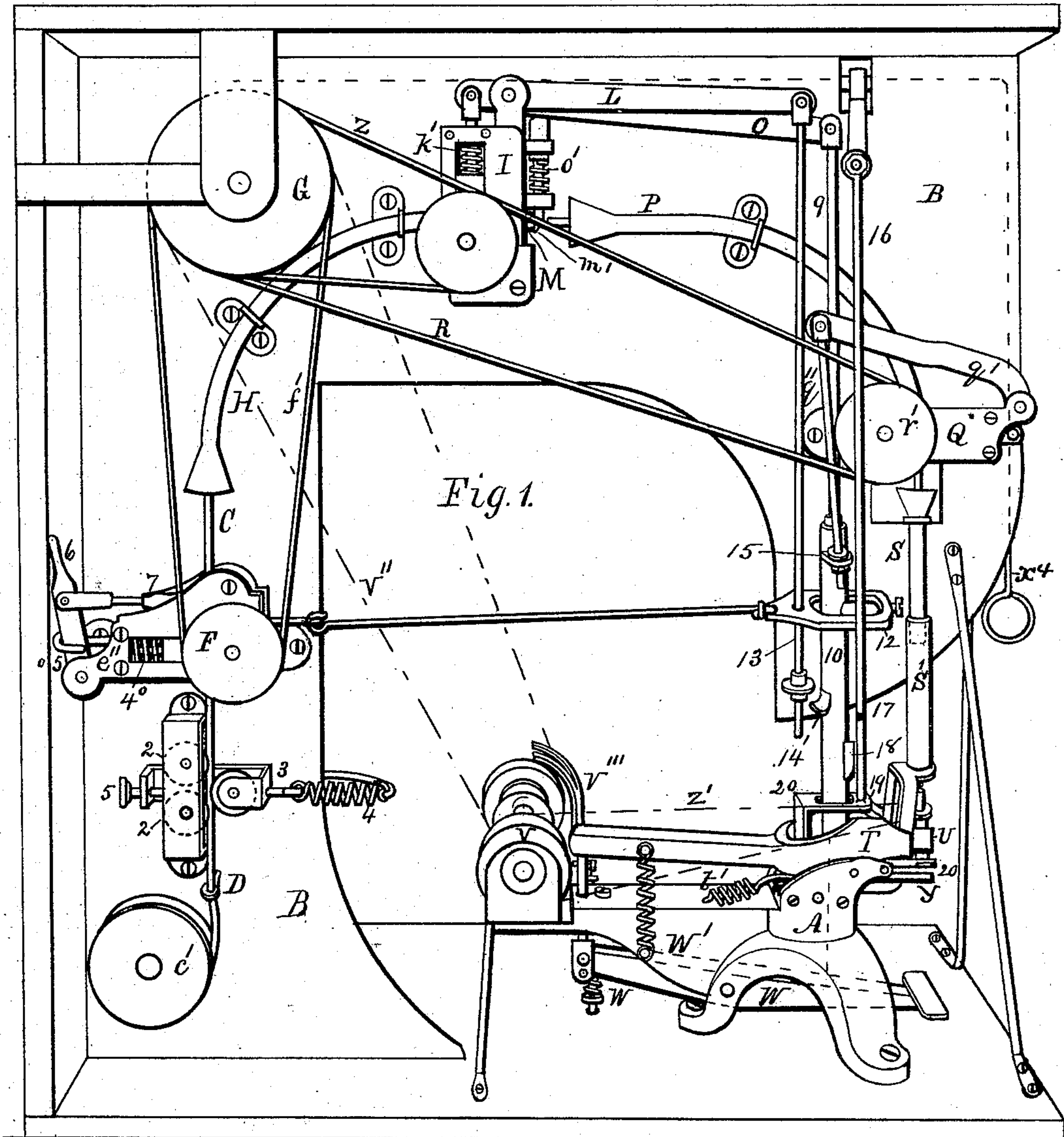


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Machinery for Straightening, Feeding and Cutting Off
Wire for Uniting the Soles and Uppers of Boots and
Shoes.

No.156,419.

Patented Nov. 3, 1874.



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Fig. 2.

