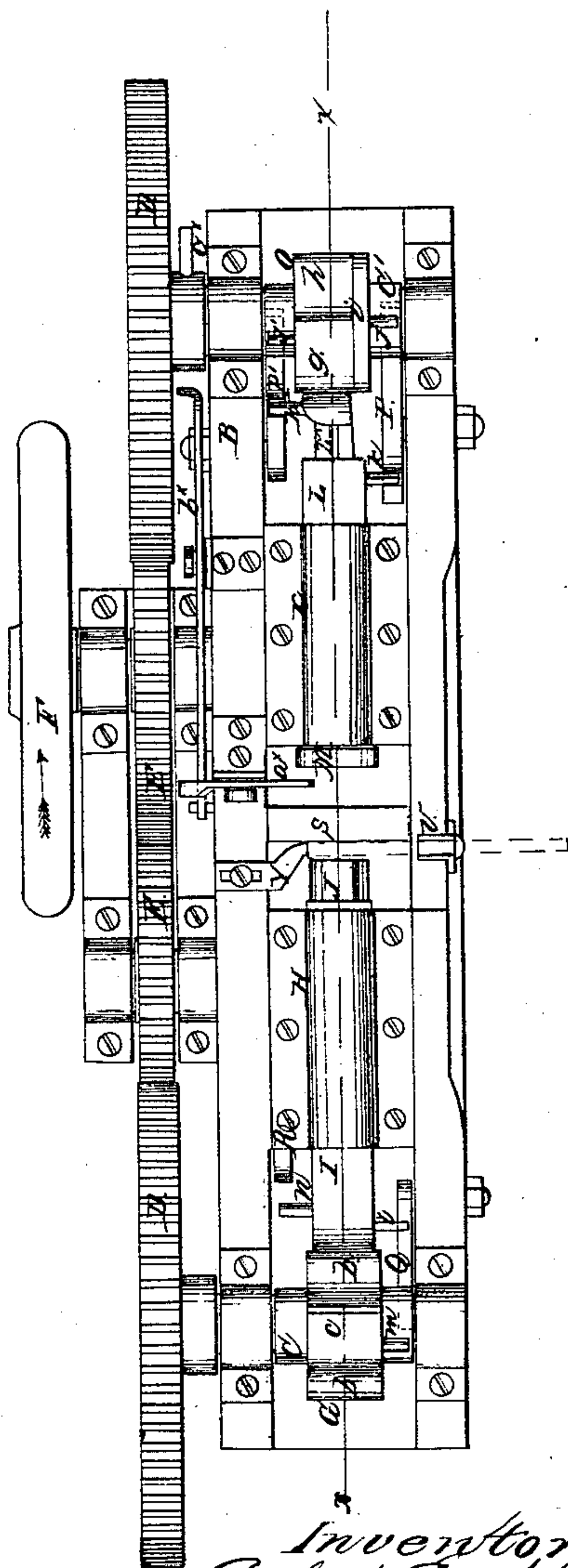
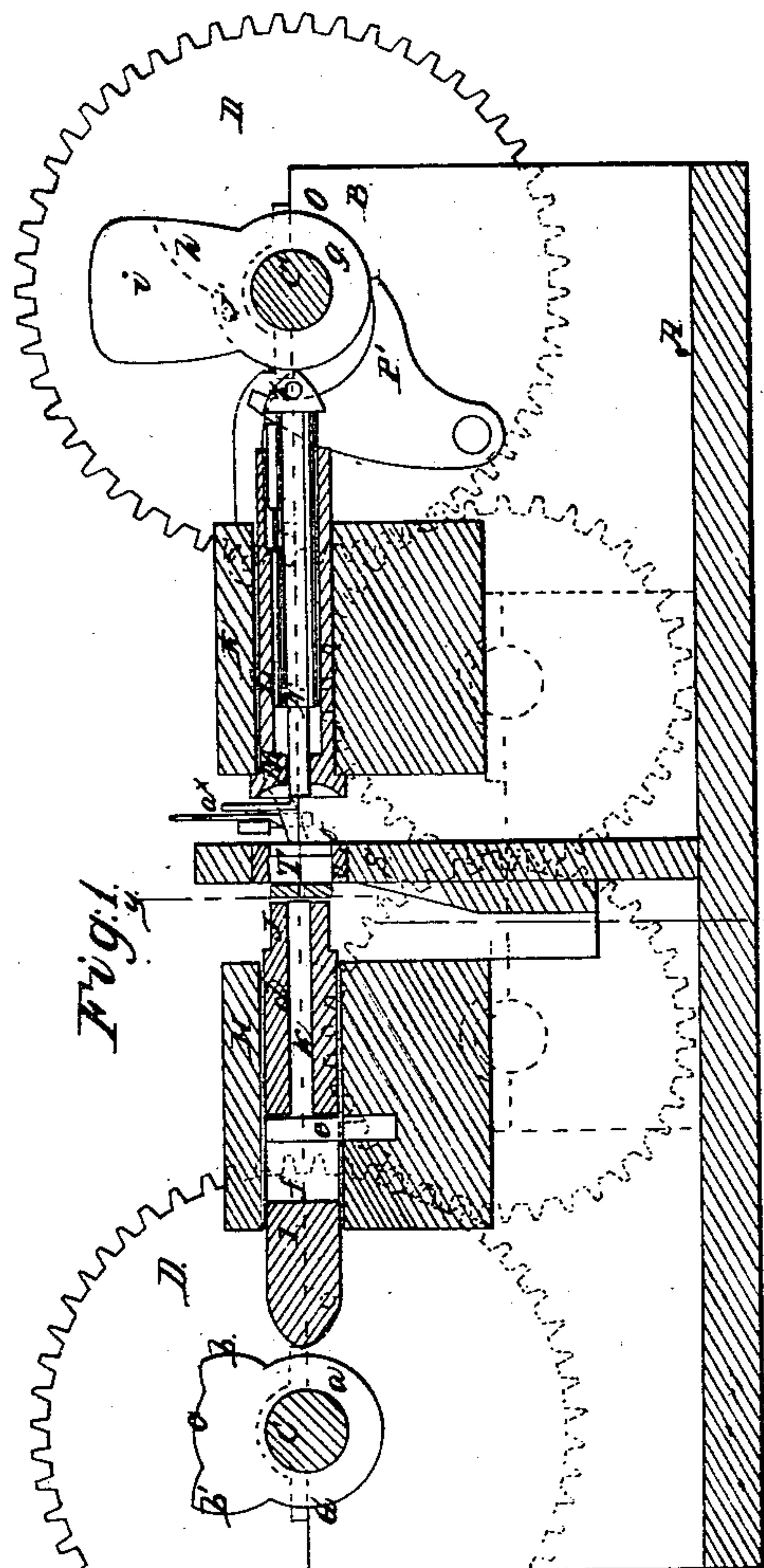
