

S. Gardner,

Making Wrought Nails,

N^o 17,502.

Patented June 9, 1857.

Fig. 1.

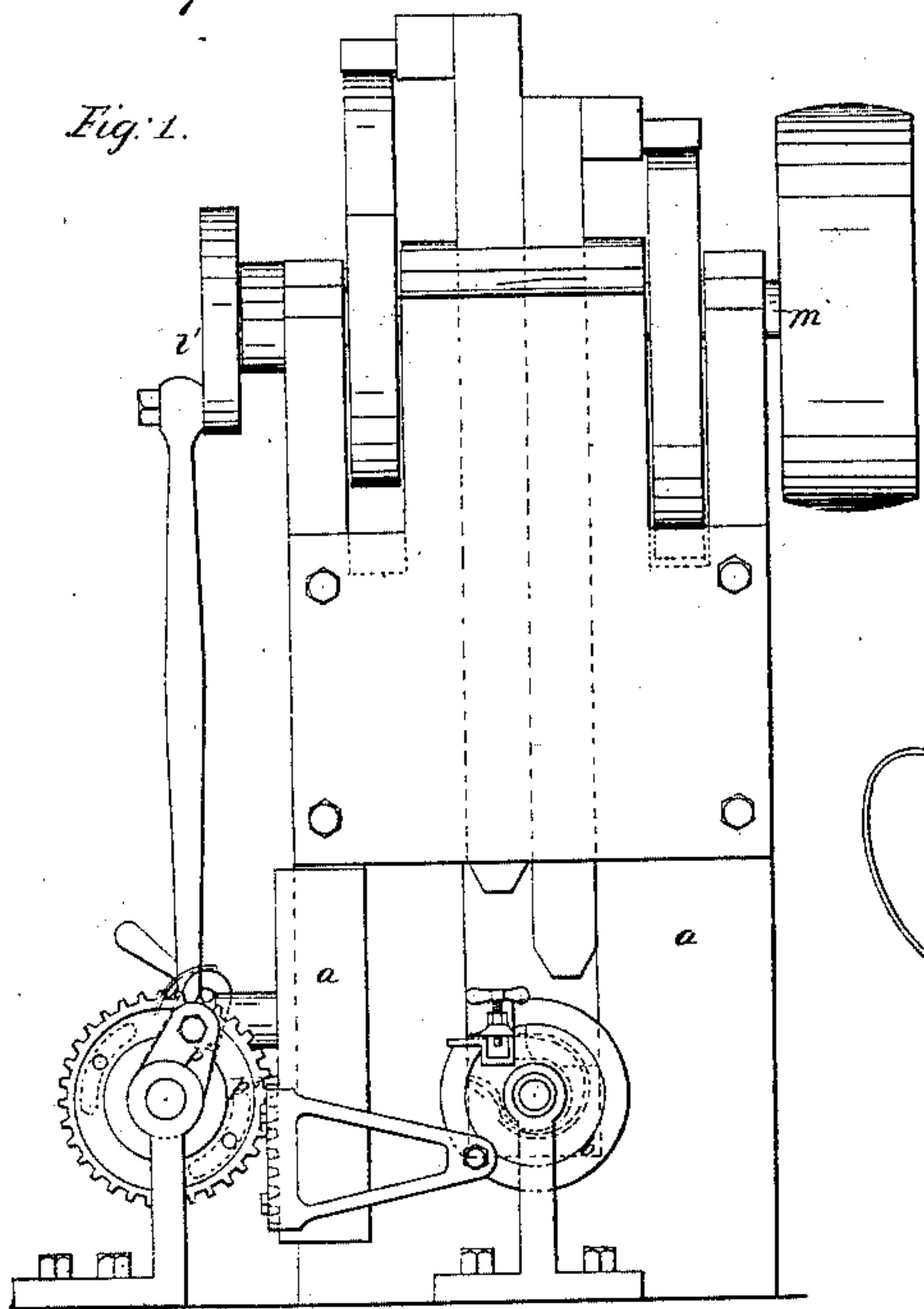


Fig. 2.