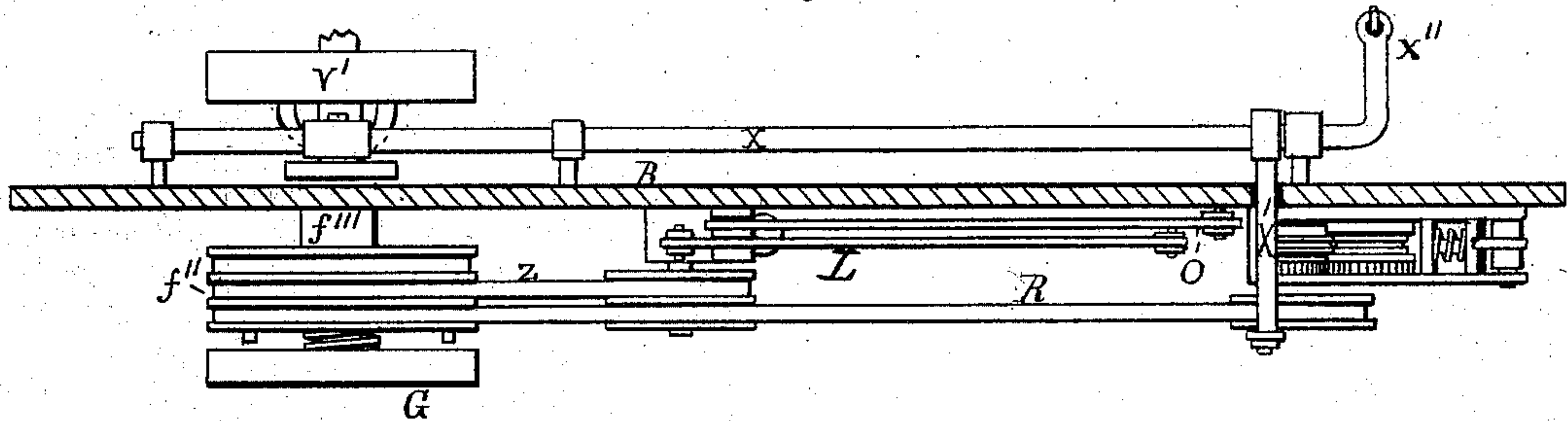


Fig. 3.

