous and effective in operation it is also necessary that but one rivet shall be fed at a time, and that there shall be a continuous feeding of the rivets to the feed-tube with every operation of the plunger-rod.

In riveting-machines as previously devised the feeding mechanism has been more or less defective, especially where rivets are used having their shanks bifurcated, and as the rivets are emptied promiscuously into the feeding device there is always a liability of such device becoming clogged and a consequent breaking or undue straining of the actuating mechanism.

My hopper J preferably consists of a circular frame J′, having a removable cover K, sufficient to allow of the ready insertion of the rivets into the hopper or of the ready withdrawal of any of the parts thereof for the purpose of cleaning or replacing with new ones. This frame J′ is preferably mounted upon the head A′ of the bracket A, or a support A^3, secured thereto, is held at an angle to the head A′, and is preferably provided with the guideways *j*, engaging like ways on the head A′, as shown in Figs. 1 and 4. The guideways allow the frame J′ to be readily placed at the desired position upon the head A′, or the support A^3 secured thereto, and when in position the hopper is firmly secured by a screw or bolt *j*. The frame J′ is provided at its base with a bearing for the feeding-rivets, and, as best seen in Figs. 4, 5, and 6, a portion of this bearing is cut out, thus forming an arc of an annular ring L, on either side of which is the space or cut-out L′, and when desired the bottom L^4 of this open space L′ is removable from the rest of the frame J′.

Mounted in the frame J′, I provide the agitator or feeder M, actuated by the arm *i*, secured to the rod or bolt *h*, rotated by means of the ratchet *g*. The lower face of the agitator M is provided with notches or cut-outs *m* of a size sufficient to allow the ready entrance of the heads of the rivets, and projecting upwardly from these slots *m* are slots or cut-outs *m′* of smaller size, adapted to fit the shank of the rivet, and it will be seen that as the agitator M is revolved by the arm *i* and the actuating mechanism, as previously explained, the rivets, by the force of gravity, will constantly feed into these slots or cut-outs *m m′*, with their shank uppermost, and will be carried upward thereby to a suitable discharge-way J^2 and discharged, shank uppermost, into the conveyer N, which is connected to said discharge J^2.

The conveyer N, as shown in Fig. 10, is provided with a slot *n*, of sufficient width to receive the shank of the rivet, and a slot *n′* at the base of the slot *n*, of sufficient size to receive the head of the rivet, which head is retained in position by the overlapping edges n^2 of the slot *n′*. The rivets, as described, are discharged into the conveyer shank uppermost, and, as shown in Fig. 1, this conveyer N is turned so as to feed the rivets into the feed-tubes T, shank downward, in the desired position.

From the fact that the rivets are inserted promiscuously into the hopper it is obvious that only a small proportion will be in the desired position to enter the slots *m m′* in the agitator, and that some will be caught by the edges of these slots and will be borne around the hopper without being discharged therefrom, and that in a short time the said slots would become filled with rivets, or the rotation of the agitator would be checked and serious injury would result; but as the frame J′ and agitator M are placed at an angle all rivets caught by the agitator, but not forced directly into the slots *m m′* in position for discharge therefrom, will drop backward out of said slot by the force of gravity. The rivets will be again engaged by the agitator M, or should any of the rivets be borne upward beyond the way J^2 without being discharged thereinto they will, when they are rotated around the annular arc L, be forced on either side thereof into the cut-out L′ and will fall to the lowest point of the hopper, where they will be again engaged.

To insure the forcing out of the notches *m m′* of the agitator M of rivets which are secured therein, but not in the desired manner to be fed into the discharge J^2 when they are rotated over the arc L, I continue the cut-out L′ upward back of the arc L, forming a space L^2. Just before the end of this cut-out L^2, I provide a stop L^3, Fig. 6, which engages such rivets as may be carried around thereto and forces them out of the notches into said space, whereupon they fall by gravity to the lower part of the hopper, as shown by rivets 1, 2, and 3 in Fig. 4. It will thus be seen that the agitator M is constantly revolved with every movement of the bell-crank C, and that there is a constant feed of the rivets to the conveyer N, provision made for any catching of the same, and the agitator kept free for the

entrance of rivets by means of the peculiar construction and arrangement of the hopper and the stop L^3, causing the notches m m', when rotated in the lowest point of the frame J′, to be always open for the entrance of the rivets. However, should any rivet become caught in the agitator, I obviate all liability of breakage to the mechanism or the agitator by means of the peculiar construction of the ratchet g. This ratchet g, as shown in Fig. 11, consists of a ring g', the center of which is provided with an annular opening g^2 and provided with annular shoulders g^3, formed on the top and bottom face of the ring g' by annular cut-outs of larger diameter than the central cut-out or opening g^2.