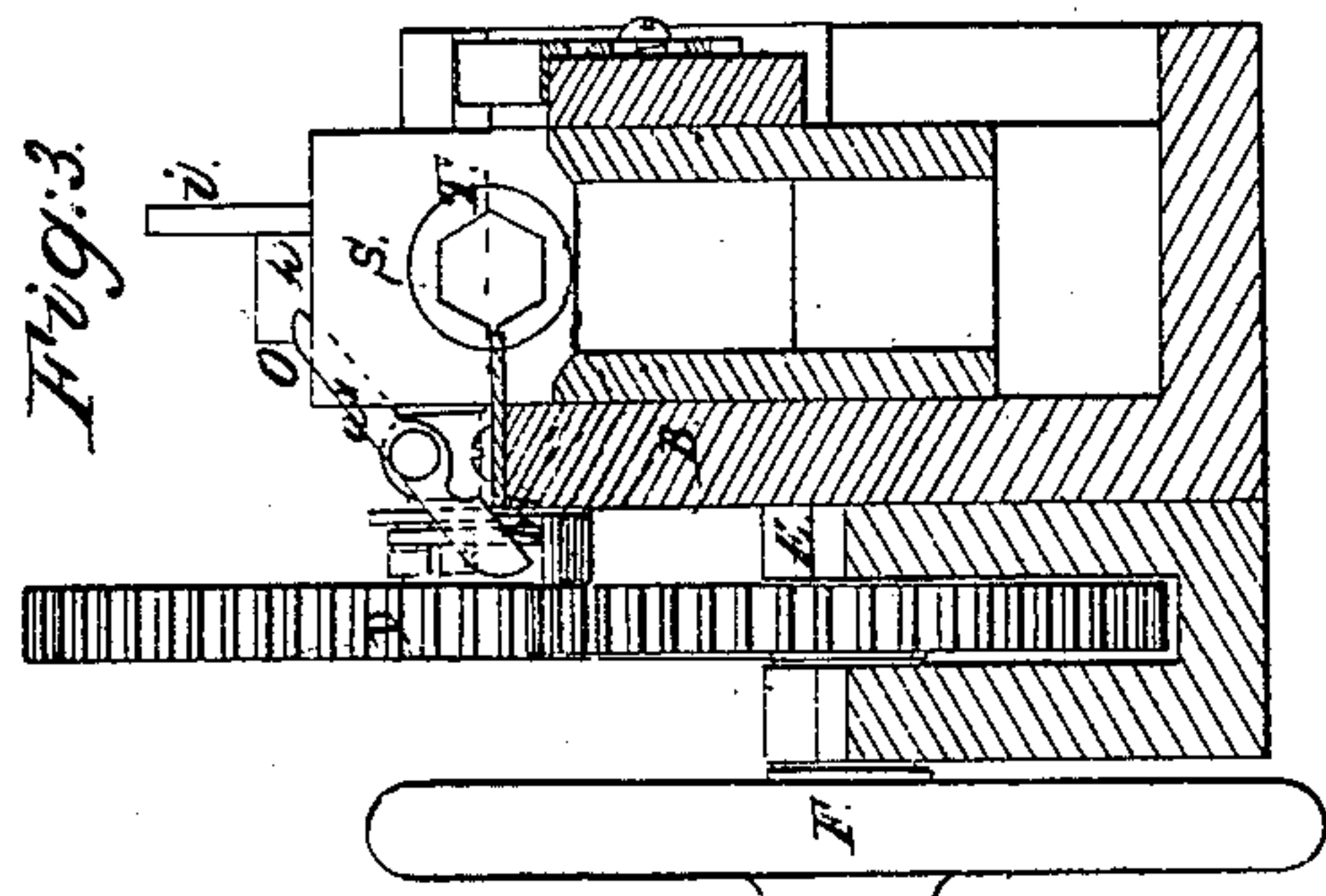