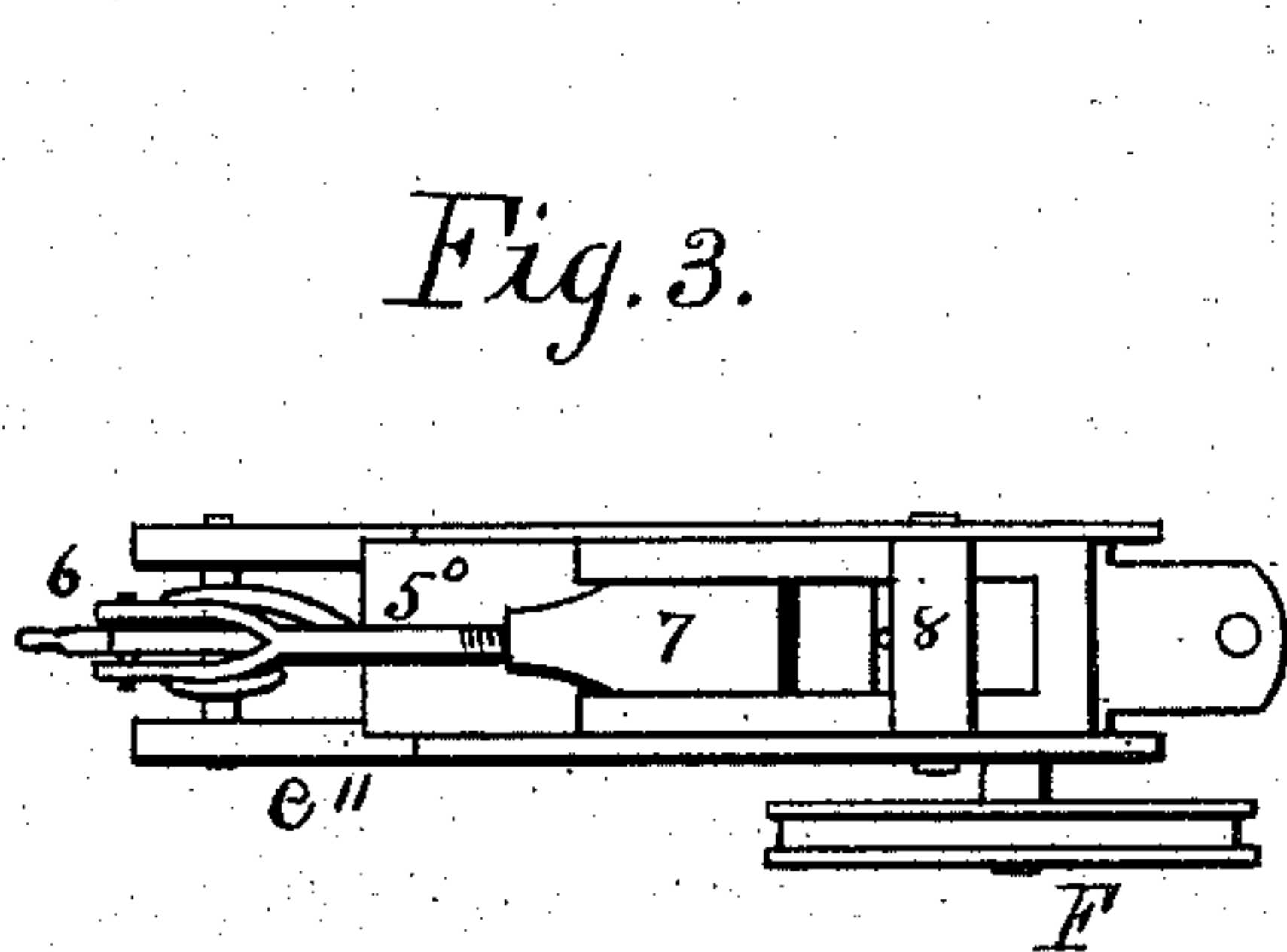


Fig. 4.

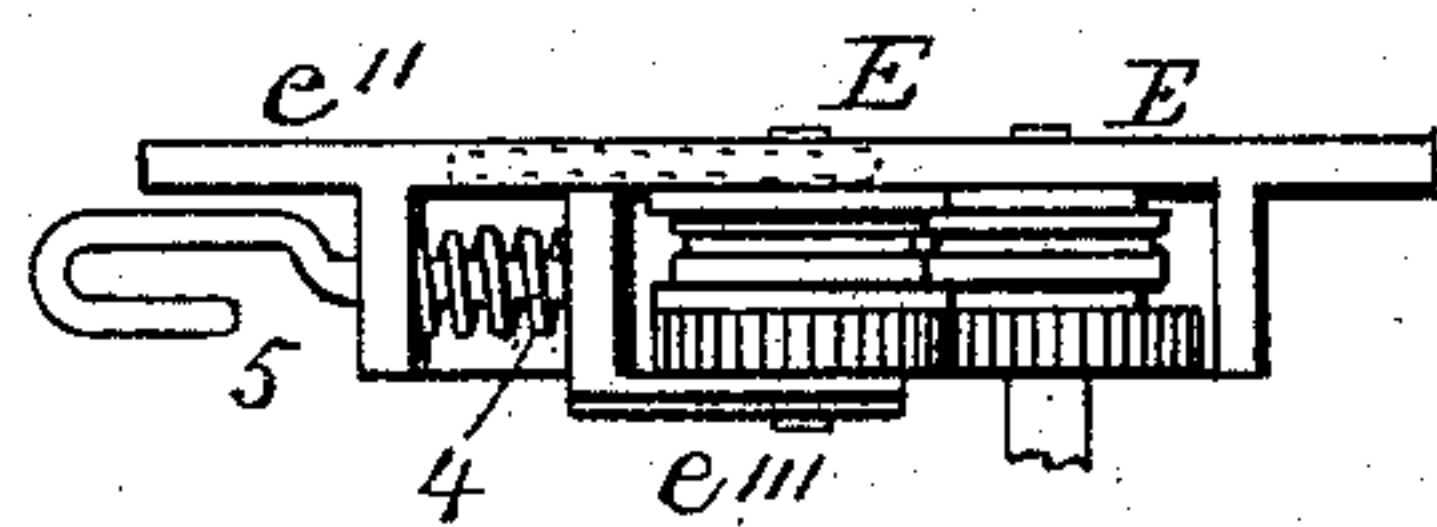


Fig. 5.