Mounted upon the annular shoulders g^3, I provide the disks g^4, which are clamped together by means of screws g^5, tightly abutting the same against these shoulders g^3 of the ratchet g. The rod h, upon which is mounted the arm i, actuating the agitator, is firmly secured to these disks g^4, and the clamping-screws g^5 only contact these disks g^4 against the separate shoulders of the ratchet g sufficiently tight to insure constant rotating of these disks with the gear g and a consequent rotation of the agitator M. If a rivet should become caught therein, the gear g, although actuated as usual by the dog f, slips around the disks g^4 without rotating these disks and operating the agitator M, thus obviating any liability of breakage or strain to the parts.

At a point on the conveyer N, interposed between the hopper J and the feed-tube T, I provide the cut-off R, having lugs R′ projecting therefrom, and having a space R^2, adapted to fit the head and shank of a rivet interposed between these lugs and normally registering with the slots n n' of the upper part of the conveyer N.

In the conveyer N, I provide the slot N′, through which the cut-off is operated, and I set off the slots n n' in the lower part of the conveyer N, so that when the slot R^2 is registered with the slots of the upper part of the conveyer N the slot in the lower part of said conveyer will be blocked by one of the projections R′, and a rivet will feed down into the space R^2 of the cut-off. When by the operation of the lever E and the connection e' the cut-off is forced to register its slot R^2 with the feeding-slots n n', provided in the lower part of the conveyer N, the rivets in the slots of the upper part of the conveyer N are blocked by the opposite stud or projection R′, and the rivet between the projections R′ is registered with the slots in the lower part of the conveyer, and is thereby guided to the feed-tube T. Thus it will be seen that when the agitator is continually feeding rivets to the cut-off these rivets are fed to the feeding-tube T only by the operation of the cut-off, and then at the proper time, one by one, they are allowed to slide down the slots n n' in the lower part of the cut-off and drop into the feeding-tube T in the desired position, shank downward, with the head retained by suitable means until the plunger is forced downward and the rivet forced out of the feeding-tube T, which is of construction to separate and allow the rivet to be forced therethrough when actuated by the plunger. If from unusually ready entrance of the rivets into the agitator the conveyer should become filled with rivets above the cut-off, no serious result will follow, as the peculiar construction of the hopper will allow the rivets to be disengaged from the agitator, and by the operation of the cut-off the rivets will be discharged from said conveyer, thus gradually leaving room for others to feed out from the discharge J^2. The face R^3 of the cut-off, from which extend the projections R′, is preferably wider than said projections, which are only sufficiently wide to equal the diameter of the rivets, and I provide a simple guideway for said cut-off by continuing the upper and lower divisions of the conveyer, so as to abut against these projections R^2 and overlap upon said face R^3, thus securely retaining the cut-off from disengagement. Suitable stops R^4 are provided upon the cut-off to limit its movement, and while any suitable connection would suffice to convey motion from the lever E to the cut-off R, I preferably use a spring, which, if a rivet should become caught in the cut-off, would give sufficiently to allow the lever to work without operating the cut-off, thus preventing undue straining of the parts.

In the operation of the cut-off I provide a screw r, against which the spring e' abuts, and which can be readily adjusted to the desired space to just operate the cut-off without unduly wearing the stops R^4.

The operation of my machine will be readily perceived from the foregoing, and it will be seen that the rivets are emptied promiscuously into the hopper, continuously fed therefrom to the cut-off, and thus fed one by one to the feeding-tube T, shank downward, in the path of the plunger or inserting mechanism, which is operated immediately upon the insertion of the rivet.

