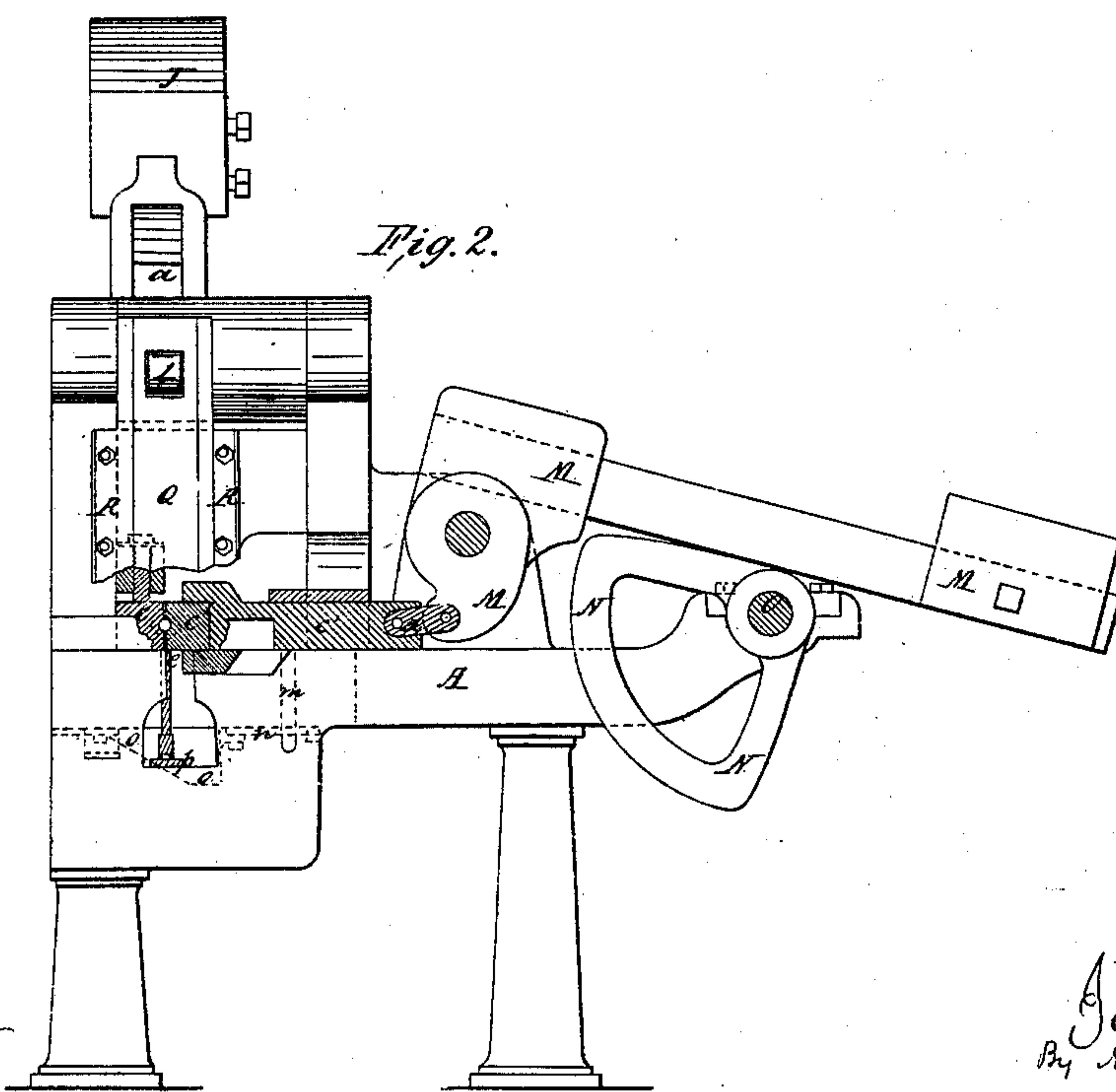