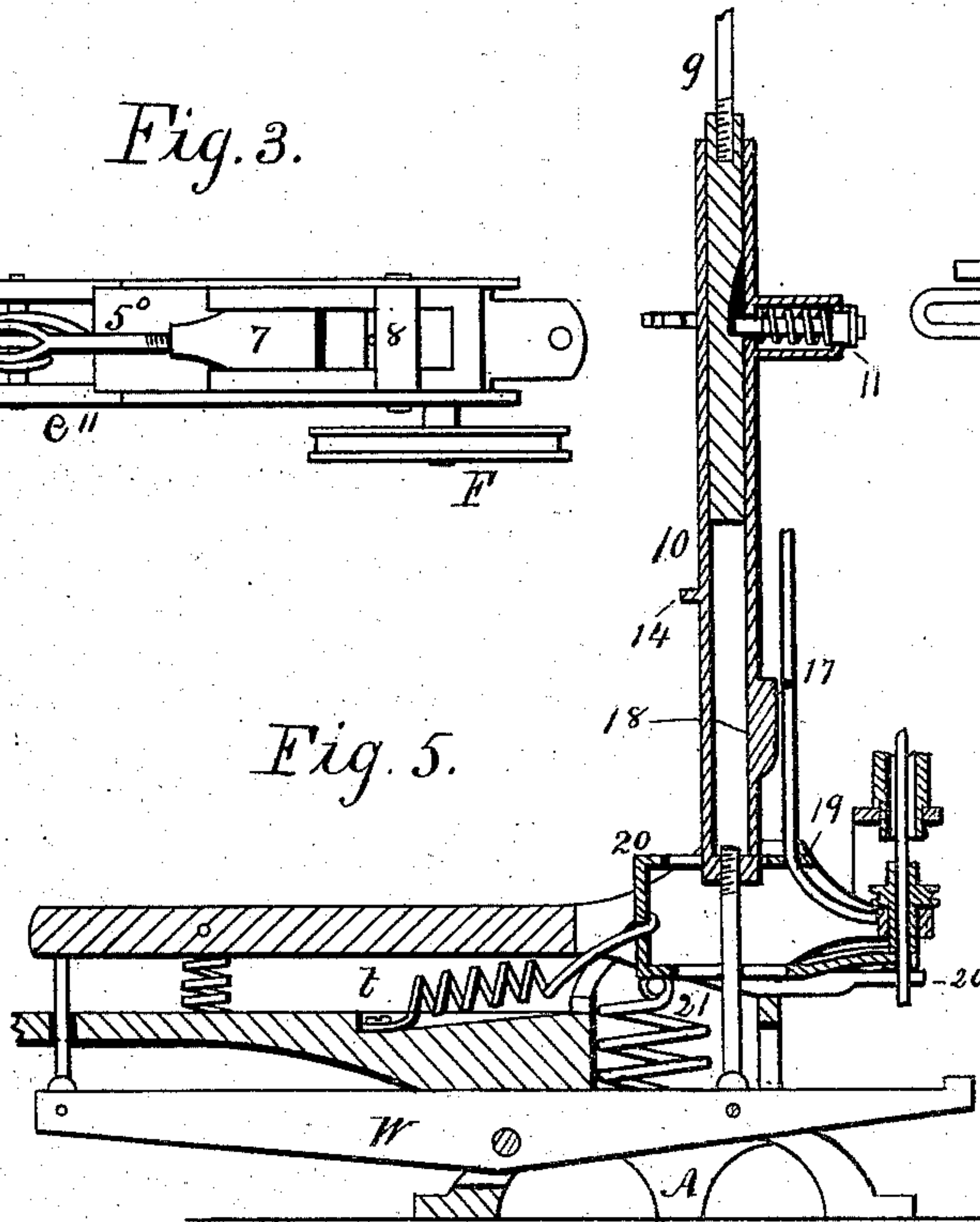