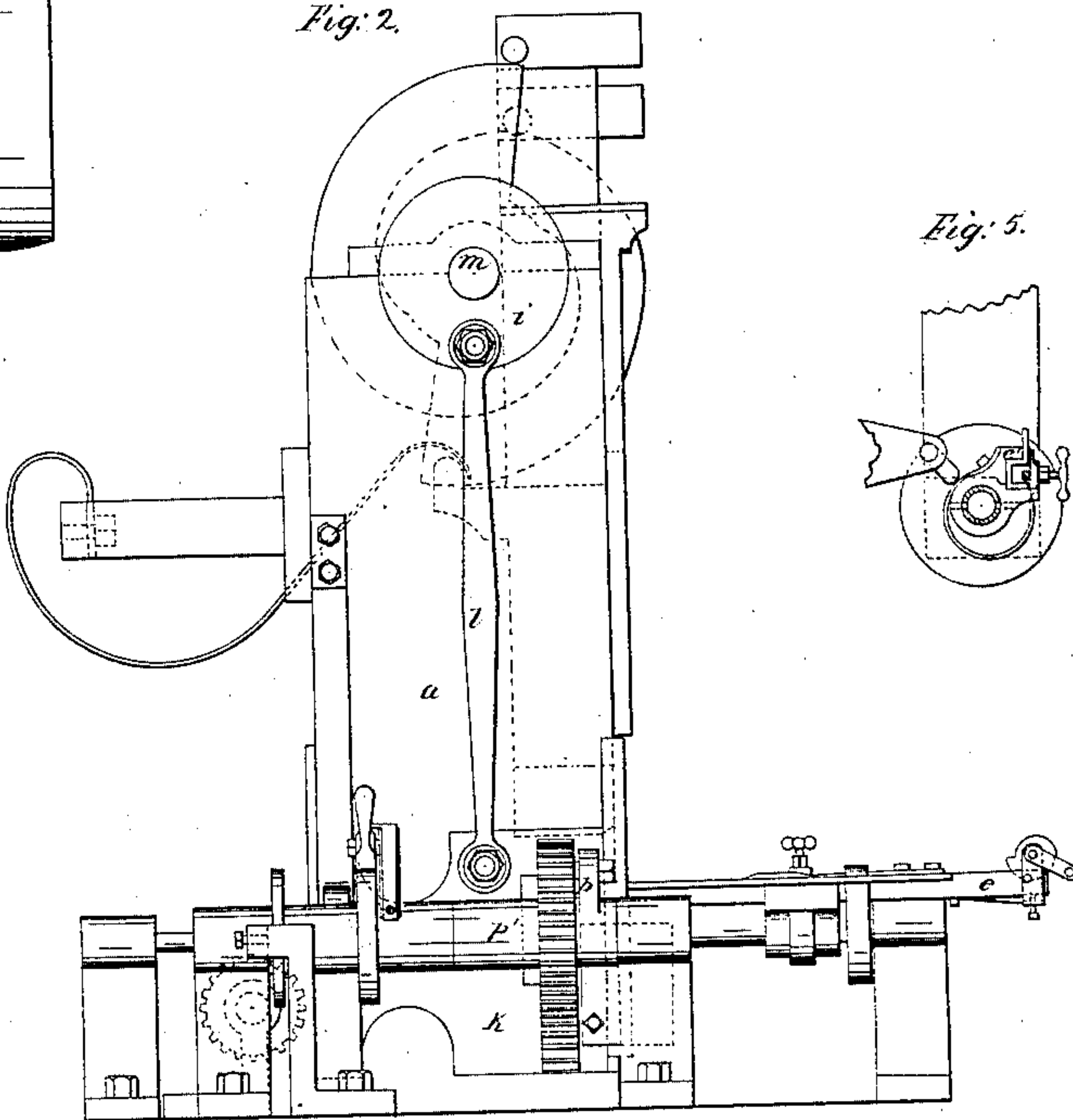


Fig. 5.

