(No Model.) 3 Sheets—Sheet 1.

F. W. BEALE & J. H. REED.

RIVET SETTING MACHINE.

No. 395,868. Patented Jan. 8, 1889.

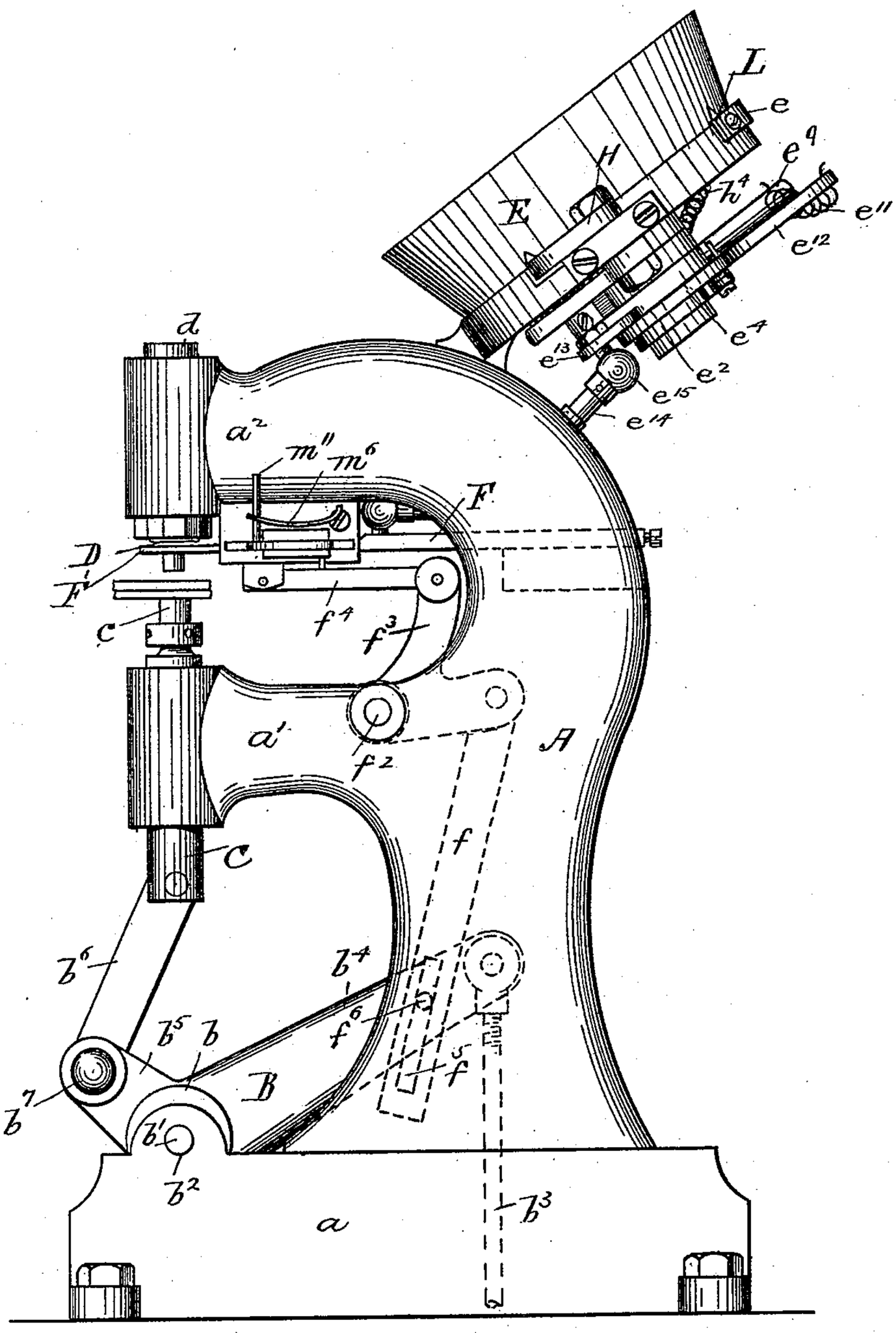

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

F. W. BEALE & J. H. REED.

RIVET SETTING MACHINE.

