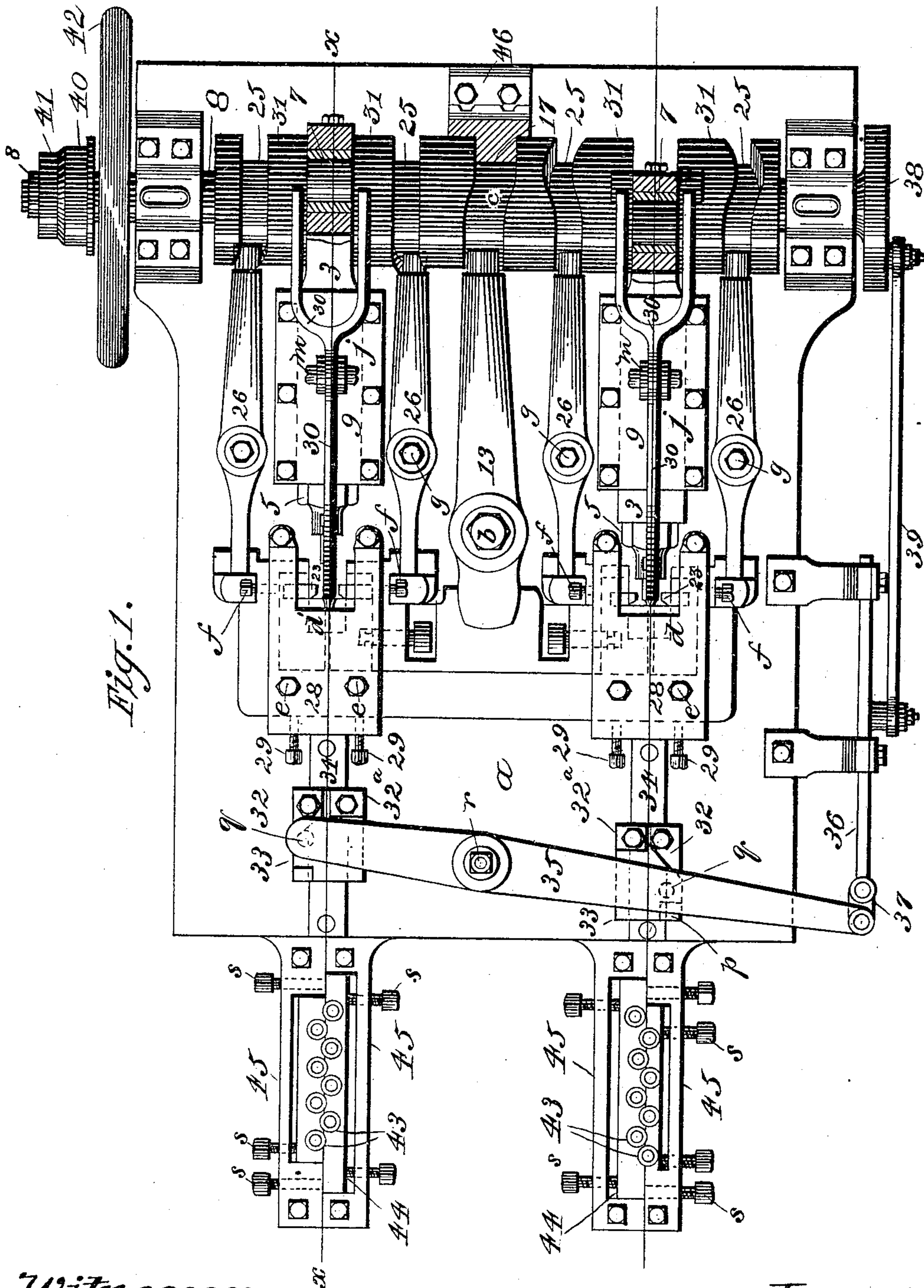


3 Sheets—Sheet 1.

WIRE NAIL MACHINE.

Patented Sept. 11, 1888.



W. A. Corwin
J. K. Smith.

Joseph F. Hannel.

(No Model.)

3 Sheets—Sheet 2.

J. F. HAMEL.
WIRE NAIL MACHINE.

No. 389,300.

Patented Sept. 11, 1888.