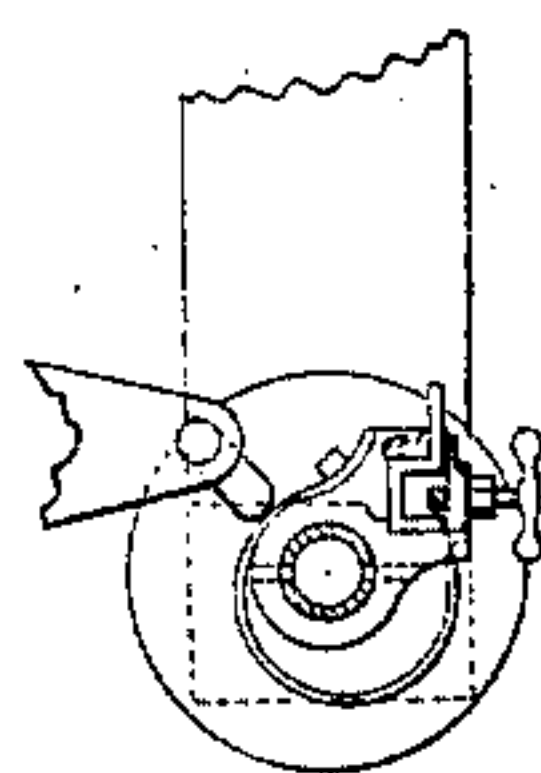


Fig. 3.