No. 395,868. Patented Jan. 8, 1889.

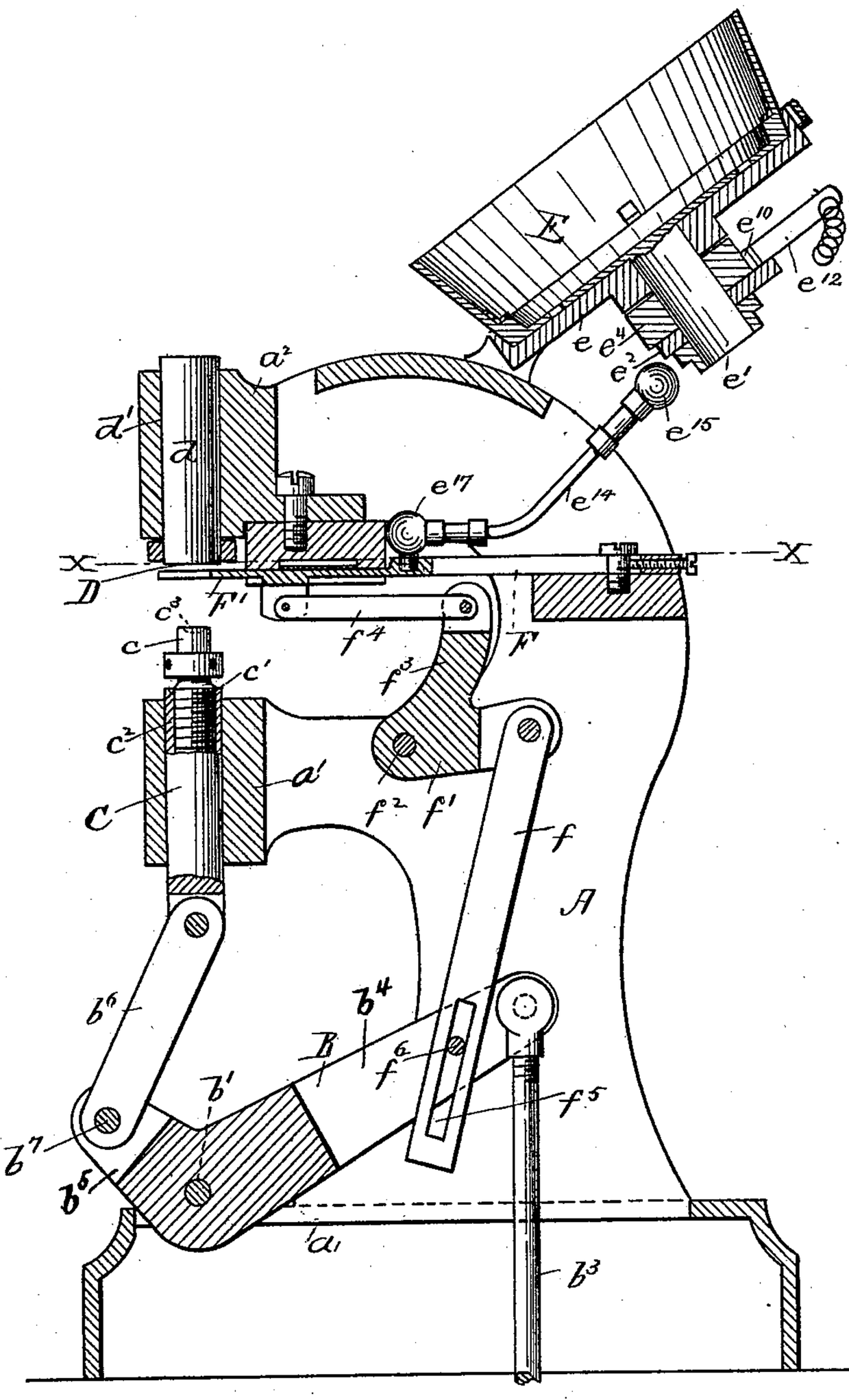

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

F. W. BEALE & J. H. REED.

RIVET SETTING MACHINE.