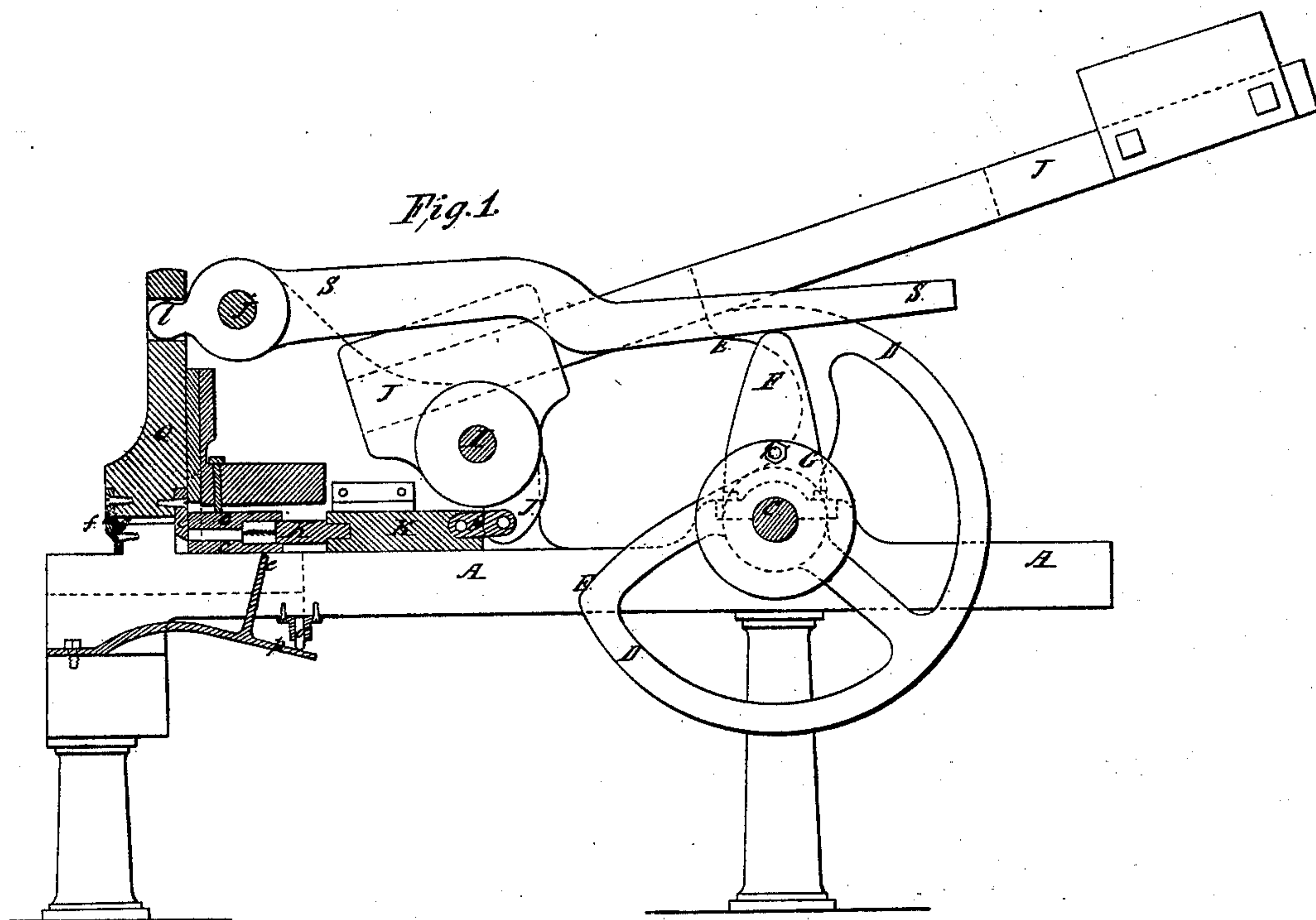