*A. Emerson.*

### Nut and Washer Machine.

*N<sup>o</sup> 64, 510.*

*Patented May 7, 1867.*



Witnesses;  
Thos Twiss  
J A Service

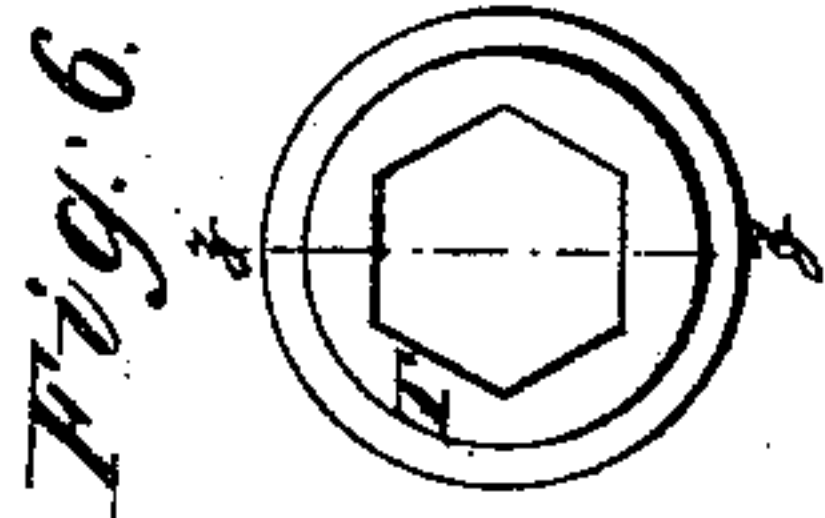
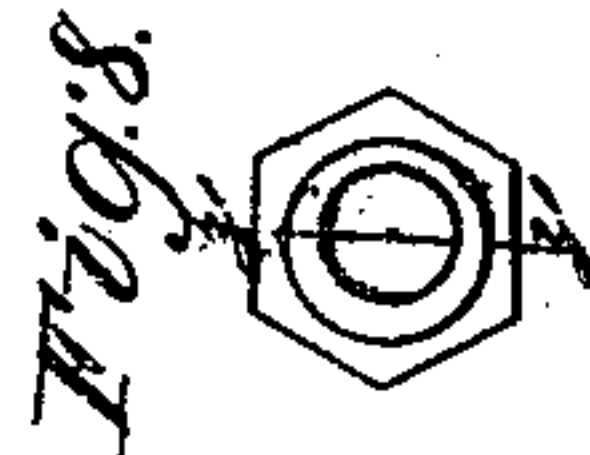
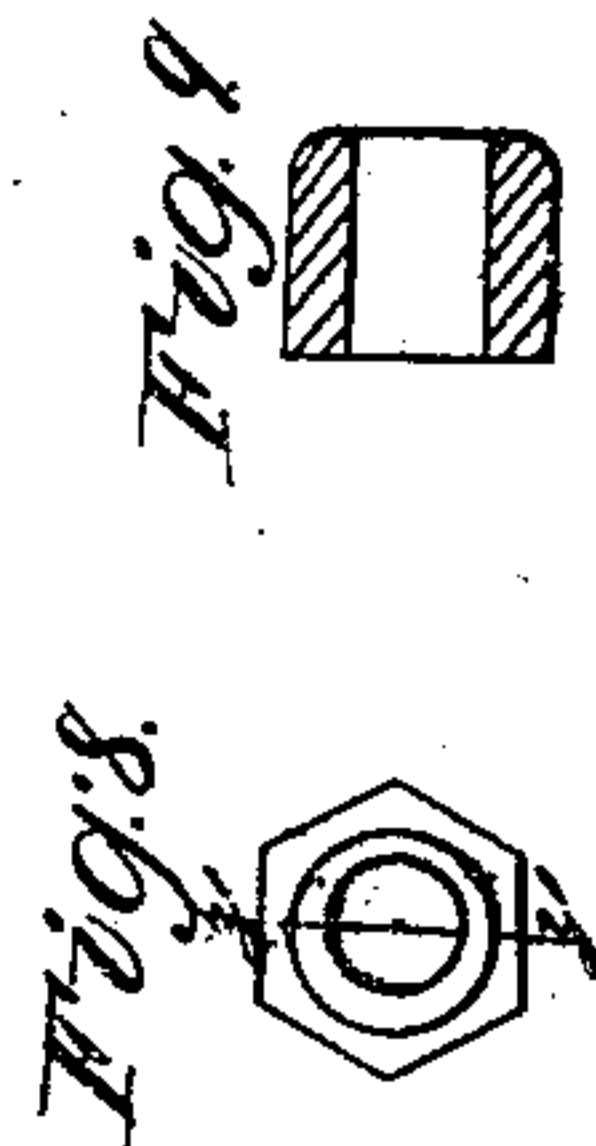
