

SHIPMAN & HENDRYX.

Machine for Extending Tubing.

No. 62,293.

Patented Feb. 19, 1867.

Fig. 1.

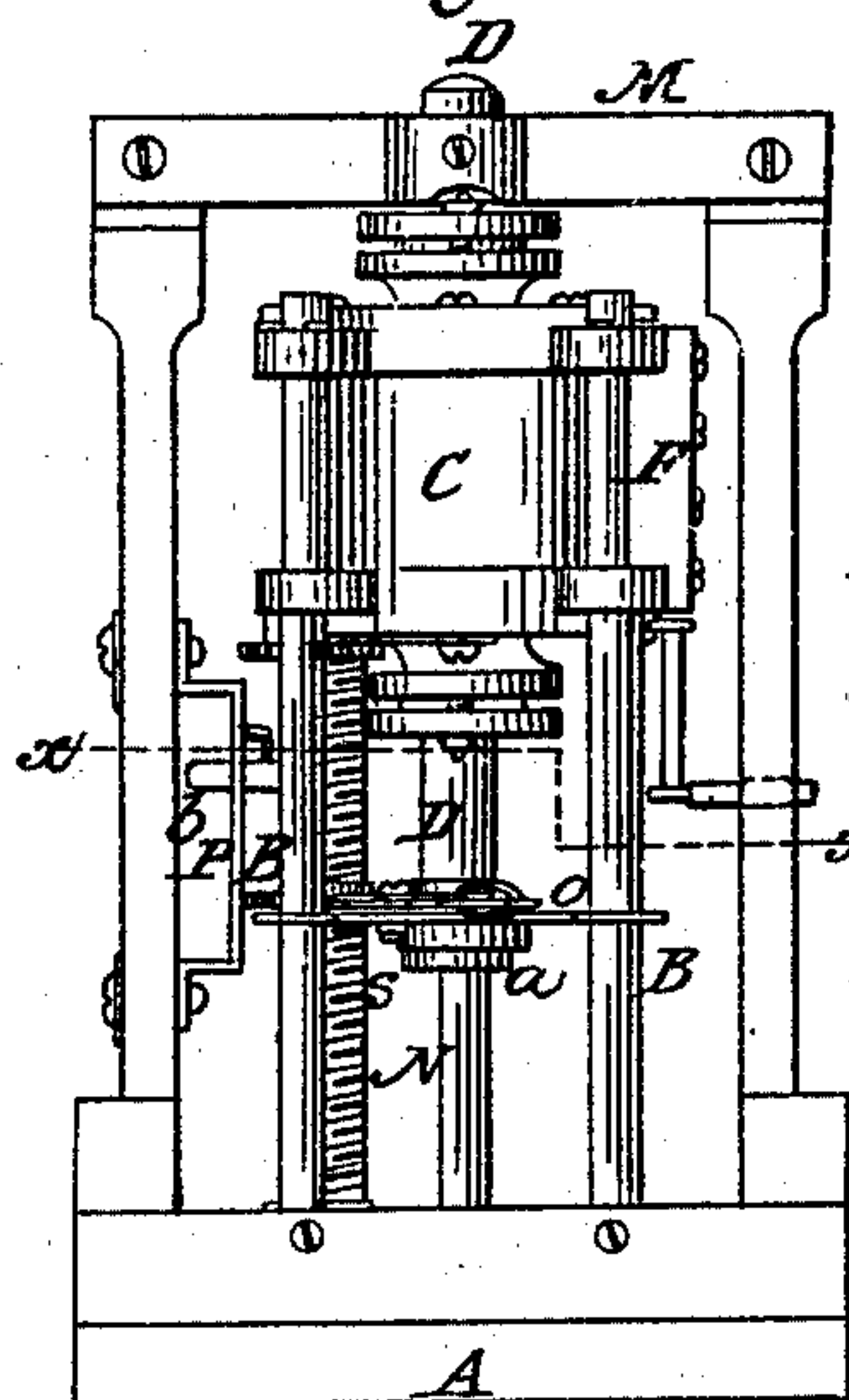


Fig. 4.



Fig. 2.