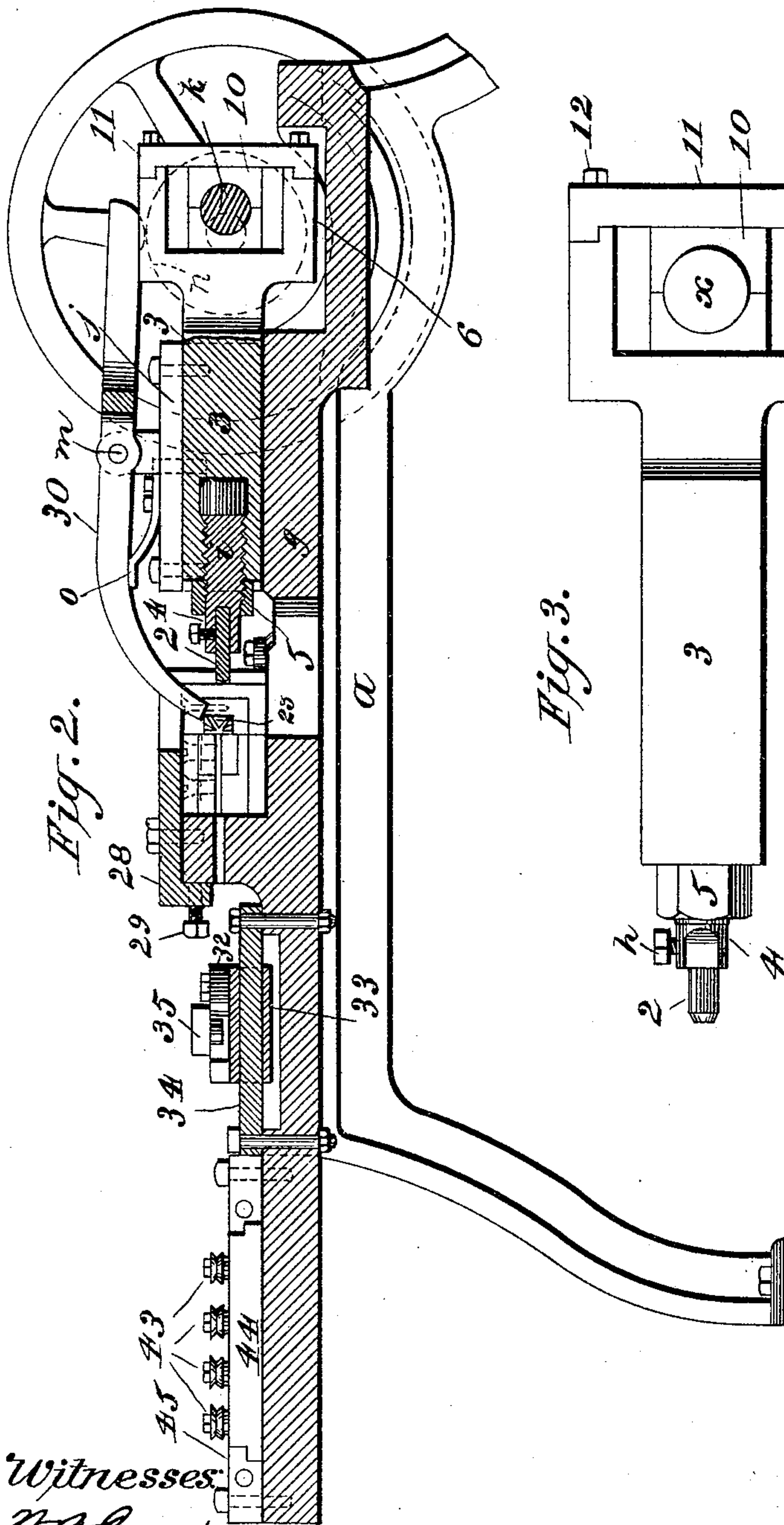


Fig. 2.

Fig. 3.