No. 395,868. Patented Jan. 8, 1889.

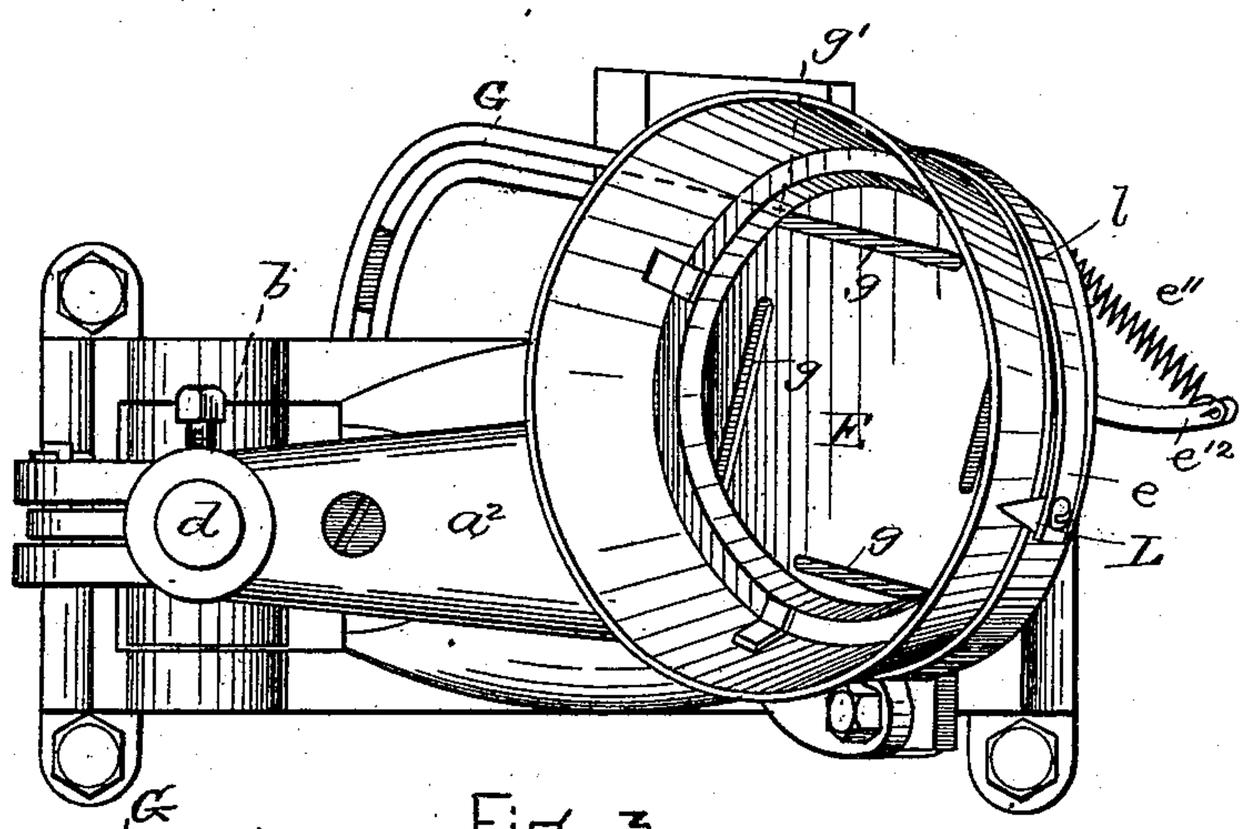

Fig. 3.