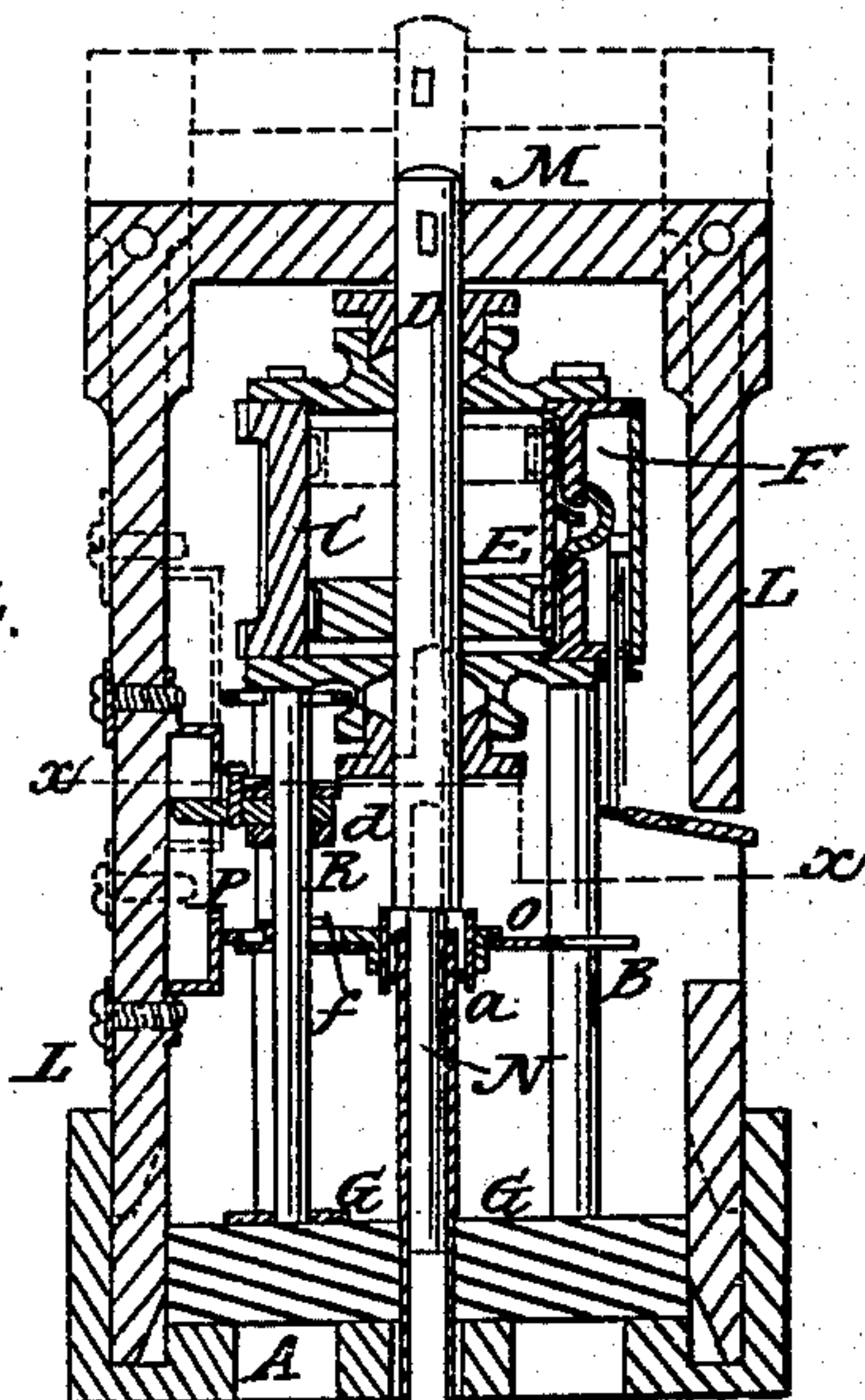


Fig. 3.