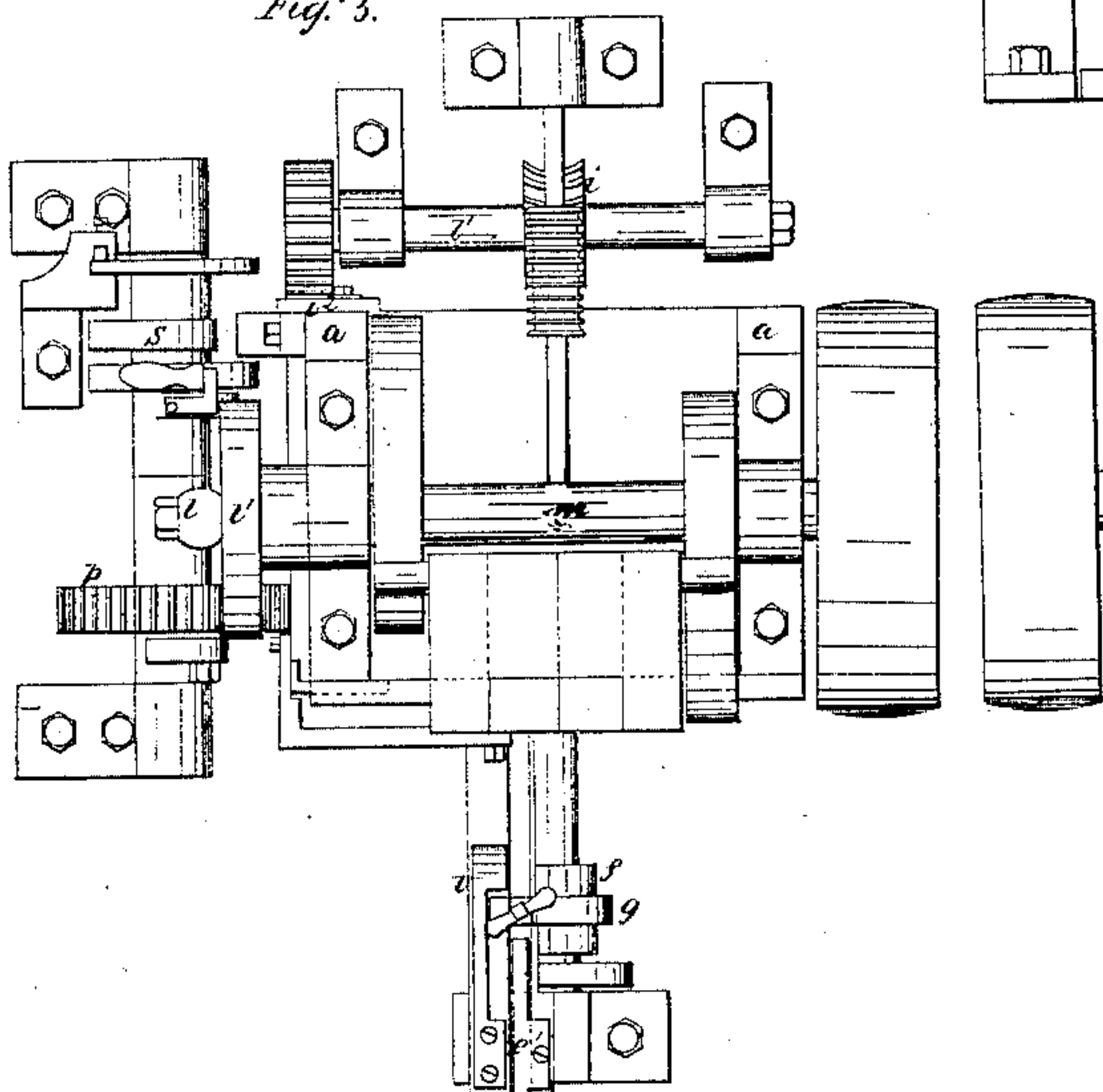


Fig. 4.