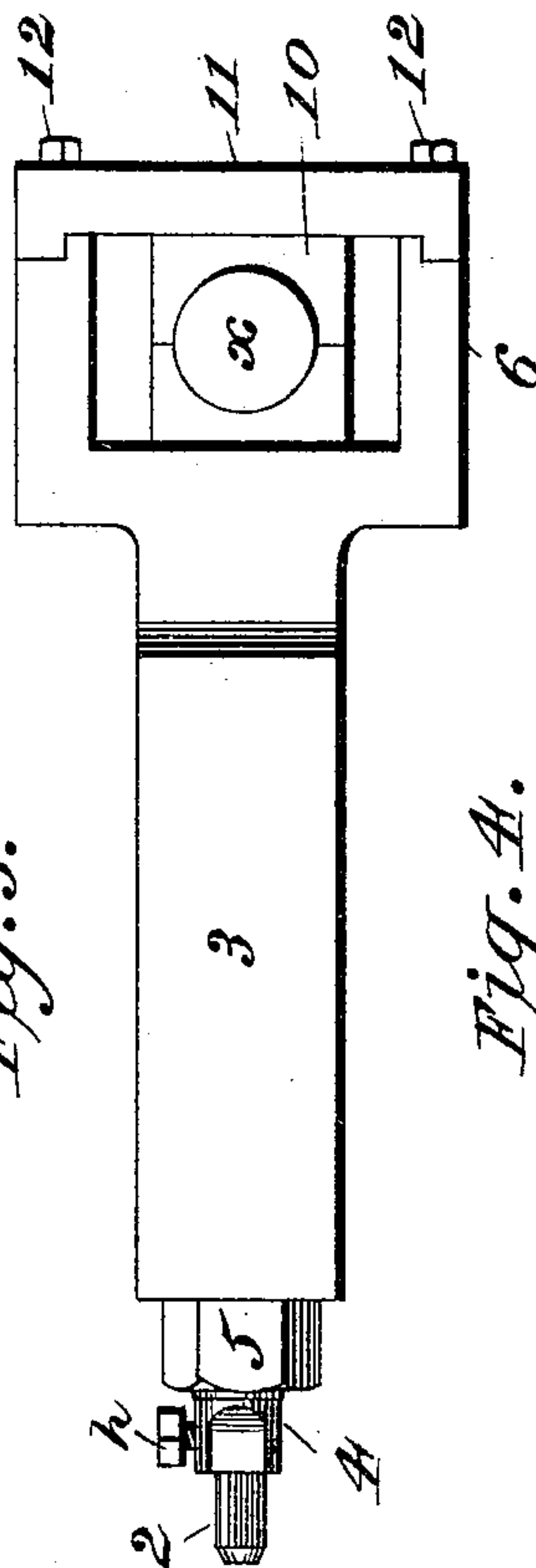
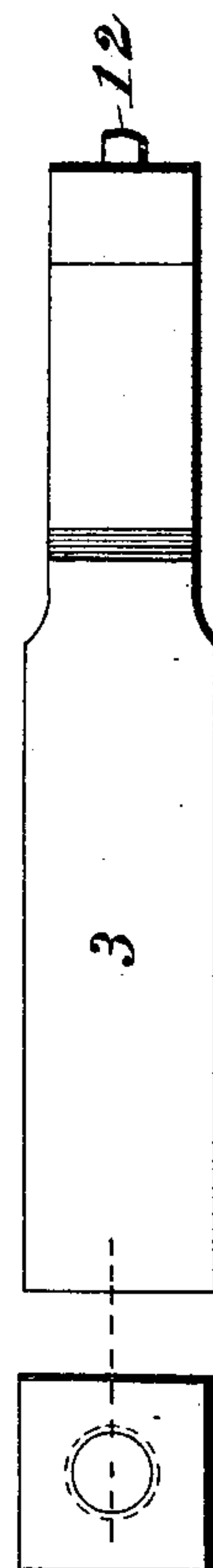


Fig. 4.



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3 Sheets—Sheet 3.

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Fig. 5.

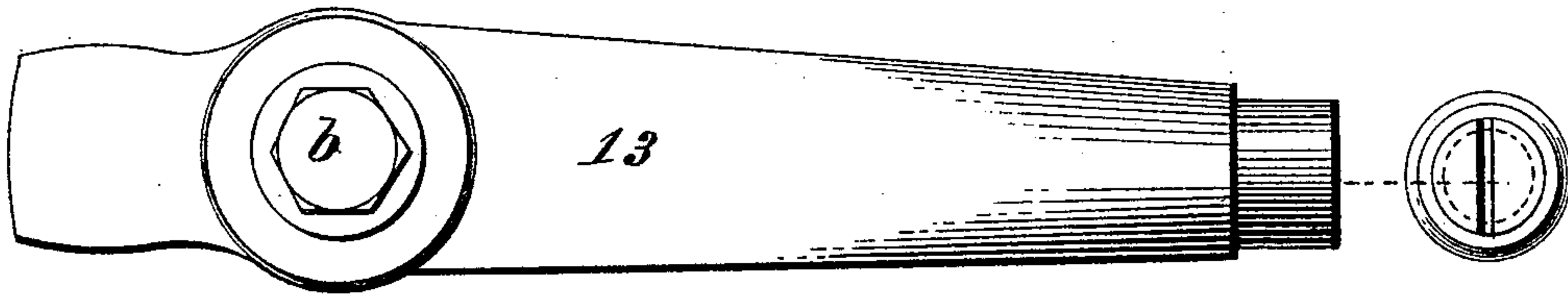


Fig. 6.