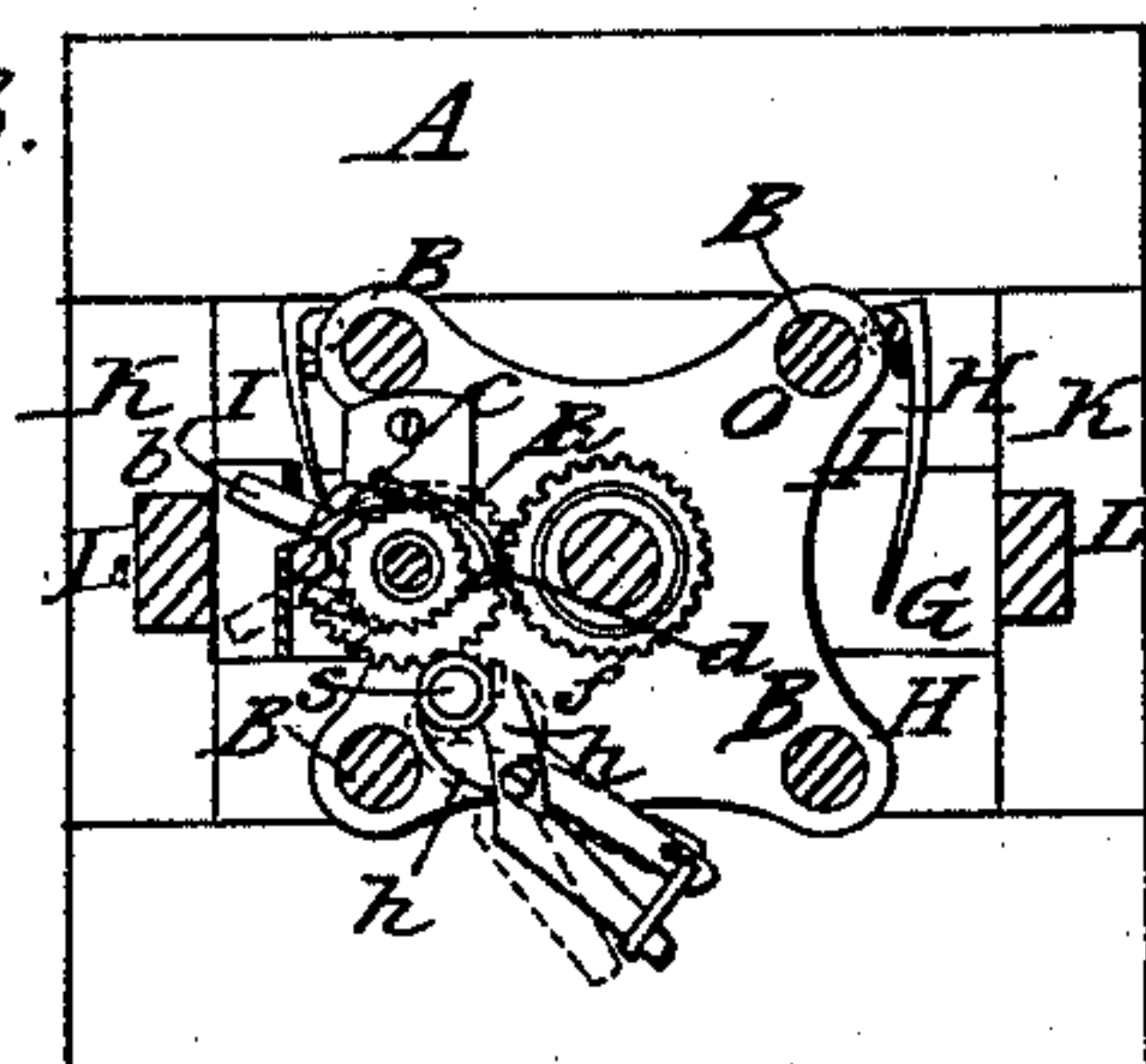


Fig. 5.