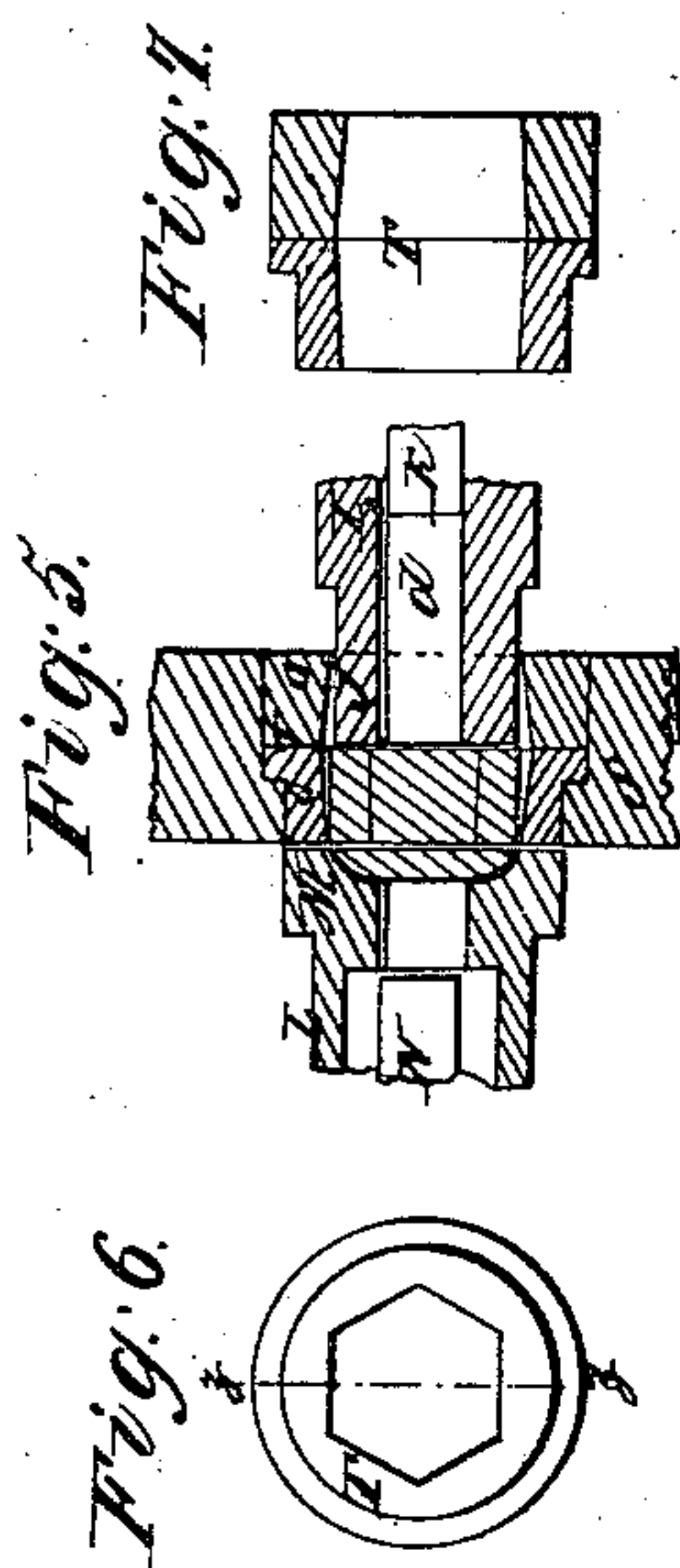
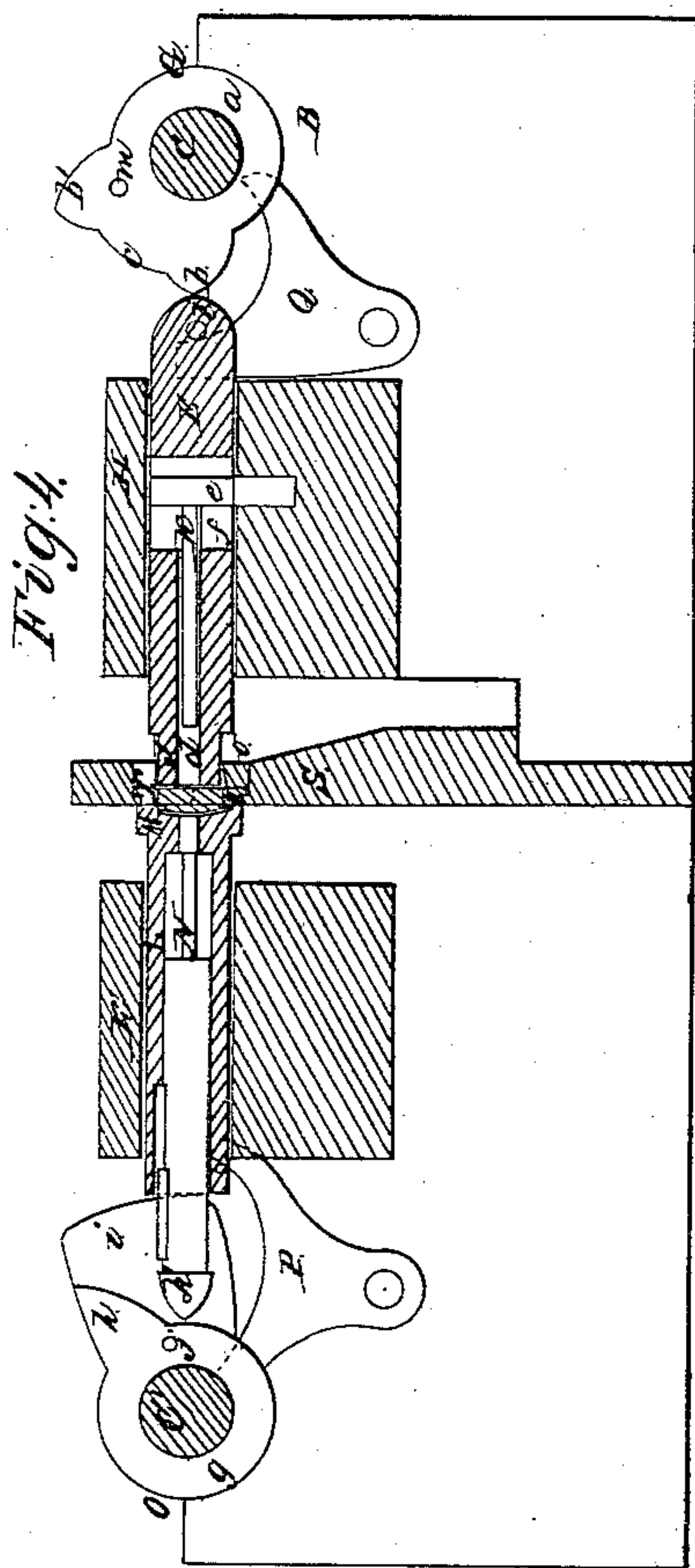
Inventor:  
Andrew Emerson  
Per Hymus Co  
Attorneys.