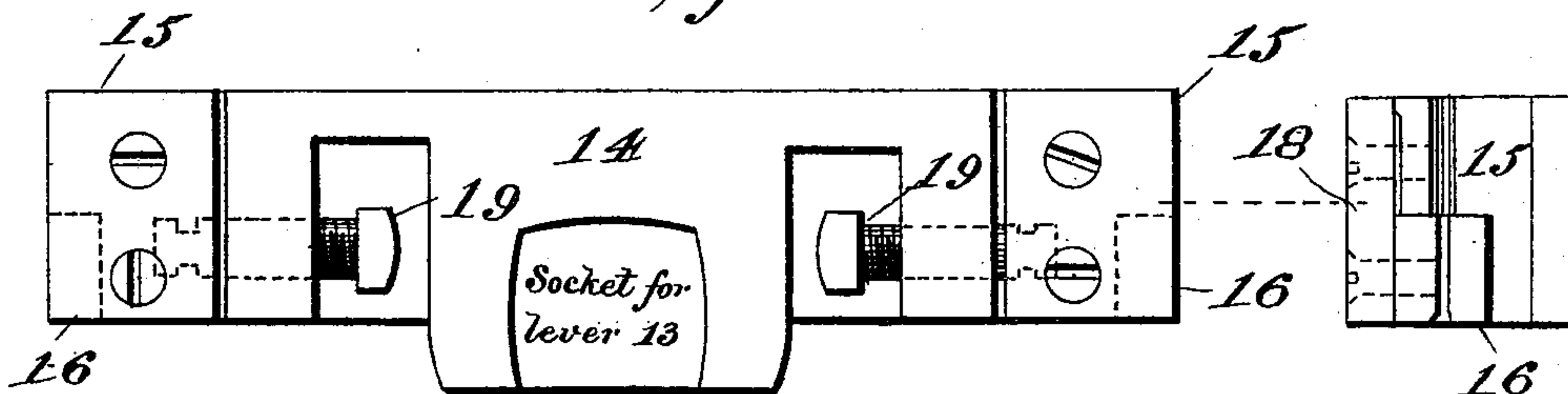


Fig. 7.

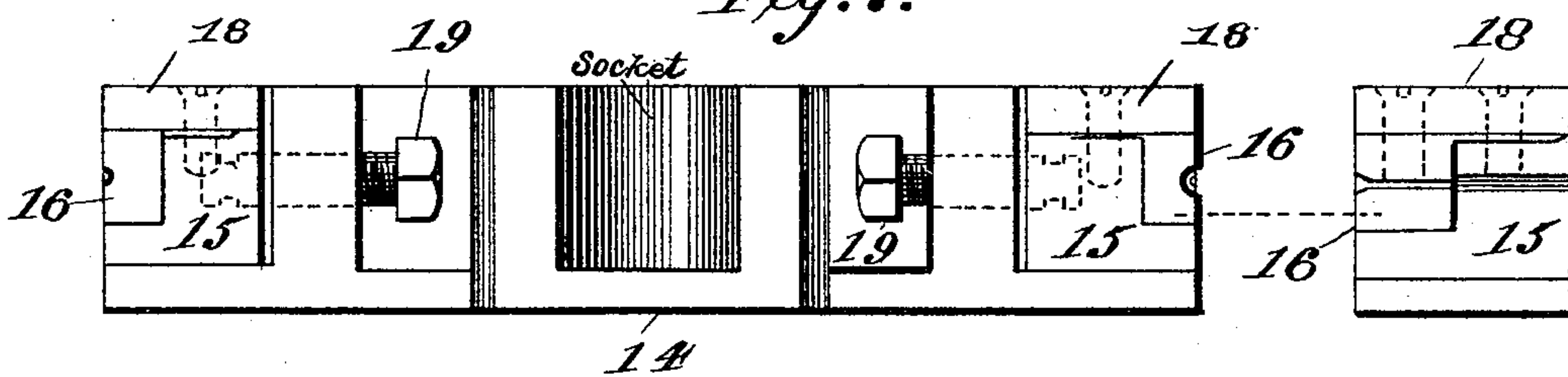


Fig. 8.