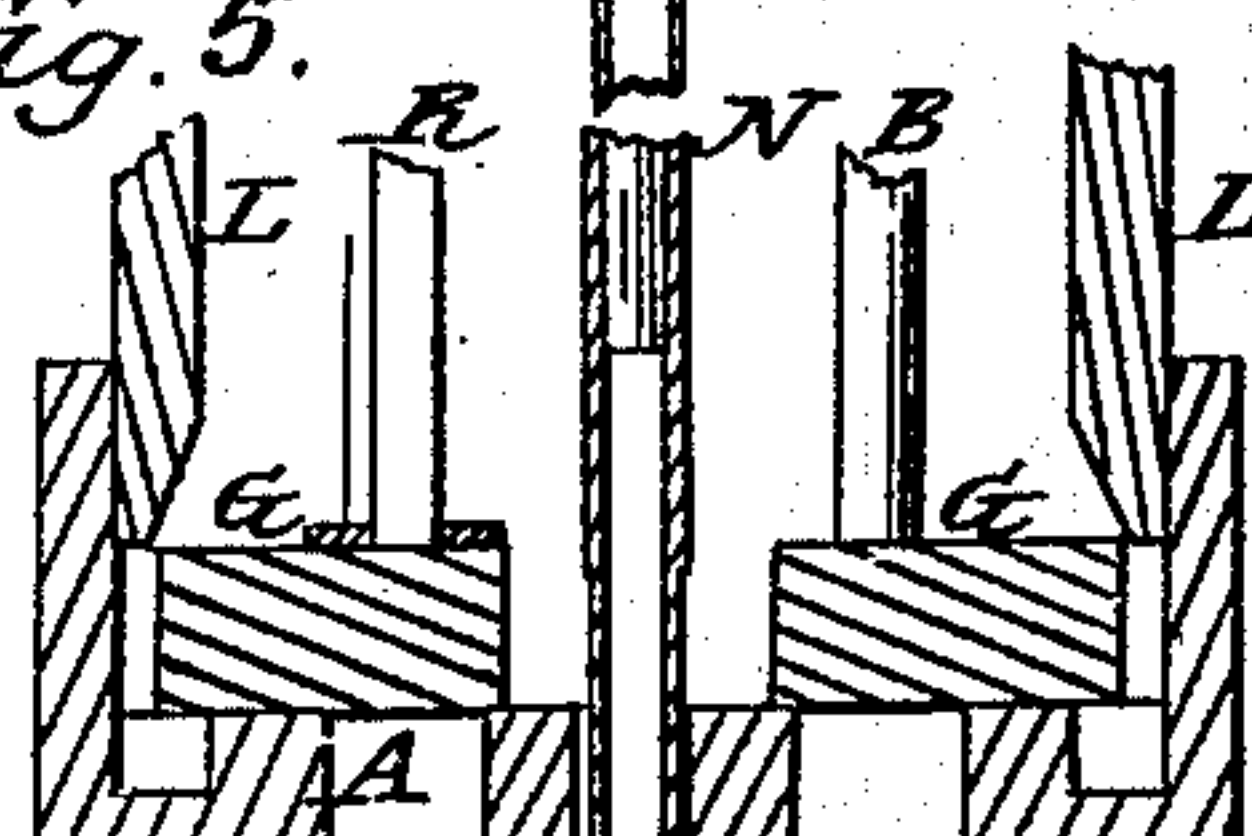


Fig. 6.