Considerable change may be made in the detail construction and arrangement of my machine without departing from the spirit of my invention, and it will be seen that as the hopper may be made of hard metal there will be but little wear, and that from the peculiar construction of the parts of the hopper and cut-off there is no liability of any straining of the parts from catching of the rivets, thus producing a simple and very efficient machine for the purpose desired without any liability of undue wear or strain.

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

1. In a rivet-setting machine, the combination of a hopper-frame, a bearing-face in said frame disposed at an angle to a perpendicular, a feeder rotating within said frame above the bearing-face, cut-outs m and m' in the

lower face of said feeder for receiving the rivets, a discharge-opening in the hopper-frame through which the rivets feed when said cut-outs are registered therewith, and a cut-out L′ in the upper part of said bearing-face and extending below the said bearing-face, whereby the rivets fall from said feeder when not registered with said discharge-opening, substantially as specified.

2. In a rivet-setting machine, the combination of a hopper-frame provided with a discharge-opening, a bearing-face for the feeding-rivets provided within said frame and disposed at an angle to a perpendicular, a feeder mounted above said frame, cut-outs *m* and *m′* in said feeder for receiving the rivets, a cut-out L′ in the upper part of said bearing-face, extending below the said face, and a cut-out L^2 on the outside of said feeder and above said discharge-opening in the hopper-frame, substantially as and for the purpose set forth.

3. The combination, in a hopper, of the frame J′, the discharge J^2, a feeder M, set at an angle to a perpendicular, and cut-outs in the feeder M for receiving the rivets, with the arc L in the upper part of the path of the feeder, cut-outs L′ in the frame on either side of said arc L, and a stop L^3, substantially as and for the purpose specified.

4. The combination, in a hopper, of the frame J′, set at an angle to a perpendicular, and the discharge J^2 in said frame, with a sleeve revolving over a bearing-face in the frame, cut-outs in the lower face of said sleeve for receiving the rivets, cut-outs L′ in the upper part of the frame J′ on either side of the feeder-path, a cut-out L^2, also in the upper part of said frame and extending on the outside of the rivet-receiving slots in the feeder, and a stop L^3, substantially as and for the purpose set forth.

5. In a rivet-machine, the combination of the hopper J, a discharge in said hopper, a rotating sleeve within the hopper for feeding the rivets to said discharge, with actuating mechanism for rotating the feeding-sleeve, and a friction-clutch interposed in said actuating mechanism, whereby the friction is overcome and the feeder is not rotated when a rivet is caught therein, substantially as and for the purpose described.

6. The combination, with the frame J′ and a discharge therein and a rotary sleeve within the frame for feeding and discharging the rivets, of a shaft or rod *h*, connected to said feeding-sleeve, a collar g^4, firmly secured to said rod *h*, a ratchet *g*, secured by friction to said collar, and means, substantially as described, for rotating the ratchet, thus rotating the feeder, substantially as and for the purpose set forth.

7. In a rivet-setting machine, the combination of a hopper for feeding the rivets, a conveyer having a longitudinal slot for feeding the rivets, a second longitudinal slot provided at the extremity of said conveyer and arranged out of alignment with the adjacent extremity of the former slot, and a cut-off for feeding the rivets from one slot to the other, substantially as set forth.

8. In a rivet-setting machine, the combination of a hopper for feeding the rivets, a conveyer having a longitudinal slot for feeding the rivets, a second longitudinal slot provided at the extremity of said conveyer and arranged out of alignment with the adjacent extremity of the former slot, a cut-off provided with a pair of openings alternately registering with said slots for receiving and feeding the rivets, and a stop for limiting the movement of said cut-off, substantially as described.

9. In a rivet-setting machine, the combination of a hopper for feeding the rivets, a conveyer having a longitudinal slot for feeding the rivets, a second longitudinal slot provided at the extremity of said conveyer and arranged out of alignment with the adjacent extremity of the former slot, a cut-off for feeding the rivets from one slot to the other, and a rivet-inserting plunger connected to said cut-off, whereby both are operated simultaneously, substantially as specified.

In testimony whereof I have hereunto signed my name, 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.

JACOB J. UNBEHEND.

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