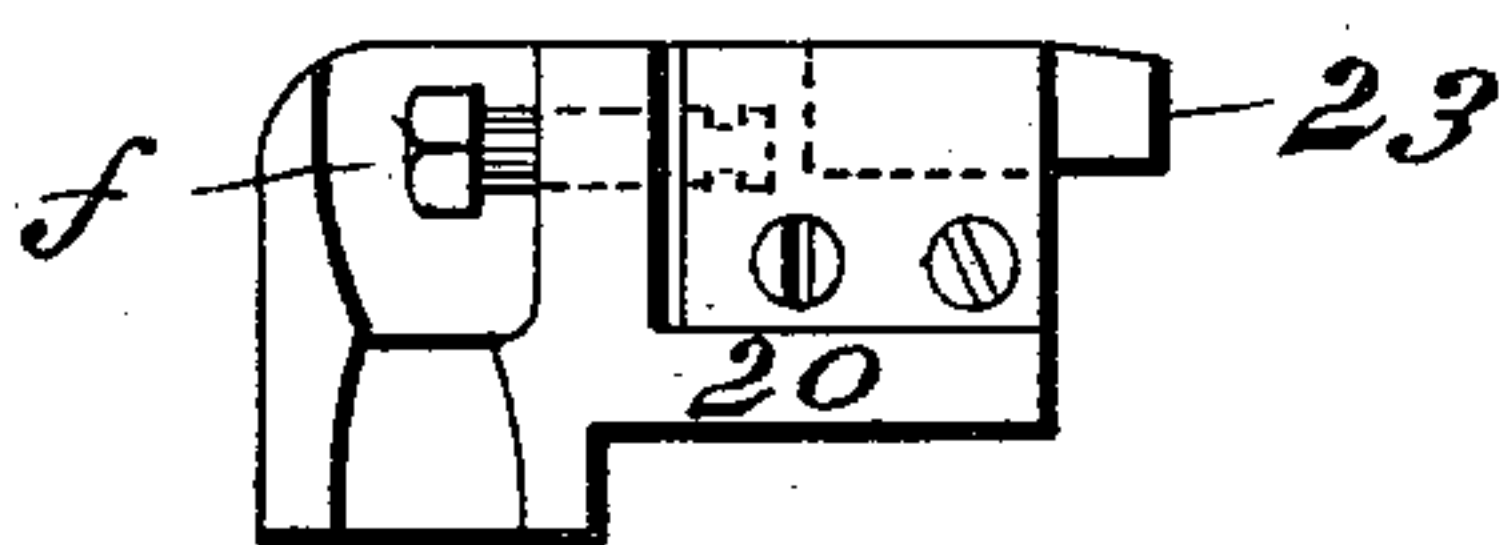


Fig. 9.