J. S. Hall,

Bolt, Spike & Rivet Machine.

N<sup>o</sup> 80,478.

Patented July 28, 1868.



Witnesses:

Geo. D. Patten  
Thos. Jewell

Inventor:

John S. Hall  
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Fig. 3.

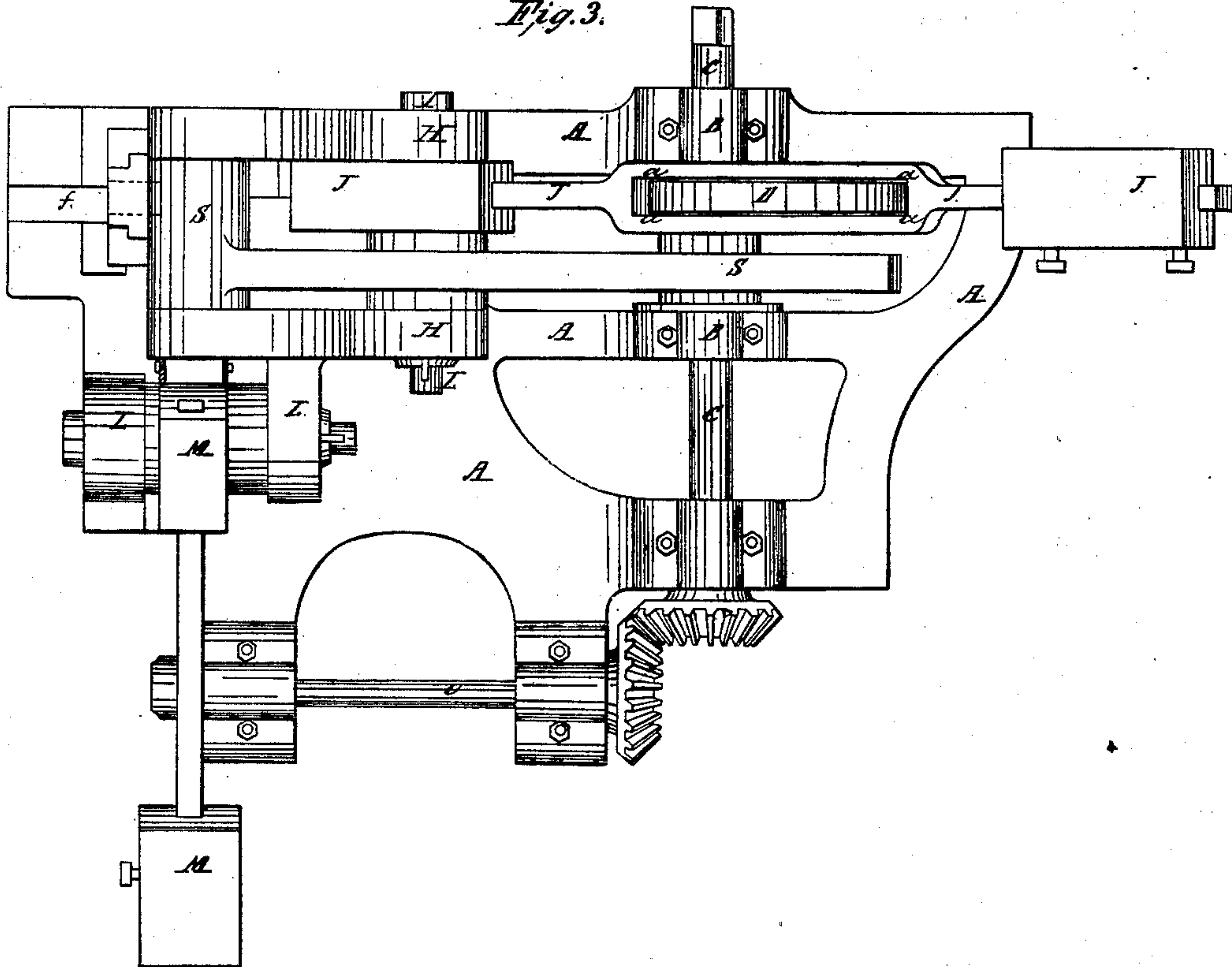
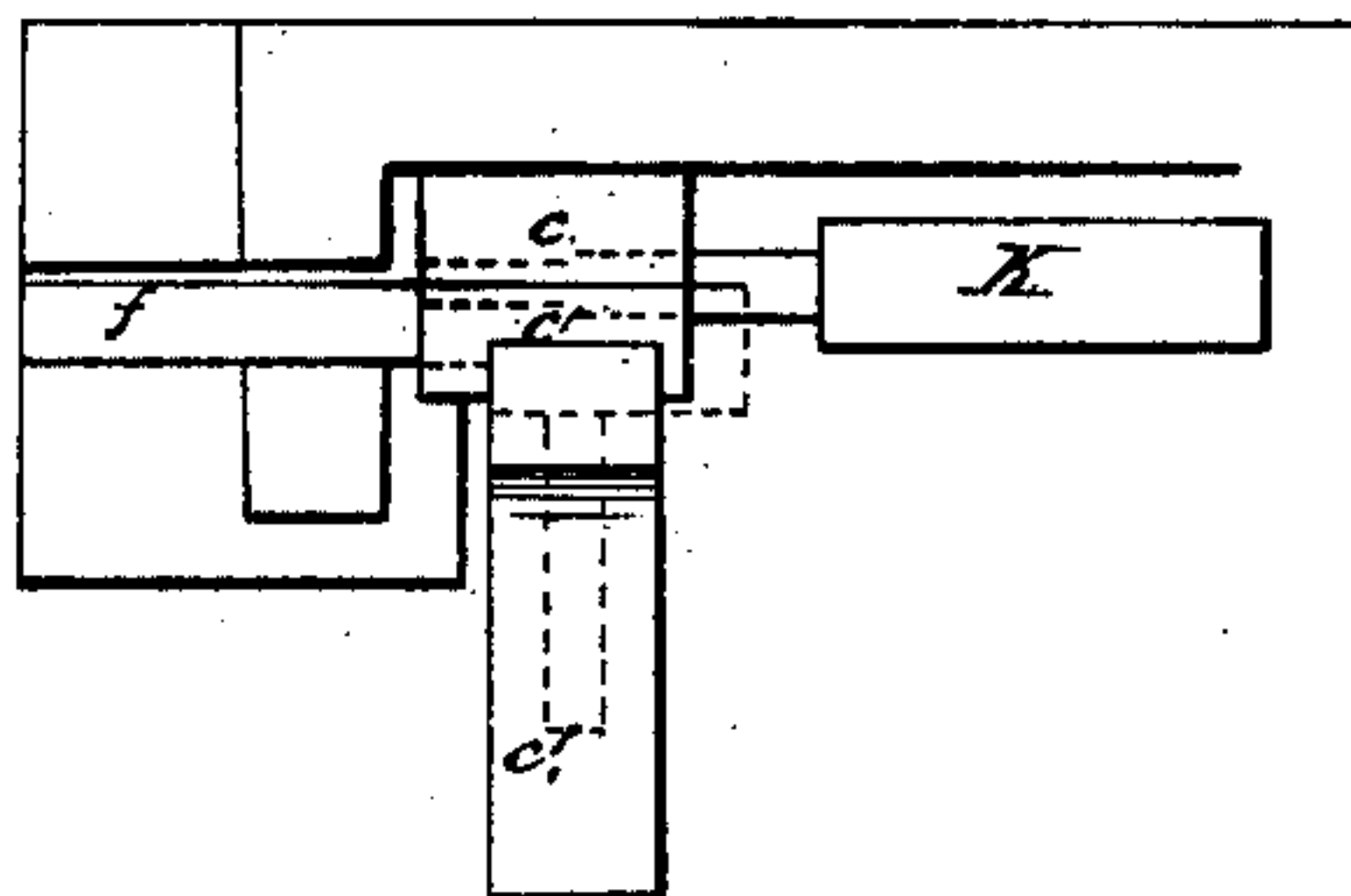


Fig. 4.