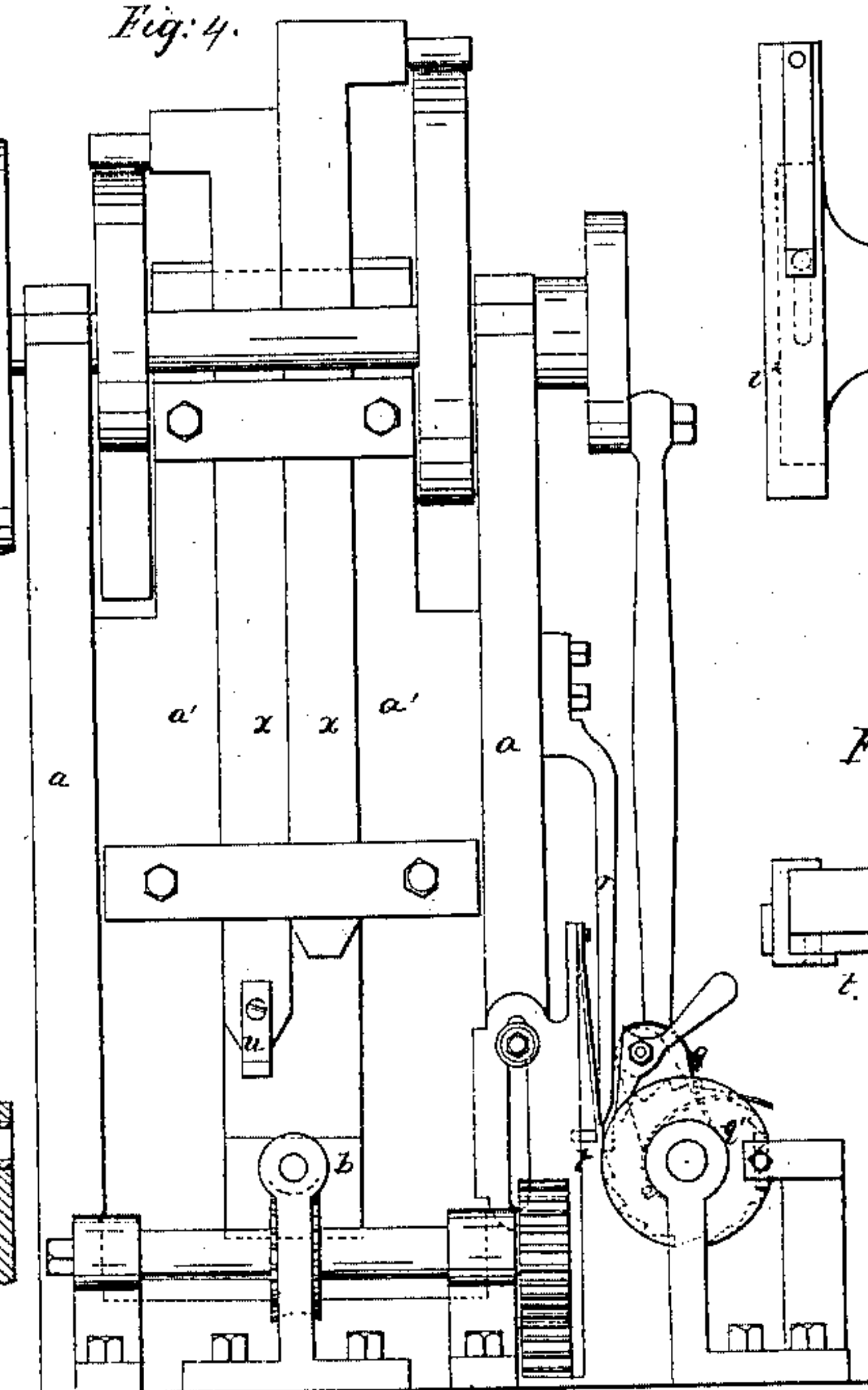


Fig. 7.

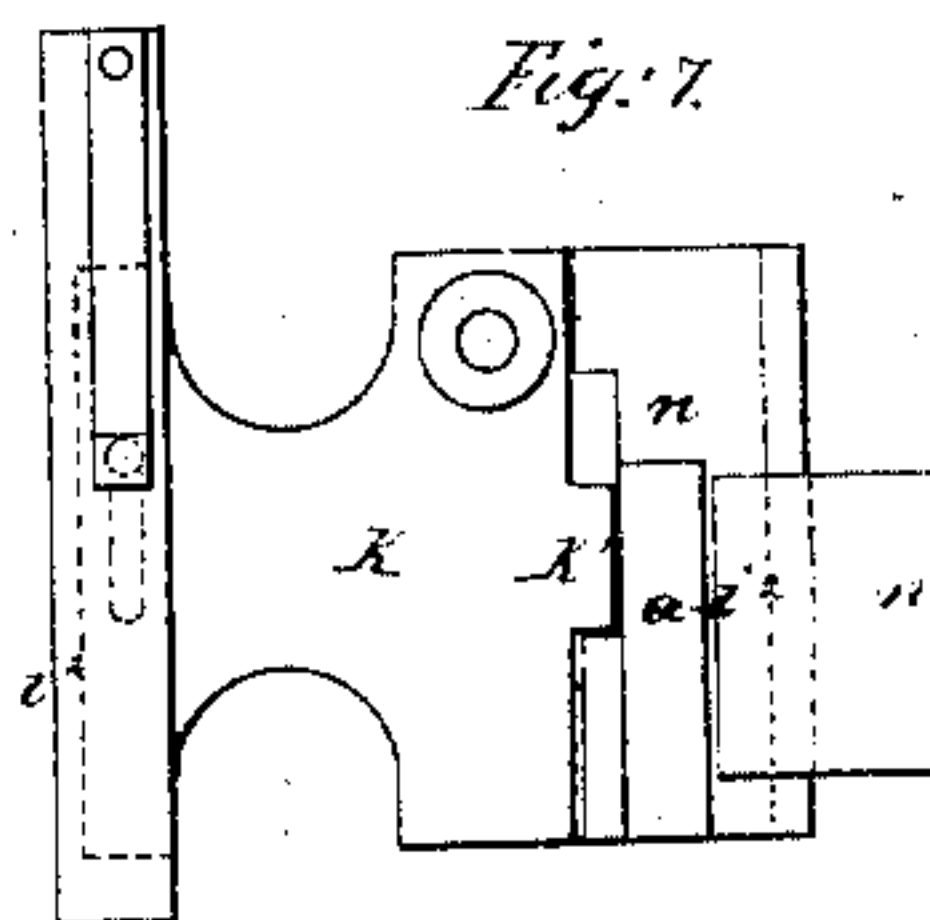


Fig. 6.