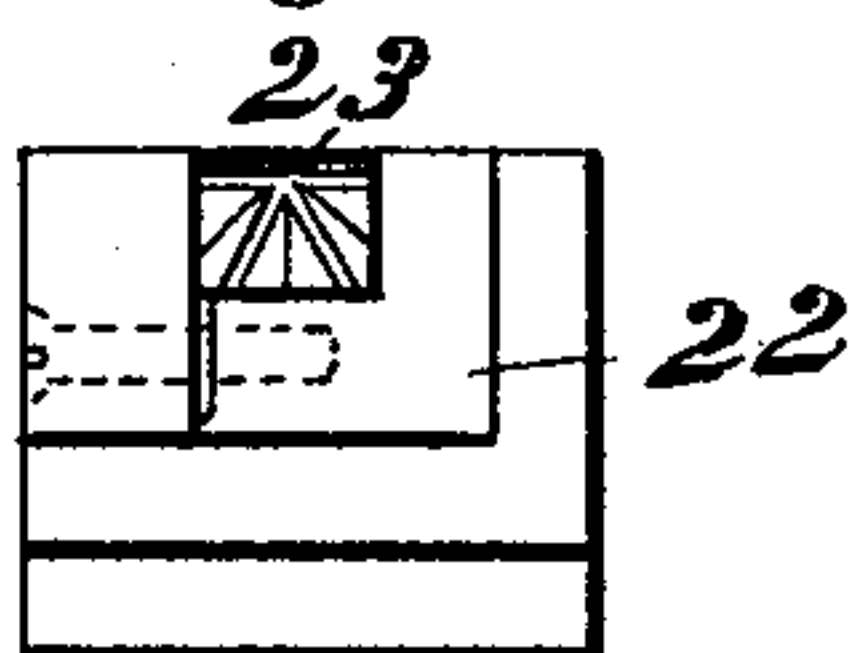
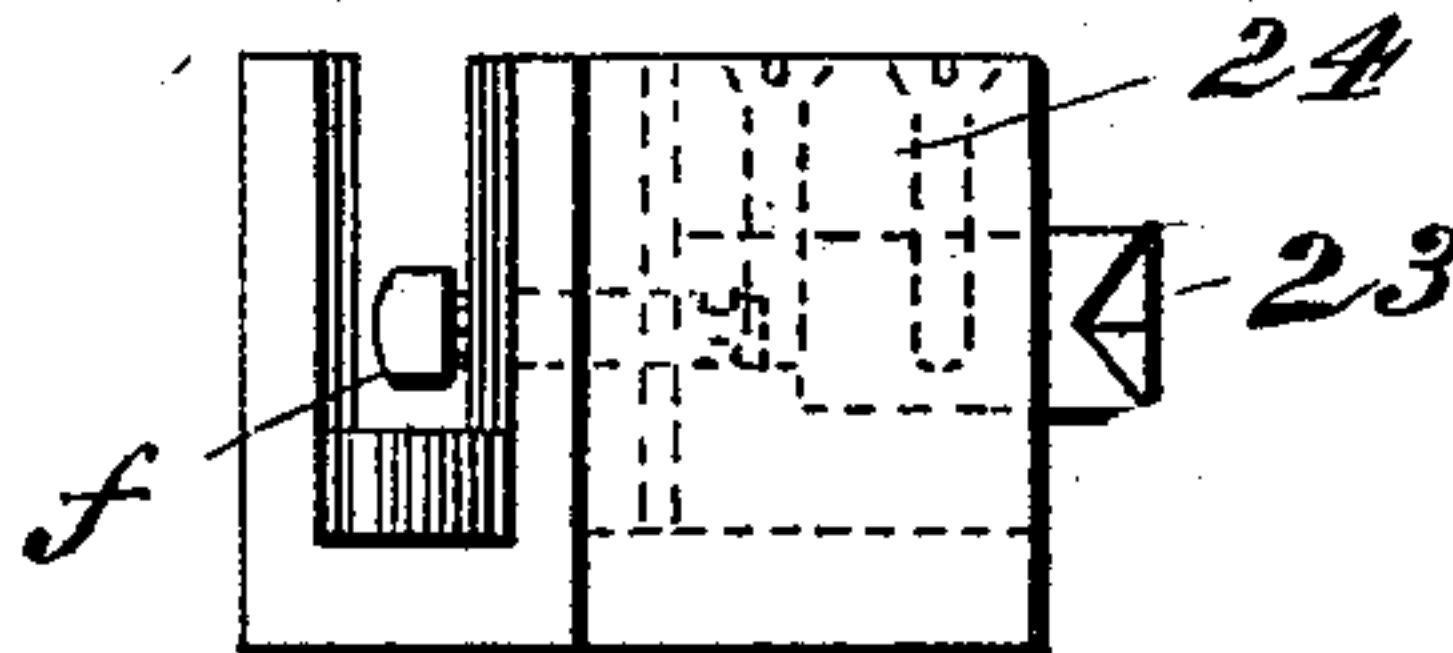


Fig. 10.



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UNITED STATES PATENT OFFICE.

JOSEPH F. HAMEL, OF PITTSBURG, PENNSYLVANIA.

WIRE-NAIL MACHINE.

SPECIFICATION forming part of Letters Patent No. 389,300, dated September 11, 1888.

Application filed June 6, 1887. Serial No. 240,493. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH F. HAMEL, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny, State of Pennsylvania, have invented a new and useful Improvement in Wire-Nail Machines; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an improvement in that class of wire-nail machines to which wire is fed from a continuous coil by the aid of gripping-blocks.

My improvement relates particularly to a double set of dies operated by one cam and lever and the cutters, the reciprocating heading punches or plungers, and the double set of gripping-blocks operated by one eccentric plate and connecting-rod.

The object of my invention is to prevent the shake to a certain extent by having the reciprocating heading punches or plungers alternate, and to gain speed and to render wire-nail-making more economical.

Figure 1 is a plan view of my improved machine. Fig. 2 is a vertical longitudinal section on the line *b b* of Fig. 1. Fig. 3 is a side view of one of the heading-dies and its stock. Fig. 4 is a plan view of one of the plungers and an end view thereof. Fig. 5 is a plan and end view of the lever which actuates the grippers. Fig. 6 is a plan and end view of the gripper-bar. Fig. 7 is a side and end view thereof. Fig. 8 is a plan view of one of the cutters and its head. Fig. 9 is an end view, and Fig. 10 a side view, thereof.

Like symbols of reference indicate like parts in each.

In the drawings, 8 represents the main shaft of the machine, which is provided with the usual fly-wheel, 42, and is driven by suitable belt-pulley, 40, 41 being the adjacent loose pulley.