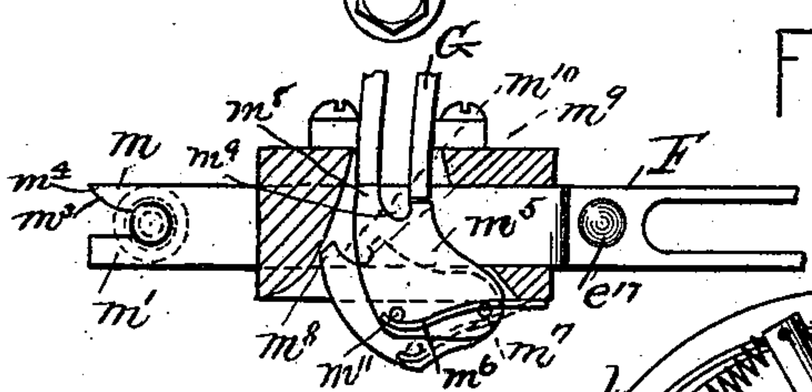

Fig. 6.

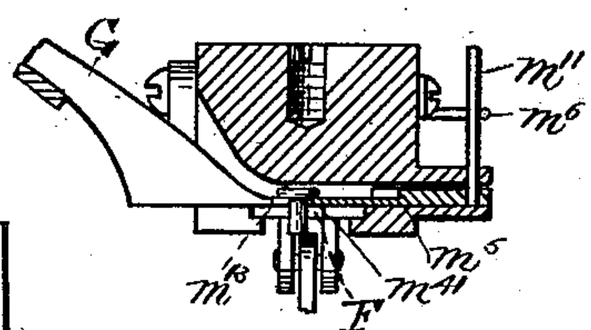

Fig. 7.

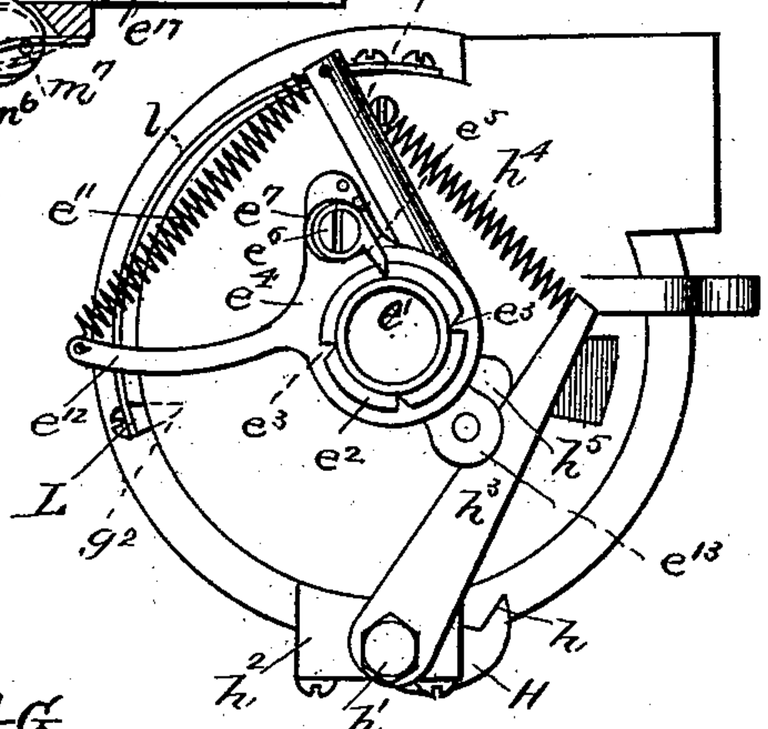

Fig. 4.