*A. Emerson.*

### *Nut and Washer Machine.*

*N<sup>o</sup> 64, 510.*

*Patented May 7, 1867.*



*Witnesses;*

Thos Fische  
J. A. Sewer.

*Inventor;*

Andrew Emerson  
Per Myself  
Attest



# United States Patent Office.

ANDREW EMERSON, OF NEW YORK, N. Y.

Letters Patent No. 64,510, dated May 7, 1867.

## IMPROVEMENT IN MACHINES FOR MAKING NUTS.

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, ANDREW EMERSON, of the city, county, and State of New York, have invented a new and improved Machine for Making Nuts and Washers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to a new and improved machine for making nuts and washers, and has for its object the forming of the same with angular or sharp edges, and with smooth surfaces or sides, so as to have a finished and neat appearance. The chief difficulty attending the manufacturing of nuts by machinery is the giving them a smooth finished exterior and sharp angular corners. Heretofore there has always been a rough surface and the corners rounded in a greater or less degree, a result fully obviated by my invention. In the accompanying drawings—

Figure 1, sheet number 1, is a vertical longitudinal section of my invention, taken in the line *x x*, fig. 2.

Figure 2, a plan or top view of the same.

Figure 3, a transverse vertical section of the same, taken in the line *y y*, fig. 1.

Figure 4, sheet number 2, is a vertical longitudinal section of the same, taken in the same line *x x* as fig. 1, but showing the working parts in a different position.

Figure 5, an enlarged longitudinal section of the dies and punch pertaining to the same.

Figure 6, a detached side view of the female die.

Figure 7, a section of fig. 6, taken in the line *z z*.

Figure 8, a face view of a nut constructed by my machine.

Figure 9, a section of the same, taken in the line *z' z'*.

Similar letters of reference indicate like parts.

A represents a bed-piece; on which a framing, B, is placed and secured in any proper manner to support the working parts. C C' are two shafts placed transversely on the framing B, one near each end, and having toothed wheels D D at one end which gear into wheels E E of equal diameter, the wheels E E gearing into each other, and consequently forming a connection between the wheels D D. The shaft of one of the wheels E is provided with a driving-pulley or wheel, F, the power being applied to said shaft. On the shaft C there is a cam, G, composed of a portion, *a*, which is a part of a cylinder, and two projecting portions, *b b'*, with a curved surface, *c*; between, as shown clearly in figs. 1 and 4. H is a guide fitted on the framing B, and having a horizontal slide, I, fitted within it, one end of which is a male die, J, and corresponds in shape to the nut or washer to be made. The slide I has a hole, *d*, made in it extending the greater portion of its length, and in this hole a rod, K, is fitted, said rod being stationary and attached to an upright bar, *e*, in the guide H, and passing through an oblong slot, *f*, in the slide I, the length of said slot admitting of the requisite sliding movement of the slide I, as will be understood by referring to figs. 1 and 4. K is a guide similar to H, which is also fitted and secured on the framing B, and has a horizontal slide, L, within it, one end of which is a female die, M, corresponding in shape to the desired form of the face or upper side of the nut or washer, which in this case is a concave, forming a portion of a sphere. Within this slide L there is a punch, N, which works through the centre of the female die M, as will be understood by referring to figs. 1, 4, and 5. On the shaft C' there is secured a cam, O, having a portion, *g*, which forms the greater portion of a cylinder, and a projection, *h*, extending from *g*, as shown in fig. 4. This cam O also has a projection, *i*, attached, and pins *j j'* extending horizontally, one from each side of it; and within the framing B, below the shaft C', there are two levers, P P', one of which, P, acts upon a pin, *k*, extending from the slide L, and the other, P', acts upon a pin, *k'*, extending from the outer end of the punch N. Within the framing B, below the shaft C, there is a lever Q, which acts against a pin, *l*, projecting from the slide I; and the cam G has a pin, *m*, extending horizontally from one side of it. A pin, *n*, also projects from the slide I opposite to the side from which the pin *l* projects, and a spring, R, in the framing bears against pin *n*. S is an upright plate secured permanently in the framing B, midway between the guides H K, and having a female die, T, fitted within it in line with the dies J M at the ends of the slides I L. This die T corresponds in shape to that of the nut or washer to be made, and it is larger in diameter at its centre than at its ends, as shown more particularly in fig. 7. To