The machine is a double machine, both parts, however, being worked from the same shaft, 8. The two parts of the machine have a single gripping-lever which is common to both parts, and is pivoted to the bed of the machine on a pivot, *b*, so as to have a horizontal oscillatory motion. This motion is imparted by a cam-groove, *c*, on the shaft 8, in which the end of the lever 13 works. There are two sets of gripping-dies, each consisting of two parts—one

fixed part, *d d'*, and a movable part. The movable part consists of dies 16, one at each end of a horizontal transverse sliding bar, which extends between the two fixed parts *d d'*. The dies 16 at the ends of the sliding bar are set in die-blocks 15, and secured thereto by caps 18 and suitable screws, and the blocks 15 are themselves held to the sliding bar by adjustable screws 19. The fixed parts *d d'* of the two pairs of dies are held in place by suitable screws and by cap-plates 28, and the sliding bar 14 is also guided in its movements by the cap-plates 28, which are adjustably held in place by vertical screws *e*, working in slots in the cap-plates, and by means of horizontal bolts 29. These cap-plates also serve to guide the movable cutters, as will be hereinafter explained.

As will be apparent by reference to Fig. 1, the cam *c* and oscillating lever 13 impart a longitudinal movement to the sliding bar 14 transversely of the machine. When it moves in one direction, it forces the die 16 at one end of the bar up against the face of the gripping-die *d*, and when it moves in the other direction it forces the die 16 at the other end of the bar up against the face of the other die, *d'*.

There are two parallel wire strands fed to the machine from suitable spools, one strand passing between each pair of the gripping-dies, so that in its motion in either direction the bar 14 causes the gripping of one of the strands. In front of each pair of dies is a pair of cutters, 23, for severing the wire. These cutters are clearly shown in Figs. 1, 8, 9, and 10. Each of the two pairs or sets of cutters comprises two sliding carriages, 20, carrying blocks 22, in recesses of which are set the cutters 23, which are held by means of face-plates 24 and suitable screws. The cutters are adjusted by screws *f*, which bear on the blocks 22. These cutters and their accessories are identical in construction and are fully illustrated by the views of a single member of one of the pairs contained in Figs. 8, 9, and 10. Each one of the cutters has a separate lever, 26, for working it. There are therefore four of these levers, all pivoted to the bed of the machine by pivots *g*, and oscillated by cam-grooves 25 on the shaft 8, within which the ends of the levers 26 fit. These cams are so timed relatively to each other that the two opposite cutters forming one of the pairs shall

approach each other to cut off the wire at the same time that the members of the other pair are separated. They therefore act alternately, and each pair of cutters is arranged relatively to the motion of its adjacent gripping-dies, 16 and d , or 16 and d' , that the gripping-dies shall seize the wire immediately after the cutting of the wire in front of the dies by the cutters. The cutters are so set that the length of wire projecting from the face of the gripping-dies after they have closed is just enough when upset to form a head of proper size on the nail. The nails are upset by heading-dies 2, of which there are two—one for each pair of cutters and gripping-dies.

I have illustrated the construction of the heading-dies and their stocks in Figs. 2, 3, and 4. Each heading-die 2 is fixed by a bolt, h , to the end of a block, 4, which is secured to a head or stock, i , by a sleeve-nut, 5. The head i is adjustably fixed to the end of a plunger, 3, by being externally screw-threaded and fitted in a recess in the plunger, which has a corresponding female thread. The plunger 3 works on a flat slide on the bed of the machine, and is held in place thereon by means of a plate, j , bolted to the bed of the machine, so as to cover the plunger and to guide it in perfectly right lines in its reciprocating motions. At the rear end of the plunger there is a square yoke or cam-box, 6, within which is arranged a squared block or brass, 10, which is loosely fitted around a crank, k , on the shaft 8. The block 10 is held in place by a bar, 11, constituting the rear end of the yoke or cam-box, to which it is secured by bolts 12. The rotation of the shaft 8, therefore, imparts a longitudinal reciprocating motion to the plunger, and, as the only driving-force is exerted on the brasses 10 and the yoke 6, there is little wear, and the plunger has a very positive and steady motion, which prevents shaking and rattling of the parts, and tends materially to increase the effective life of the machine. The cranks k are set on the shaft 8 diametrically opposite to each other, so that the plungers shall have simultaneous motions in opposite directions, one moving forward to head its nail while the other is returning, and vice versa.