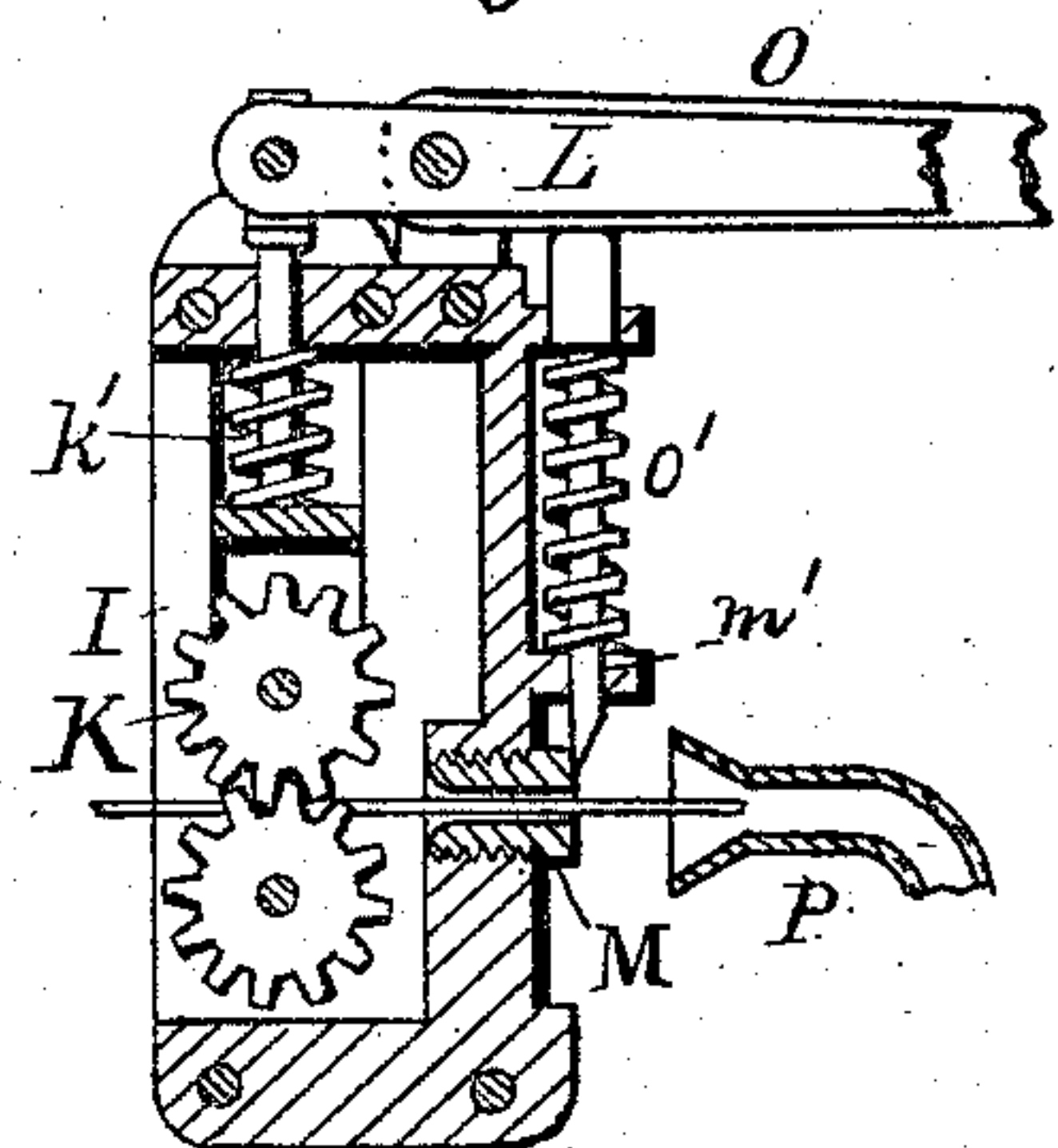