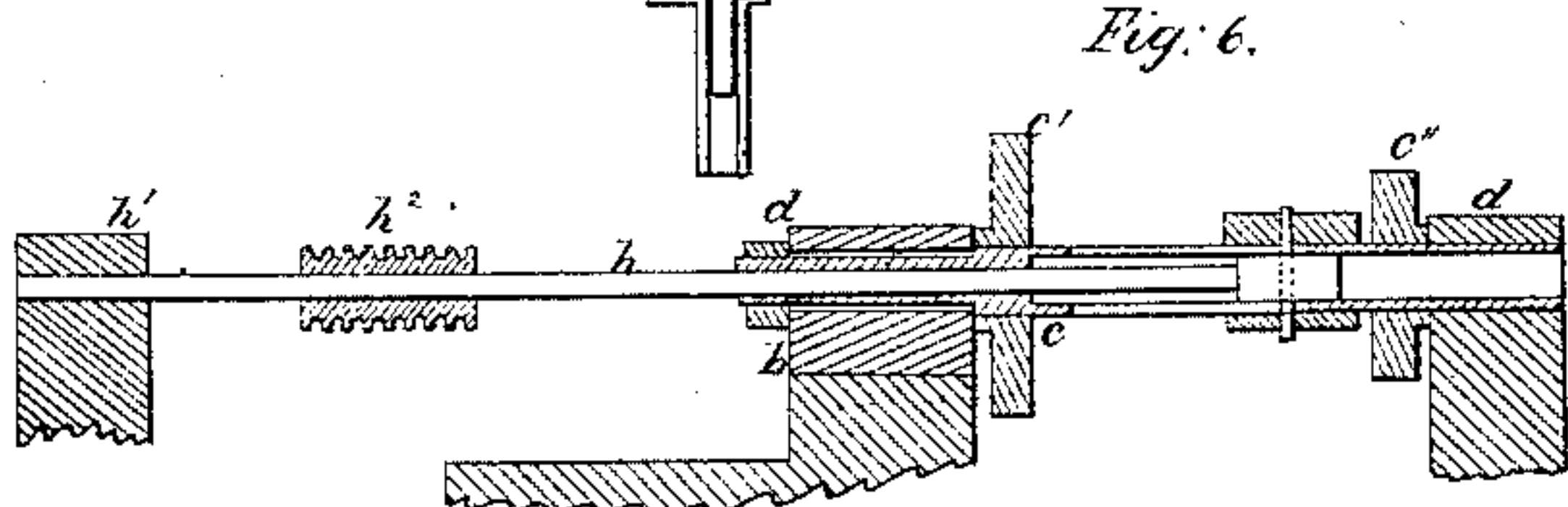
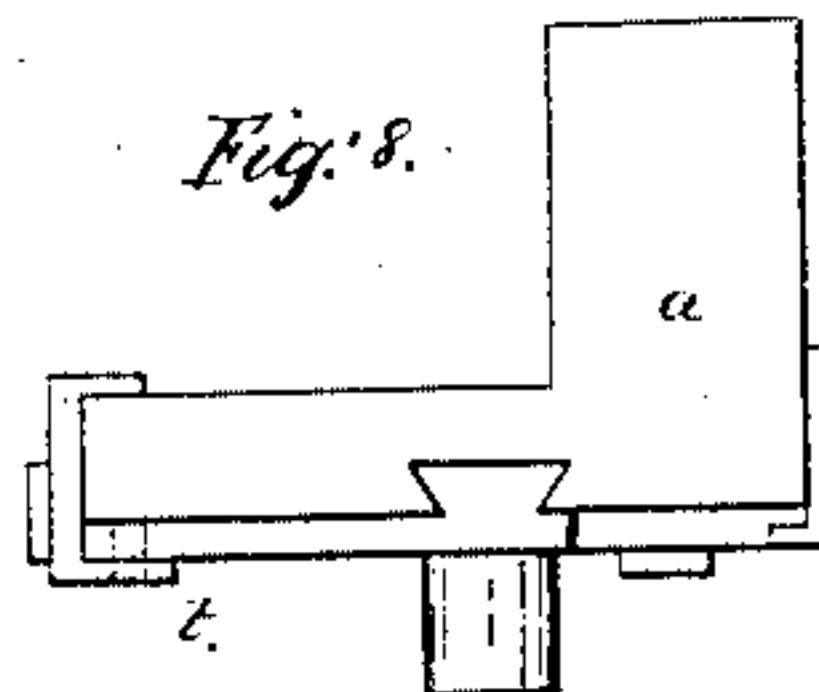


Fig. 8.