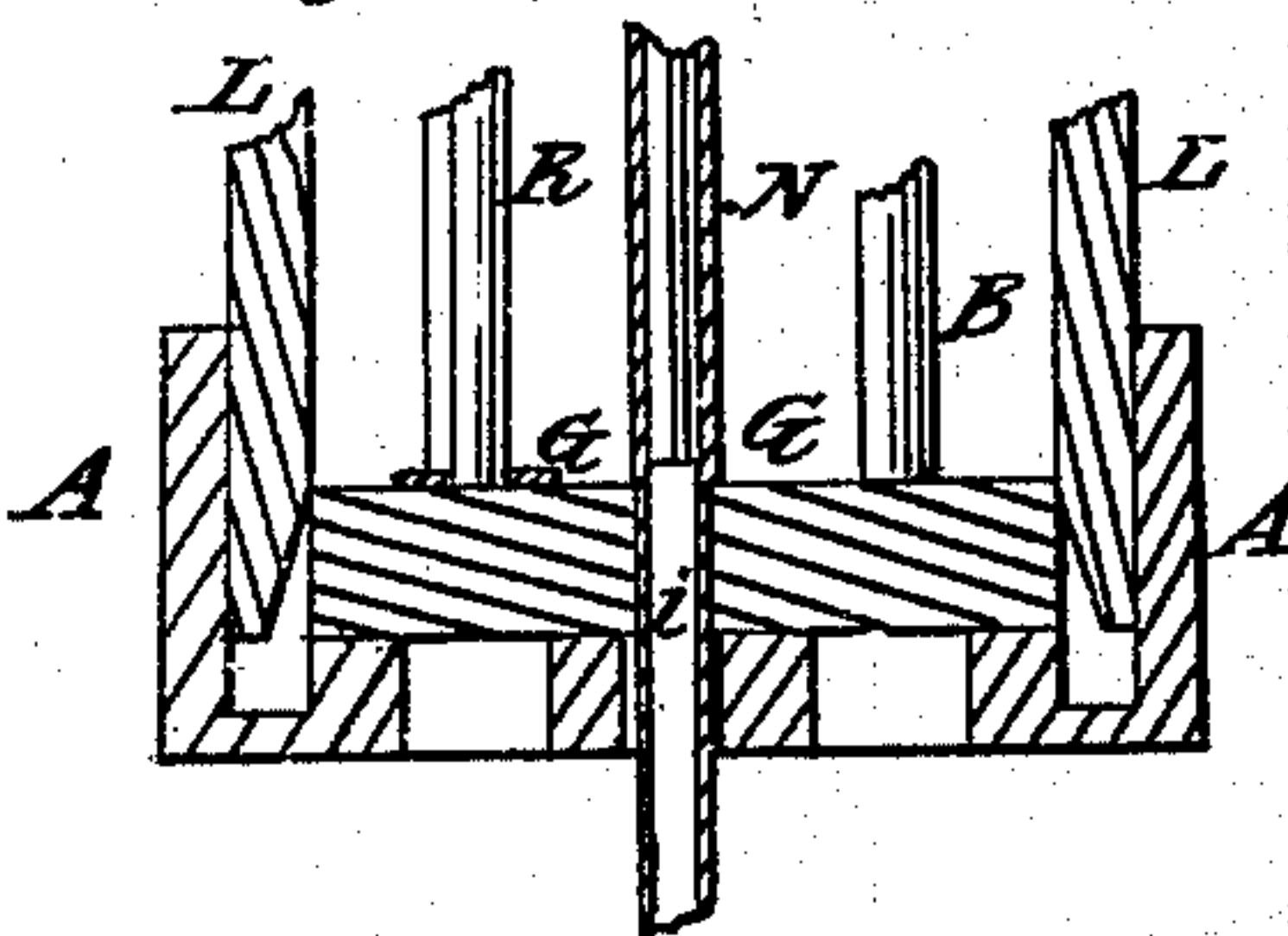
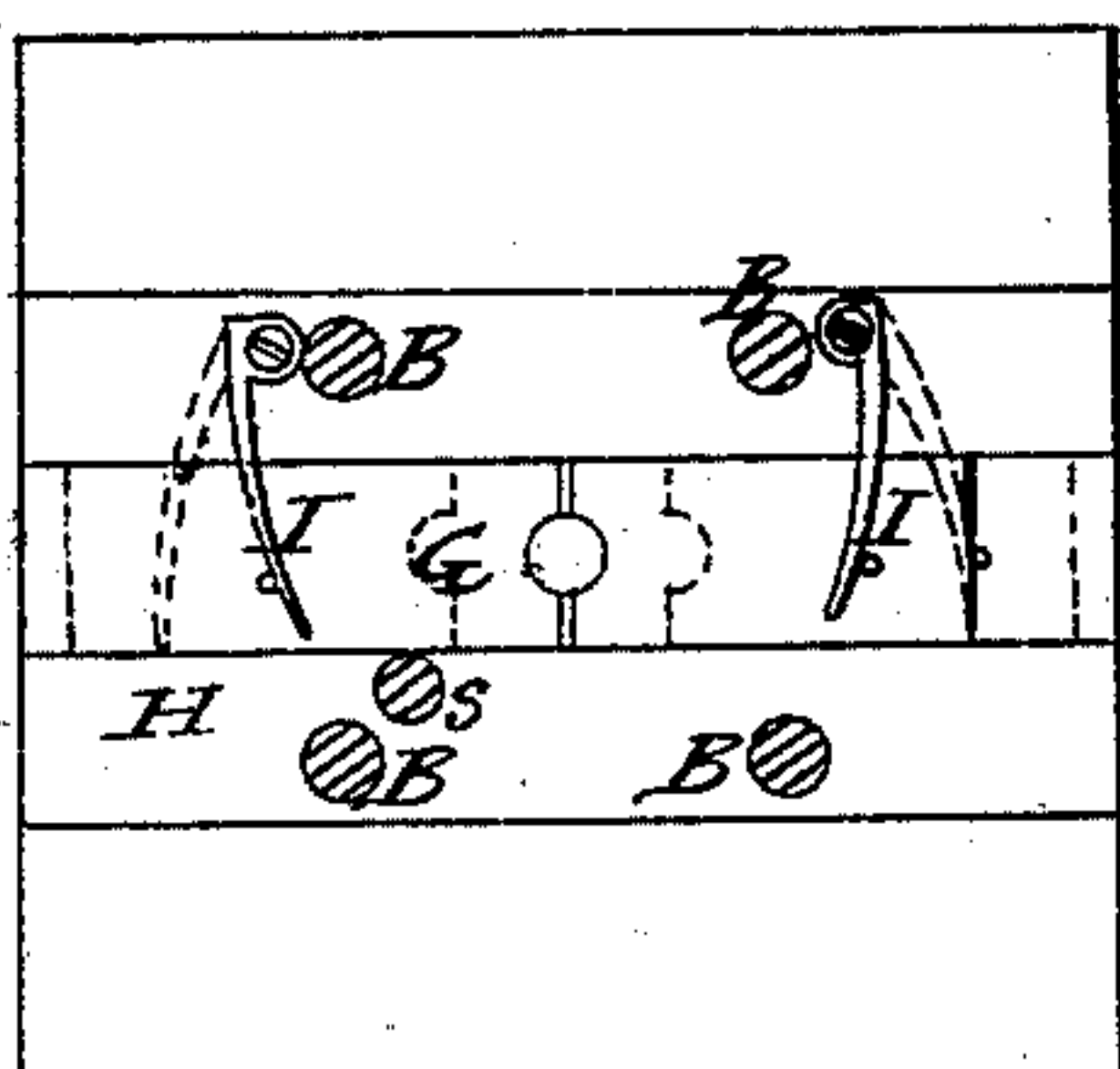