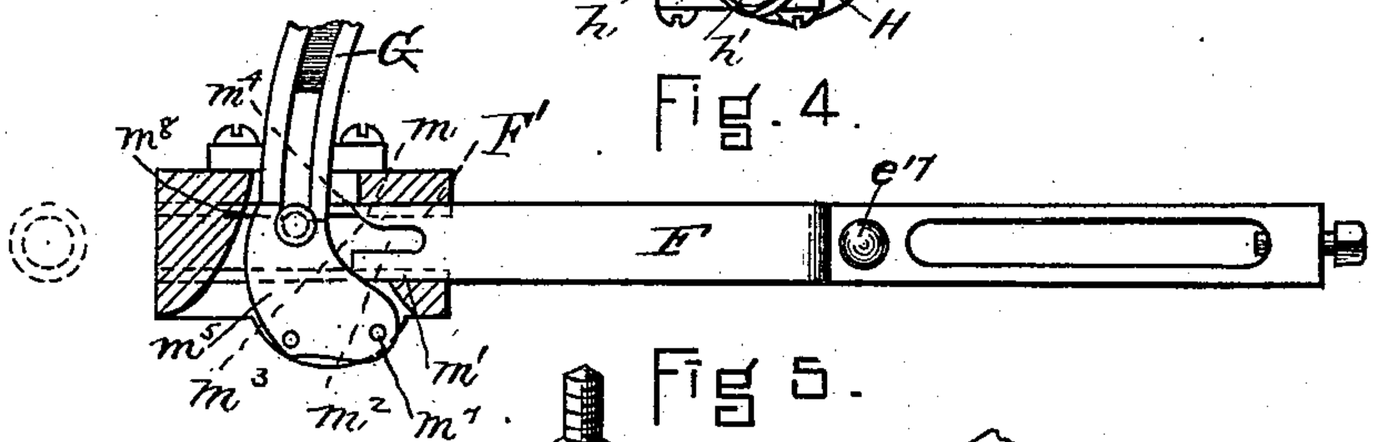

Fig 5.

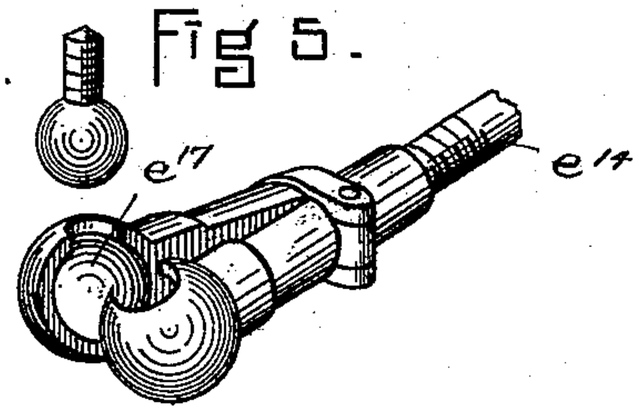

Fig. 8

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UNITED STATES PATENT OFFICE.

FORREST W. BEALE AND JAMES H. REED, OF LYNN, MASSACHUSETTS.

RIVET-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 395,868, dated January 8, 1889.

Application filed February 8, 1887. Serial No. 226,905. (No model.)

To all whom it may concern:

Be it known that we, FORREST W. BEALE and JAMES H. REED, both of Lynn, in the county of Essex and State of Massachusetts, both citizens of the United States, have invented a new and useful Improvement in Rivet Feeding and Setting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates, especially, to devices for automatically separating headed rivets from the bulk or mass held in a hopper or other receptacle and a chute or passage for conveying them from the separator to a feeding device, which carries the rivets in successive order from the end of the said chute or passage to a position over a clinching-die and beneath a reciprocating header.

It further relates to mechanism for simultaneously operating the header, the transferrer, and the separator and distributer, adapted to be actuated by one movement of lever or treadle.

It further relates to various details of construction, which will be hereinafter referred to.

In the drawings, Figure 1 is a view in side elevation of a machine containing the features of our invention. Fig. 2 is a vertical central section thereof. Fig. 3 is a plan view thereof. Fig. 4 is a view of the hopper and its operating mechanism inverted. Fig. 5 is a detail view upon the line $x\,x$ of Fig. 2, showing the end of the rivet-supplying chute, its stop or gate, and the rivet-carrier. Fig. 6 illustrates the same parts in a different position. Fig. 7 is a cross vertical section to illustrate the manner of delivering the rivets from the chute to the carrier. Fig. 8 is a view in perspective illustrating the construction of a ball-joint connection, hereinafter referred to.