Each one of the parts of the machine has a knocking-lever, 30, for detaching the nail from the gripping-dies after it has been headed and cut. These levers are pivoted on axes m on the machine-frame over the plungers 3, and at their front ends are curved down, so as to be directly over the space between the cutters. They are moved so as to strike and to disengage the cut nails by means of cams 31 on the shaft 8, on which the rear ends of the levers rest, and they are moved back again by means of springs o , which bear on the levers against the force of the cams.

I shall now describe the mechanism whereby the wire strands are fed into the machine. This consists of two feed-carriages, 33, mounted on longitudinal slides 34 in the lines of the

wires, and provided with dogs 32 and 32^a, between which the wire strands lie. The dogs 32^a are fixed, and the dogs 32 are pivoted so as to be movable toward and from the fixed dogs.

35 is a lever, which extends transversely of the machine and pivoted at r , and passes over the carriages 33, between lugs p at the back of the carriages, and projecting shanks of the pivoted dogs 32 at the forward ends of the carriages. The lever has lugs q , which have some loose play between the lugs p and the shanks of the dogs 32, and is oscillated on its pivot r by means of a crank-wheel, 38, on the driving-shaft 8, which, by means of a connecting-rod, 39, sliding bar 36, and link 37, is connected with the end of the lever. As the lever 35 oscillates on its pivot, the lug q on one side of its pivot engages the lug p of the proper carriage and moves it back on the slide 34, while the similar lug on the other side of the pivot, after a little idle or loose motion of the lever, engages the shank of the movable dog 32 of the other carriage and turns it, so that it shall bite upon the wire, and it then moves the carriage forward to feed the wire into the machine. In this way the two wire strands are alternately fed into the machine in the proper manner, conformably to the action of the cutters, grippers, and headers.

The slight idle motion of the lever 35 at the beginning of its stroke is one of the elements of my invention, and is an advantage, because it gives the gripping-dies an opportunity to open before the forward feed of the wire begins.

Back of the feeding-carriages are the wire-straightening devices, which consist of frames 45, within which are bars 44, carrying the usual series of straightening-wheels, 43, between which the wire strands pass. These bars are adjustable to and from each other by set-screws s .

The operation of the machine will be apparent from the foregoing description. Both parts of the machine work at the same time, but alternately with each other—i. e., one set of grippers acts to grip its wire, while the other set opens to release the other wire, so one pair of cutters approaches while the other recedes, and one header advances to upset the nail while the other is retracted. The proper synchronism of the parts is effected by timing of the cams on the shaft 8, as will be readily understood by the skilled mechanic.

The advantage of the machine is that it is of double the capacity of the ordinary single machine, and is yet very simple in its construction and has very few working parts to get out of order. The alternate actions of the parts also balance each other and make the operation of the machine very easy, thus increasing its effective life.

Another advantage in my machine is in the plungers 3, which reciprocate directly in right lines on their bearings, and are driven directly

from cams on the main shaft without the intervention of any connecting-rod, which would increase the wearing of the parts and tend to make the motion of the plungers unsteady.

5 This, however, I do not claim.

I claim—

1. In a duplex wire-nail machine having a driving-shaft and a feeding mechanism whereby two strands of wire are fed to the machine
10 transversely to the line of the shaft, the combination of alternately-acting cutters, gripping-dies, and heading-dies arranged on the same side of the shaft, the said heading-dies being arranged transversely to the line of the
15 shaft, substantially as and for the purposes described.

2. In a duplex wire-nail machine having two sets of gripping-dies, cutters, and heading-dies, a reciprocating bar having at its ends dies
20 which constitute members of the pairs of gripping-dies, substantially as and for the purposes described.

3. In a duplex wire-nail machine having a driving-shaft and feeding mechanism whereby
25 two strands of wire are fed to the machine transversely to the line of the shaft, the combination of alternately-acting cutters, gripping-dies, and heading-dies arranged on the same side of the shaft, the said heading-dies being arranged transversely to the line of the shaft, cams on the shaft, and levers operated by the cams and moving the cutters and gripping-dies, substantially as and for the purposes described.

4. In a wire-nail machine, a feed-carriage
35 having a fixed and movable dog and a lever which advances the carriage by action on the movable dog and retracts the same by engagement with the carriage in its motion in the opposite direction, there being loose motion of
40 the lever between the movable dog and the engagement of the lever with the carriage, during which loose motion the lever has no operative action on the dog or on the carriage, substantially as and for the purposes described. 45

In testimony whereof I have hereunto set my hand this 28th day of May, A. D. 1887.

JOSEPH F. HAMEL.

Witnesses:

JOHN K. SMITH,
W. B. CORWIN.