Fig. 7.



Witnesses:
John H. Shuman
A. J. Abbott.

Inventor:

H. A. Shipman &
A. B. Hendryx
by their attorney
John E. Earle

United States Patent Office.

H. A. SHIPMAN AND A. B. HENDRYX, OF ANSONIA, CONNECTICUT.

Letters Patent No. 62,293, dated February 19, 1867.

IMPROVEMENT IN MACHINES FOR EXTENDING TUBING.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, H. A. SHIPMAN and A. B. HENDRYX, of Ansonia, in the county of New Haven, and State of Connecticut, have invented a new Improvement in the Manufacture of Seamless Tubing; and we do hereby declare the following, when taken in connection with the accompanying drawings, and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view of the apparatus by which our improvement in the manufacture of seamless tubing is accomplished.

Figure 2, a vertical central section.

Figure 3, a cross-section cutting through line *xx*; and in

Figures 4, 5, 6, and 7, detached views to illustrate its operation.

Our invention relates to an improvement in the manufacture of tubing from brass, copper, or kindred metals which are capable of being drawn or extended, so that the length of the tube is increased by the reduction of the thickness of the metal consequent upon such drawing, and our invention consists in compressing a portion of the tube, (which is of nearly the required internal diameter,) from the outside by means of dies, and holding the compression while a follower upon the inside of the tube, of the diameter required for the tube, strikes or presses axially with the tube upon the compressed portion, forcing its way through the said compressed portion, thereby elongating the tube proportionately to the compression, then by the withdrawal of the follower or mandrel an adjoining portion is in like manner treated until the whole is drawn to the extent required.

To enable others skilled in the art to thus manufacture tubing, we will proceed to describe our manner of so doing as illustrated in the accompanying drawings.