A is the frame of the machine. It is made in one casting, and is adapted to be mounted upon a table. Its base a supports the lever B, the lever having a hub, b, and a pivot or stud, b', extending therefrom, which enters holes b^2 in the base. This lever is adapted to be moved downward by a rod, b^3, attached to the end of the long arm b^4, and a treadle, and upward by a spring. (Treadle and spring are not shown.) It has a short arm, b^5, which receives a lower end of a link, b^6, which is pivoted thereto by the pivot or stud b^7. The link is connected at its upper end with the sliding rod or spindle C, which is movable in the intermediate section, a', of the frame, in a hole bored therein, and this block supports the die piece or block c, which is mounted in the spindle C, so as to be vertically adjustable, being provided with a screw-threaded extension, c', which enters the screw-threaded hole c^2 in the upper part of the movable spindle, so that by turning the die-block in one direction or the other it is lifted or lowered.

The die-block has a suitable prong-turning cavity, c^3, formed therein, and in the drawings we have represented the cavity as circular.

D is a stationary header. It is formed at the end of a stud, d, which enters a hole, d', in the upper section or arm, a^2, of the frame, and is locked thereto by means of a set-screw.

The separating mechanism comprises a hopper or tray, E, which is mounted upon a plate, e, fastened to the frame A, and the hopper or tray is adapted to be intermittingly revolved upon this plate by means of its stud or post e', which extends downward through a hole in the plate e and carries a ratchet-wheel, e^2, having teeth e^3. There is also mounted upon this stud a collar or plate, e^4, which carries the pawl e^5, attached thereto by a pin or stud, e^6, and held in contact with the ratchet-wheel by means of a spring, e^7. The plate or collar e^4 is loose upon the stud e', and it is held in contact with an oscillating arm, e^9, by the pin e^{10} and the spring e^{11}, which extends from the end of the oscillating arm to the arm e^{12} of the collar e^4. The oscillating arm is supported by the stud e', and is oscillated thereon at suitable intervals by the arm e^{13}, the rod e^{14}, which is connected with the arm e^{13} by a ball-joint, e^{15}, and with the slide-plate F by the ball-joint e^{17}. The slide-plate F carries the rivet carrier or transferrer F′, which will hereinafter be described.

The slide-plate is moved outward upon the upward movement of the arm b^4 of the lever B and the downward movement of the die c, and is moved inward upon the downward movement of the said arm of said lever and the upward movement of said die. This is accomplished by connecting the said lever B

with the slide-plate F by means of a rod or link, f, which has a loose connection at its lower end with the lever B, and which is connected at its upper end with the rock-lever f', which is pivoted at f^2. The arm f^3 of this rock-lever is connected by means of a link, f^4, with the slide-plate F. The link connecting the lever B with the rock-lever has a slot, f^5, through which the pin f^6, fastening it to the lever, extends. This slot permits a certain amount of lost motion to be provided the sliding plate, so that it may not be moved forward until the die has dropped sufficiently to permit the rivet being brought into place under the head, and shall not be moved backward until the die has been moved upward sufficiently to hold the rivet between the material into which the rivet is driven and the head. It will be seen that by this mechanism, upon the outward movement of the plate F, the feed-pawl e^5 is caused to ride upon the ratchet-wheel until it engages a tooth thereof at the end of said movement, and upon the return or reverse movement of the plate the pawl engaging the ratchet causes the hopper to be revolved a portion of a revolution.