UNITED STATES PATENT OFFICE.

SMITH GARDNER, OF NEW YORK, N. Y.

MACHINE FOR MAKING WROUGHT NAILS.

Specification of Letters Patent No. 17,502, dated June 9, 1857.

To all whom it may concern:

Be it known that I, SMITH GARDNER, of the city, county, and State of New York, have invented certain new and useful Improvements in Manufacturing Wrought Nails; and I do herein describe and ascertain my said invention, reference being had to the accompanying drawing, in which—

Figure 1, is a front elevation. Fig. 2, is a side elevation, right hand. Fig. 3, is a top plan. Fig. 4, is a rear elevation. Fig. 5, is a detached portion showing the feeding tube in the opposite position to that shown in Fig. 1. Fig. 6 a longitudinal section through the feeding apparatus and anvil; Fig. 7, elevation of the gate detached; Fig. 8, top edge of the same with racks.

My invention is made to produce a wrought iron nail, such as a horse-shoe nail, or for similar purposes formed entirely automatically and cut off complete ready for use.

The construction is as follows: I make a solid frame work *a a* at the bottom of which between two cheeks *a' a'* there is an anvil *b* the upper surface or face of which is formed to suit the shape of the nail to be made one half being like one side of the nail and the other like the other adjoining side. Just in front of the anvil my feeding apparatus is placed which not only feeds forward the nail rod but also turns it at each blow till the perfect nail is formed, and then places it under the cutter to sever it from the rod; this feed apparatus consists of a hollow mandrel *c* having upon it two flanches or disks *c' c''*. This mandrel has its front bearing in a standard *d* and passes through a hole in the anvil *b* which is made large, so as not to touch the mandrel; the rear bearing *d'* is just behind the anvil, and independent of it, which prevents the jar of the anvil, or its heat when in full operation being communicated to the mandrel or its working parts. A spout of metal *e* is affixed to the flanches *c' c''* on the mandrel which are cut out to receive it, and into this spout which is just level with the face of the anvil the nail rod is put; a spring *y'* affixed to the under side of the spout and from its loose end two up-rights extend up on each side of the spout and hold an eccentric or cam between them as seen in Figs. 1 and 9. This cam bears on the rod as it moves forward when drawn from under the hammers after the nail is cut off until it brings the spring up against

the spout when it grips it and prevents its moving any farther. This is of great importance as without it I cannot gage the feed properly. A sleeve *f* surrounds the mandrel bearing upon it a stout spring *g* the end of which lies over the open side of the spout, (see Fig. 5.) A set screw passes through the spring and bears directly upon the nail rod. Through the center of the mandrel *d* a rod *h* passes and extends back to a bearing in a standard *h'*; the front end of this rod is enlarged to fill the interior of the hollow mandrel and is connected with the sleeve *f* around the mandrel by a pin that passes through them all. This pin moves to and fro in a slot in the mandrel, clearly shown in Fig. 6, when the rod gives motion to the sleeve; a portion of the sleeve projects through the bottom of the spout *e* so that the nail-rod rests on it, and is firmly gripped thereto by the set screw in spring *g* so as to move with the sleeve and rod. On the rod behind the anvil there is a cylindrical rack *h²* that works into the spur wheel *i* below, which is hollowed to receive the cylindrical rack. Spur wheel *i* is on a shaft *i'* on one end of which is another spur wheel gearing into a rack *i²* that slides vertically on the frame shown in Fig. 2. A sliding gate *k*, (shown detached in Figs 7 and 8) is connected with the driving or cam shaft *m* by a connecting rod *l* and crank pin on disk *l'* on the end of said cam shaft by the rotation of which the gate is moved up and down; a projection *k'* on the front side of the gate catches a slide piece *n* sliding on the frame outside it and carries it up and down with the gate.