A is the bed-plate, supported upon four columns B, a steam cylinder, C, through which passes a piston-rod, D, attached to a piston, E, and operated by steam admitted to the steam chest F in the usual manner for operating common steam hammers. G G are two slides, (see fig. 7,) movable in guides H H to open, as denoted in red fig. 7, and as seen in fig. 5, by springs I or their equivalent, and are closed by the descent of slides L moving vertically in guides K, which said slides are connected by a cross-head, M, to the piston-rod D, as seen in fig. 2. In their descent the inclined ends of the said slide L enter behind each of and so as to close the slides G, as denoted in figs. 6 and 7. The said slides G have fitted to or formed upon their inner ends dies corresponding to the external surface of the tube to be formed, as seen in fig. 7. N is a mandrel or follower, attached to or made a part of the piston-rod D, and of the diameter required for the interior of the tube to be formed. O is a plate, supported so as to slide freely upon the columns B, and through which the piston passes freely. On the said plate and surrounding the mandrel, we arrange a conical ring, *a*, slotted so as to diminish in diameter as it is pressed farther into the socket in which it is placed for the purpose hereafter shown. The said plate is moved down by the operation of a slotted guide, P, (see fig. 4,) fixed to one of the slides L, as seen in figs. 1, 2, and 3, operating upon a lever, *b*, which carries a pawl, *c*, that acts upon a ratchet, *d*, fixed to a shaft, R, and by the movement of the lever *b*, as from the position in black to that denoted in red, fig. 3, caused by the descent of the slide L, as from the position in red to that denoted in black, fig. 2, the shaft R is caused to make a partial revolution, which by an arrangement of gears in immediate connection causes a partial revolution of the screw S, which said screw operates upon the plate O, to give to it a downward movement in proportion to the extent of the turning of the said screw. The conical ring *a* is also connected to the said shaft R by gears *ff*, (see figs. 2 and 3,) so as to have a rotating movement independent of the plate O. The plate O is put in connection with or so as to be moved by the screw S, by a hinged nut, *h h*, so that when the said hinged nut is closed as denoted in black, the plate O will move by the action of the screw, or when the nut is open, as denoted in red, the movement of the plate O, by the action of the screw, ceases, then the plate O may be freely moved up or down as occasion may require.

The operation of the machine thus constructed is as follows: Prepare a short hollow tube of metal in the usual manner for the manufacture of tubing, its internal diameter corresponding to the size of the mandrel N, which must be of the internal diameter of the tube to be produced, that is to say, the metal should be as much thicker than the required thickness when finished, as will afford sufficient metal to extend the tube to the length

and thickness required. Place the metal thus formed over the mandrel and within the grasp of the conical ring *a*; then force the ring *a* into its socket to securely attach the metal to the plate *O*; then insert the lower end within the grasp of the dies on the slide *G*; then admit steam to the cylinder to raise the mandrel *N*, as denoted in rod, fig. 2, and seen in fig. 5. As the mandrel, with the slides *L L*, descends, (by the release of steam in the usual manner for common steam hammers,) the lower inclined ends of the two slides *L L* force the dies together and compress the metal, as seen at *i*, fig. 6. Continuing its descent the mandrel forces the compressed metal before it, drawing out the tube, as seen in fig. 2. Again raised, the slides *G* being released, open as seen in fig. 5, by the reaction of the springs *I*, as seen in fig. 3, the lever *b* acting as before described to turn the screw *S*, draws down the plate *O* and the metal tube thereto attached, feeding a certain portion of the tube between the dies, which upon the next descent of the hammer is compressed and drawn in like manner as before described, and so continuing until the whole tube has been in like manner drawn out. At each downward movement the tube being drawn is partially revolved by the operation of the shaft *R* through the gear *f*, for a purpose which will be apparent to all persons skilled in similar work.

We have represented our machine as striking a blow upon the inside of the tube, and this we believe to be the best method of extending the tube, yet the mandrel may be operated by a press or in various ways to extend the compressed portion of the tube. If the tube is not sufficiently extended in the first operation it may be again passed through the same machine by introducing dies of smaller diameter into the slides *G*, or another machine of like construction with smaller dies may be employed.

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

We claim extending metallic tubing and reducing the thickness thereof, by first applying external pressure to the tube, which shall reduce its diameter and then internal pressure, which, while restoring, or partially so, the previous internal diameter of the tube, shall attenuate and elongate the metal in the manner and by means substantially as herein set forth.

H. A. SHIPMAN,
A. B. HENDRYX.

Witnesses:

JOHN H. SHUMWAY,
A. J. TIBBITS.