In order that the rivets may be arranged or separated so that they may be fed to the passage or chute G, which connects the hopper with the carrying-plate or transferrer F', we have formed in the bottom of the hopper a number of recesses, g, which extend inward from the edge thereof upon tangential lines, and in the drawings we have represented the hopper as provided with four of these recesses. They are of a width sufficient to receive the shank of a rivet, and upon each reciprocation of the plate F one of these recesses is brought into line with the upper section, g', of the chute, which is arranged upon a line to form a continuation of the said recess, so that any rivets picked up by the recess as the hopper revolves are permitted to escape therefrom into the chute. This connection between the recess and the chute is made upon one side of the hopper, and as the hopper is inclined each recess is then in the best position to deliver the rivets to the chute. It is not intended to fill the hopper with rivets to such an extent that they shall cover the recesses when they are in a delivery position. After each recess has delivered its rivets to the chute, upon the revolution of the hopper it is passed downward through the rivets in bulk in the lower part of the hopper, and during its passage it picks up one or more, as the case may be, and transfers it or them to the point of delivery of the chute.

It is of course necessary that each recess should register accurately with the chute at the end of the movement of the hopper, and in order to accomplish this we have provided the hopper with four V-shaped recesses, g^2, upon its outer surface, one for every rivet-receiving recess, and we have also arranged a latch, H, having a V-shaped or pointed end, h, so that it shall automatically close into these recesses in successive order at the end of the feeding movement of the pawl.

The lock or latch shown in the drawings is mounted upon the stud h', which passes through the lug h^2, extending from the plate e, and carries at its lower end the long arm h^3; and a spring, h^4, attached to the end of this long arm and to the bottom of said plate, serves to keep the lock in a hole, g^2, until it is moved outward by the movement of the projection h^5 on the collar of the arm e^9 into contact with the arm h^3 to throw it outward, and the lock or latch H forms engagement with the hole g^2 upon the beginning of the backward movement of the feed-pawl, and the latch or lock is held by this block disengaged until near the end of the feed movement of the pawl, when the block is moved from engagement with the lever sufficiently to permit the latch or lock to enter one of the said V-shaped holes. We also use for holding the hopper locked when a rivet-receiving recess is in line with the chute a spring-latch, L, which is held by a spring-arm, l, fastened to the side of the plate e, and which is adapted to enter in successive order the said recesses g^2. This latch is so hung and shaped that it prevents the hopper from being moved backward, locking it rigidly while it is thrown outward automatically to release the hopper upon a forward movement.

The transferrer or carrier F' is formed upon the end of the slide-plate F, and it comprises two arms, m m', arranged to form a recess, m^2, between them. The recess m^2 has a rounded edge, m^3, to form a point, m^4. The carrier is arranged to be moved beneath the lower end of the chute G and to take therefrom rivets in successive order. The chute is arranged to end above the path of reciprocation of the carrier, so that the shanks of the rivets shall be in position to enter the recess m^2 of the carrier as the carrier is advanced and while its head rests upon the foot m^{13} of the chute and the outer end of m^{41} of a movable stop, m^5. (See Fig. 7.) This movable stop is arranged at the end of the chute to receive and hold the lowermost rivet therein when the carrier is not in operation; but upon the advance of the carrier and its engagement with the shank of a rivet this stop is moved outward sufficiently to allow the head of the rivet to clear it, when it is immediately returned by a spring, m^6, to its original position to again close the chute. It preferably is shaped as shown in Fig. 6, is pivoted at m^7, and has a finger or arm, m^8, which forms practically a continuation of one side of the foot of the chute. It also has the notch or recess m^9, which forms the end of the chute when the plate is closed, and in which the shank of the lowermost rivet in the chute rests. The plate or arm m^5 also has an inclined edge, m^{10}, so that upon the outward movement of the carrier F' the rivet shall throw the plate or arm back easily. The spring m^6, which bears against the pin m^{11}, extending from the plate,

serves to return it to its normal position after the rivet has been moved from it by the carrier F′ to close the chute.