It will be noticed in Fig. 7, that the notch in the slide *n* is somewhat longer than the projection *k'* giving the projection play so as to allow the slide *n* to remain at rest a short time at the termination of each movement up or down. The slide *n* bears upon it an arm *n'* that extends inward to the disk *c'* on the mandrel most clearly represented in Fig. 1, where it is so connected as to turn said mandrel a quarter revolution at each vibration first in one direction and then back. This motion causes the nail-rod that projects beyond the trough a proper distance and lies on the anvil under the hammers to receive a blow on the side and edge alternately until the nail is completely formed. The hammers are two in number and are made to rise and fall consecutively

by means of cams of proper shape above. The weight of these hammers may be aided by springs to bring them down if found necessary. When a blow is given to the nail rod it stands still until the hammer is raised out of the way, it is then turned onto the other side under the other hammer and receives a blow, and again rests, as before described, the rest being effected by the elongated notch in n into which projection k' plays. After a sufficient number of blows have been struck, determined by the kind of nail to be made it is to be cut off and the rod again properly presented for the succeeding nail. The mode of effecting this is as follows: A rack o is formed on slide n into which a spur wheel p gears; this spur wheel p is loose upon its axis the hub being extended out (see p' Fig. 2.) Besides this wheel there is a radial arm p^2 affixed to the axis having a stud on its end that enters a slot in the face of the spur wheel p . The length of this slot can be determined by the slide pieces p^3 (see Fig. 1.) These regulate the extent that the spur wheel can play or turn independent of the arm and axis and consequently the degree the axis will be vibrated by it. On the same shaft or axis a pawl arm q is affixed with a pawl on its end that takes into a ratchet wheel q' turning it a given determined distance at every revolution of the cam shaft m . The number of these distances in the whole circumference of this wheel governs the number of blows required to form each nail.

On the hub of the ratchet wheel q there is a spring s that revolves around with it, and as this spring comes around toward the frame it strikes a permanent guard r affixed to the frame which presses it inward and as it leaves the lower end of the guard r it strikes a pin t which it forces into a hole in the gate k . This pin t is connected with the slide rack i^2 and couples said rack with the gate k by which it is raised, putting the rod h into motion, sliding it back and carrying with it the sleeve until the head of the finished nail formed on its end reaches the rear edge of the anvil and under a knife or shear u (see Fig. 4.) Affixed to one of the hammers, it is by this cut off; after which, the rod is drawn back until it arrives at the proper point to receive the first blow for the succeeding nail when the end of the spring g that holds the rod is raised and moves back to take a new grip upon the nail rod. The distance of this feed is determined

by the spring catch v that raises the spring g , when the nail is carried back to the cut off. The spring g passes under this catch v (shown in Fig. 3,) but in returning after the nail is cut off it rides over the cam v a distance equal to the length of rod required to form the nail. When this movement is completed by the ascent and descent of the rack i^2 coupled as above stated with the gate k the pin t is drawn out by means of a spring t' to which it is affixed (see Fig. 4,) and the rack i^2 and gate k are disconnected, the former remaining at rest till the proper number of blows are given to make a nail upon the new portion of rod presented, at which time the spring s again comes around to couple the gate and rack for a new cut off. To prevent the ratchet wheel q' from being thrown around too far by the sudden action of the pawl when the machine is in rapid motion I affix a friction disk w to the hub or sleeve thereof on which I bring a sufficient friction to prevent it. I also propose to use a similar device for the axis to which arm p^2 is affixed if found necessary for a like purpose.

This device although described for the making of nails is to be understood as covering the swaging other articles such as spikes, bars, springs, &c.

Having thus fully described my new nail machinery what I claim therein as my invention and for which I desire to secure Letters Patent is—

1. The feeding apparatus constructed substantially in the manner and for the purpose herein specified.

2. I also claim projecting the finished nail to the rear of the anvil to be cut off as described.

3. I also claim the eccentric y and spring to hold the nail rod when rapidly brought back to its place.

4. I also claim vibrating the rod under the two hammers so as to alternately receive a blow on its different sides as above set forth, and by means substantially herein described.

5. I also claim the general combination and arrangement of the several parts of the machine for feeding, presenting, swaging, and cutting off the finished nail by which I make a wrought iron nail of any specified pattern.

SMITH GARDNER.

Witnesses:

WM. GREENOUGH,
J. J. GREENOUGH.