facilitate the construction of this die I make it of two parts, *o o*, as shown clearly in fig. 7, which are placed and secured within the plate S firmly in contact, (see figs. 1, 4, and 5.)

The operation is as follows: The bar of metal from which the nuts or washers are formed, shown in red, is placed in a rest, U, at one side of the framing B, the heated end being by the side of plate S, and over the die T, and against a gauge, V, as shown clearly in fig. 2. The pulley or wheel F is rotated in the direction indicated by arrow 1, fig. 2, and the projection *b* of the cam G acts against the slide I and forces the same, and consequently the die J, which is also a cutter, forward and cuts the blank from the bar, and presses the former into the die T, and the slide L is also at the same time moved towards the plate S so that the die M will be pressed in contact with the die T, the die M reaching the die T before the movement of J ceases, so that the latter may press the blank into M and cause a rounded or convex face to be given the blank, as shown clearly in figs. 4 and 5. The projection *b* then passes the outer end of the slide I, and the latter is forced outward in contact with the surface *c* by the spring R pressing against the pin *n*. The slide L was moved forward by the projection *i* of the cam O acting against its outer end, and the die M is held in contact with the die T by projection *i* until after the die and cutter J is moved a trifle back by the action of spring R, and also after the punch N is moved forward by the projection *h* of cam O, said punch being forced through the blank at the central and larger part of die T, into which part the punch is allowed to force it by the backward movement of die J. The perforating or punching of the blank in the larger part of the die I admits of the blank expanding therein, and the pieces of metal forced out by the punch N are driven into the hole *d* of the slide I. After the hole is punched in the blank the slide L and punch N are drawn back by the pins *j j'* acting against the levers P P', the latter acting against the pins *k k'* of the punch and slide. As the slide L and punch N are drawn back the slide I is again forced forward in consequence of the projection *b'* of the cam G acting against it, and this second movement of I causes the die and cutter J to force the blank out from the die I, the projection *b'* being sufficiently long to admit of that. In this discharge movement of the blank the latter has its exterior surfaces made perfectly smooth, and the angles or corners are all sharp owing to the expansion of the blank in the larger part of the die during the punching operation, and the contraction and compression of the blank in being forced out of the end of the die T, which is smaller. As the blank reaches the end of the die T it is punched off by a lever, *a×*, actuated by a larger lever, *b×*, which is operated by a pin, *c×*, on the hub of one of the wheels D. The slide I is then drawn back by the lever Q acting against the pin *l* of slide I, the lever Q being actuated by the pin *m* of cam *g*, the pieces in the hole *d* being discharged by rod K under the backward movement of I. The nuts or washers thus formed have a smooth and finished appearance, with angular or sharp corners, and without any burr or roughness at any part.

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

1. The construction and arrangement of the slides I L fitted in the guides H K of the frame B, and provided respectively with the dies J M, the punch N in the slide L, and fixed rod K in the slide I, when used in combination with an intermediate die open at both ends, substantially as described for the purpose specified.
2. The constructing of the die T with an enlarged centre, when said die, thus constructed, is used in connection with a punch, arranged in connection with suitable dies, so that in the punching operation the blank will be expanded in the enlarged part of the die, substantially as and for the purpose set forth.

ANDREW EMERSON.

Witnesses:

WM. E. McNAMARA,  
ALEX. F. ROBERTS.