In operation, the material which is to be united by the rivet is placed over the die, and upon the downward movement of the long arm b^4 of the lever B the die is moved upward toward the stationary head. As it is moved, the carrier F′ takes the lowermost rivet in the chute and transfers it to a position beneath the head and immediately over the die, and upon the contact of the material with the end or prongs of the rivet the carrier is immediately moved backward, while the die continues its upward movement and upsets the lower end of the rivet, the carrier being returned to its original position. The rivets are fed to the chute from the hopper and fall to its foot, the bottom one resting against the stop or gate, and which yields upon the outward movement of the carrier sufficiently to permit the passage of one rivet, and immediately returning to close the chute and hold it closed until the carrier returns to a position to again advance and take the next rivet in order. During this traveling movement of the carrier the hopper is revolved, the recesses pick up rivets, and one recess is brought in line with the upper section of the chute to deliver the rivet or rivets they may have picked up thereto. These movements, as we have already stated, are accomplished by one downward movement of the treadle.

Of course we would not be understood as confining ourselves to the especial form of connecting devices, links, and levers herein specified, but may use any mechanical equivalents for operating the die, moving the carrier, and rotating the hopper. We would further say that these devices are not only applicable for feeding and clinching rivets, but also capped eyelets, tubular rivets, headed nails, headed tacks, or any headed fastenings, and with slight modification in the form of the hopper-recesses and of the chute for feeding and setting lacing-hooks and other pronged fastenings.

Having thus fully described our invention, we claim and desire to secure by Letters Patent of the United States—

1. In a rivet-setting machine, the combination, with the frame A, having the projecting arms or sections a' a^2, of the stationary header secured in the said arm or section a^2, the spindle or plunger C, sliding vertically in the said arm or section a' and provided with the die piece or block c, a rivet-hopper, a stationary rivet-feeding chute, a horizontally-movable rivet-transferring sliding plate, F F′, moving beneath the said sliding header adjacent to the end of said chute, a rivet-holding hopper, a rotary mechanism for said hopper connected with said sliding plate, an operating-lever, and connections between said operating-lever and the said spindle or plunger and sliding plate, substantially as set forth.

2. In a rivet-setting machine, the combination, with the frame A, having the arms or sections a' a^2, of the reciprocating spindle or plunger fitted to slide vertically in the said arm or section a' and provided with the die piece or block c, having the threaded extension c' screwed into the said spindle or plunger, the stationary header D d, secured in the arm a^2, the rivet-hopper E, the stationary rivet-feeding chute G, the sliding rivet-transferring plate adjacent to the end of the said chute, the operating-lever B, and connections between said lever and the said spindle or plunger and transferring-plate, substantially as set forth.

3. The combination, in a rivet-setting machine, of the chute with a transferrer or carrier arranged to be moved below the end or foot thereof and having the arms m m', one of which is provided with a point, m^4, and a curved surface, m^3, and the recess m^2, for receiving the shank of a fastening, substantially as described.

4. The combination of the chute G, the carrier F′, with the chute-closer m^5, comprising a plate having an arm, a shoulder, m^8, and a notch or recess, m^{10}, and adapted to be moved outward by a rivet held by the carrier, and to be moved inward by a spring, substantially as described.

5. The combination, in a rivet-setting machine, of the stationary header D, a reciprocating plunger, C, the rock-lever B, adapted to be operated by a treadle and connected with the plunger C by the link b^6, the said link, the carrier-plate F, the lever f' f^3, connected with said carrier-plate by the link f^4, and the link f, connecting the lever f' f^3 with the rock-lever B, substantially as described.

6. The combination of the head D, a reciprocating plunger, C, with the slide-plate F, the hopper feed-pawl e^5, the arm e^{13}, and the rod e^{14}, connecting the slide-plate with the feed-pawl, substantially as described.

7. The combination of the hopper E, having the latch-holes g^2, with the latch H, its operating-spring h^4, the arm h^3, and disengaging-block h^5, carried by the oscillating collar or plate operating the feed-pawl, substantially as described.

8. The combination of the hopper E, having the latch-holes g^2, with the latch H, its operating-spring h^4, arm h^3, and disengaging-block h^5, carried by the oscillating collar or plate operating the feed-pawl, and the latch L, carried by the spring-arm l, substantially as described.

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