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Inventor:

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By H. B. Stoughton, atty.



# United States Patent Office.

JOHN S. HALL, OF PITTSBURG, PENNSYLVANIA.

*Letters Patent No. 80,478, dated July 28, 1868.*

## IMPROVED MACHINE FOR MAKING BOLTS AND SPIKES.

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

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN S. HALL, of Pittsburg, in the county of Allegheny, and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Making Bolts, Spikes, and similar articles; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a longitudinal vertical section through the machine, showing more particularly the heading operation.

Figure 2 represents a vertical transverse section, showing more particularly the gripping of the bar or blank.

Figure 3 represents a top plan of the machine, and

Figure 4 represents a top plan of a portion of the gripping and heading-mechanism, not clearly seen in fig. 3.

Similar letters of reference, where they occur in the separate figures, denote like parts in all the drawings.

My invention relates more particularly to the operation of the header, which, though worked by a cam, comes against the end of the bar or blank by a sudden blow or impact, which forms a very perfect head, and on the largest of bars, or rods, or blanks.

And my invention further relates to the manner of removing the bar, rod, or bolt or spike, after it has been made, from the machine.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A represents the bed of the machine, on which is supported, in bearings B, a shaft, C, that is turned by any suitable power and appliances, and having upon it, and turning with it, a cam, D, a portion of the perimeter of which is cut away, as at E, and also a tappet, F, and collar, G.

In pillar-blocks H, on the bed A, is hung a shaft, I, upon which is placed a weighted lever, J, that is slotted in the line of its length, as at *a*, fig. 3, said lever extending rearwards of the machine, and so as to come within the range of the cam D, and be operated by it. To the lower part of the shaft I, or to the lower part of the hub of the lever J, the header K is connected by a link, *l*, so that the rising and falling of the lever J will move the header back and forth horizontally, or nearly so, in its ways, so as to work in dies or formers, to strike up the head upon the bar, rod, or blank, when placed therein.

The gripping and forming-die is made of two parts, *c c'*, the former being permanently secured on the bed A, and the latter being movable, as will be explained, for the introduction of the bar, rod, or blank to be headed.

On or in pillar-blocks L L, at or near the front of the machine, is pivoted a weighted lever, M, to which is connected, by a link, *d*, the movable portion, *c'*, of the die, as seen in fig. 2. This lever M is raised up and let down by a cam, N, on the end of a shaft, O, which shaft gets its rotation from the shaft C, through the bevel-gears P P, and this rising and falling of the weighted lever M opens and closes the die.

Underneath the bed is arranged a gauge, *e*, for defining the distance that the bar, rod, or blank shall project into the die. This gauge is operated by or from the movable portion *c'* of the die, or from the lever M, so that, when the die is open to receive the rod or blank, the gauge will be in position to stop it at the proper position in the die, and when the die closes, the gauge is drawn away, and the rod, bar, or blank is rigidly gripped in the die, and ready to receive the blow of the header. The bar or rod, when long, is fed in at *f*, and when the head is formed upon it, and the die is opened, it will drop down, and can be drawn out very readily, there being nothing to prevent it from being taken out.

When spikes or bolts are made, and the blanks are cut from a bar or rod, then the bar or rod is fed in over or above the stationary shear *g*, and it is cut off by a moving shear, *h* or *i*, on the shear-stock Q, according to the length to be cut off. The shear-stock is worked in its ways or guides, R, by means of a lever, S, pivoted at *j*, and extending rearward, and raised and lowered by the tappet F, which is made fast to the collar G by a screw-bolt, *k*, or otherwise, so that it will turn with said collar, and with the shaft C, to which the collar is fastened.