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM GRANT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOHN A. SOLLIDAY, OF SAME PLACE.

IMPROVEMENT IN MACHINERY FOR STRAIGHTENING, FEEDING, AND CUTTING OFF WIRE FOR UNITING THE SOLES AND UPPERS OF BOOTS AND SHOES.

Specification forming part of Letters Patent No. **156,419**, dated November 3, 1874; application filed June 27, 1874.

To all whom it may concern:

Be it known that I, WILLIAM GRANT, of Philadelphia, Pennsylvania, have invented a machine for automatically straightening, feeding, and cutting off the wire used in machines for screwing together the soles and uppers of boots and shoes, and for other machines where the wire used is required to be rotated, of which the following is a specification:

My invention is more particularly intended to be used in connection with the machine patented to Charles Tyson and John Mundell, dated March 24, 1874, in the use of which machine the several operations of straightening the wire, feeding it into the machine, and cutting it off in proper lengths for use, have heretofore been accomplished by manual labor, and consequently accompanied with considerable difficulty and frequent lengthy stoppings for the purpose.

The object of my invention is to avoid said objections, by causing the said operation to be accomplished automatically during the operation of the machine, in such a manner that the wire will be continuously passed along from the usual reel through a corresponding hole in a guide-post to and between straightening-rolls; thence upward to and between feed-rolls, and a sliding box with an opening in its bottom and a friction-roll over the opening, and parallel with another friction-roll attached to the frame of the feed-rolls; thence onward up into a tube, provided with an enlarged mouth, which conducts the said wire into another pair of feed-rolls; thence into a conical die connected with a cutter for cutting the wire at the proper time, as will be explained, a tube leading from the said die and cutter to another set of feed-rolls, which alternately clamp and release the wire, so as to draw it downward through the tube above, and let the wire be rotated in the said tube during the chasing of the thread and the screwing of the wire into the sole of the boot or shoe, as will be more fully described with reference to the annexed drawings, in which—

Figure 1 is a side elevation, showing my invention applied to the standard or pedestal A of the screwing-machine, the standard be-

ing made low or short for want of room or space to make it of the proper proportionate height, and for the same reason the parts resting immediately upon the said standard are crowded together. Fig. 2 is a horizontal or plan view of the upper portion of my invention, attached to a supporting-frame, B, above the standard A. Fig. 3 is a top view of the first set of feed-rolls, and a sliding box in connection with a driving-pulley for operating the rolls. Fig. 4 is a like view of Fig. 3, without its covering-plate and pulley. Fig. 5 is a vertical section of a portion of the machine which is immediately connected with the standard and the treadle.

The wire C, from which the short screws are to be made and screwed into the soles of the boots and shoes, (not shown,) is supplied from a reel or cylinder, C', which rotates freely as the wire is drawn upon by the feed-rolls above it, and as it is drawn upward it first passes through a small hole in a guide-post, D, then between straightening-rolls 1 2, all of which have grooved peripheries, respectively, two of which rotate upon stationary axles, and the other, 1, upon an axle fixed in a slide, 3, which is adjusted to a proper pressure upon the wire C while passing upward against the rolls 2 2 by means of the spring 4 and the set-screw 5. The wire used is required to be unannealed, and therefore rigid and springy; because, if annealed, it would become twisted by the screw-cutter or chaser, and the tough shavings would often choke the same and spoil the screw. The guide-post D keeps the wire directly in a straight line with the grooves in the rolls. Without this post the wire from the reel C' would often spring aside and allow the pressure of roll 1 to be exerted on the wrong side of the said curved wire, and of course fail to straighten it. The wire C passes upward from the straightening-rolls just described, between a pair of geared grooved rolls, E E', (see Fig. 4,) in a stationary case, e'', one of which rolls, E', is stationary, and has a grooved pulley, F, fixed on its axis, (see Fig. 3,) which is driven by a cord, f', (see Fig. 1,) operated by a three-grooved pulley, f'', fixed on a sleeve, f''', which rotates