When heading long bars, rods, or bolts, the shears are not used, and when not required in use, the tappet F is released from the collar G, and thus being loose on the shaft, does not revolve with it, and when thus released, the lever S drops at its rear, and raises the shear-stock and shears above the point where the long bar, rod, or bolt is fed in, and they remain there inactive.

An arm, *l*, on the lever-head or hub, projects into a slot in the shear-stock Q, and by this arrangement the shear-stock is moved when in use.

When very short bolts are headed, so much so that their shanks do not afford sufficient surface for the griping-dies to hold on to and resist the force of the heading-ram, then the shear *i*, which works close up to the dies, may serve to hold this short bolt or blank, in part, against the force of the ram or header, its position, as shown in fig. 1, admitting of such use of it, as it has also a support against the stationary shear *g* and its stock.

The gauge *e*, as before stated, is worked from the griping-ram, to move it into and out of position, at proper intervals, by means of a stud, *m*, that is in the griping-ram, and extends into a pivoted lever, *n*, underneath the bed, said lever *n* having a wedge, *o*, or its equivalent, upon it, that takes against the spring-arm *p*, that carries the gauge, and moves the gauge away from between the dies, after the bar or rod has been properly placed or griped in the dies, and which spring, as the wedge is removed by the reverse action of the griping-ram, returns the gauge again into its active position. The gauge *e* is so located with regard to the dies and the header as that there shall be considerable space between the end of the bar-rod or blank and the point where the ram starts from, so that the header shall have acquired great impulse before it reaches the end of the bar, rod, or blank, and form the head by a blow, and with a comparatively light hammer. When the bar, rod, or blank is fed in until it reaches the header, or, in other words, when the header is the only gauge to the feeding, then it has no space in which it might accumulate force by falling, to strike a sudden blow, and, in such case, the header would have, though weighted, but little, if any, greater force than those worked by a positive pushing-motion from a cam.

When the size and form of the bolts or spikes are changed, of course a corresponding change is made in the shears and in the dies, but the operation is substantially the same. In very long bolts or tie-rods, which are headed, the shears are not required. And in making such articles, my machine affords great facilities for removing such long pieces, for the moment the dies open, the bolt or bar drops down out of the die, and clear of the encumbering parts of the machine, whence it can be drawn out endwise.

In most, if not all, of the heading-machines heretofore made, the finished article has to be raised up out of the dies, and when the bar is long and heavy, this is no easy hand operation; besides, the head being large, cannot be drawn out of a space that would be large enough to feed the bar through. There is, therefore, a very great advantage in my construction of machine, so far as the delivery of the headed bar, rod, or bolt is concerned, viz, by dropping from the dies, upon a support of any kind, which may be a roller, and thus, without any lifting, be readily withdrawn.

In very heavy work, the gauge may be dispensed with, or arranged at the sides, so that there will be clear, unobstructed space below the dies for the bar or bolt to drop through and be drawn out. But, in either of these cases, the heading-ram must have space enough to pass through before it reaches the rod, bar, or bolt, or blank, to get up the necessary speed or motion to strike a sudden blow. The momentum desired, accomplishing with a small ram what a positive cam-motion of many tons would hardly accomplish.

The shear *i* works so close to the dies that the latter act in conjunction with said shear *i*, to sever the blank or bolt from the rod.

The closing of the dies upon the hot metal to be headed, and the impact of the heading-ram, as also the opening of the dies, releasing of the headed article, and withdrawal of the header, are all done in an instant of time, so that the dies and header do not become highly heated, or at all.

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

1. The combination of the heading-ram and its lever with the griping-dies, gauge, and with the cam D, so that the ram shall have attained great momentum before it reaches the bar, bolt, or blank in the dies, and thus form the head, substantially as described.

2. I also claim the unobstructed space under or below the dies and feeding-point, so that when the griping-ram recedes, after heading or upsetting of the end of a long bar or bolt, said bar or bolt may drop out of the dies, and thence be drawn out of the machine, substantially as described.

JOHN S. HALL.

Witnesses:

A. B. STOUGHTON,  
JAMES DUTHIE.