on the main driving-shaft, on the end of which latter a friction or clutch wheel, G, is fixed, so as to carry the said grooved pulley f'' when the latter is put into connection therewith, as will be explained. (See Figs. 1 and 2.) The other feed-roll is placed in a sliding box, e''' , in the case e'' , which latter is kept pressing against the stationary roll E' by means of a stiff spring, 4°. Through this spring a rod, 5°, connected to the slide, passes to a lever, 6, whereby the slide e''' can be drawn outward by hand when it may be required to separate the two rolls E and E' to insert the end of the wire C. In the said case e'' , and just above the two rolls E E' , is a sliding box, 7, having an opening in its bottom, and a friction-roll, 8, attached to the case e'' . This sliding box 7 is also connected to the lever 6 at a point above the connection of the rod 5° therewith. The roll 8 is parallel with the two rolls below it, and the sliding box 7 being attached to the same lever which draws back the sliding roll E , when the lever is operated backward the sliding roll E comes to the rear of the stationary friction-roll above, and the feed-roll is drawn back by the same motion, thus permitting the wire C to pass freely upward into the enlarged end of the tube H above it. The tube H curves to a horizontal position at its upper end, and enters another or second pair of feed-rolls in a case or frame I, the said rolls being constructed and operated substantially as the feed-rolls E E' , but arranged the one above the other, so that the wire C will pass horizontally between their respective grooves.

Fig. 6 is a vertical section of the second pair of feed-rolls in connection with their frame I, and a die and cutter, with levers for operating the cutter and the upper roll, respectively. The upper roll K is pressed down by a spring, k' , and raised upward by means of a lever, L, as will be explained. The die M consists of a block of hardened steel, having a hole corresponding in diameter with the wire C made through it, and the block secured firmly in the frame I, so that its hole will be directly opposite to, and in a horizontal line with, the juncture of the grooves in the rolls, the outer end of said die being also cut off in a plane at right angles to the line of the hole, and the flat cutting-edge of the cutter m' fitted to slide up and down in close contact with said end of the die-block as it is moved downward across over the hole by the depression of the lever O, to cut off the wire C when required, and immediately raised above the said hole by the spring O' after the said wire has been cut, as will be described. The wire C passes onward through the hole in the die M, and enters the enlarged end of pipe or tube P, which curves downward, and conducts said wire to a third pair of feed-rolls in a case, Q, the said rolls being constructed and arranged to gripe and release the wire alternately, substantially in the same manner as the first and second pairs of rolls operate, and the sliding roll being moved toward and from the sta-

tionary one by means of a lever, q' , to close, and a spring to separate them, as will be described; the rotary motions of the said rolls in the frame Q being produced by a band or cord, R, which connects the grooved pulley r' on the shaft of the stationary roll with the respective groove in the pulley f'' on the main shaft f''' . (See Figs. 1 and 6.) As the wire is fed along from the reel C' through the three sets of feed-rolls, it enters the enlarged end of a nearly vertical tube, S, which enters a slip-tube, S', loosely, so as to allow a limited lateral motion of the communicating ends, the lower end of the slip-tube S' resting in a roomy hole in the lever T at a short distance above the usual spindle or wire-rotator U.

The object of the slipping portion S' of the wire-conducting tube P is to enable the attendant at any time to slip it upward, so as to enable him to get hold of the wire and pull it out in case the feed-rolls should at any time break or fail to feed, from wearing away, or other causes. It also enables the attendant to ascertain, in a moment, whether the wire is being properly straightened by the straightening-rolls, or, which amounts to the same, whether the said rolls are properly adjusted. The spindle or wire-rotator U is supported vertically directly under the slip-tube S' upon the lever T, and is rotated by a cord, z' , or band, which connects it with a pulley, V, on a secondary shaft, which has a loose and a fast pulley on the opposite end, operated alternately by a pulley, V' on the main driving-shaft f''' , the band V'' and a shifter, v''' , which is operated by the usual treadle W, to slip the band to the fast pulley, and the spring w'' to bring it back again to the loose pulley. (See Fig. 1.)

To the end of lever O is attached a rod, 9, which passes into a pipe, 10; and the said rod has a notch near its lower end, which comes below a spring-bolt, 11, (see Figs. 1 and 5,) which is operated in a short horizontal tube, which is fixed on and opens into pipe 10. To the spring-bolt 11 is attached a slotted slide, 12, through which passes, down near its other end, or in rear of pipe 10, a rod, 13, with a knob or screw-nut near its lower end, which comes below a shoulder or projection, 14, on the pipe. The upper end of said rod is attached to the lever L, which operates by pressure on the loose roll K of the second pair of feed-rolls in frame I. A wire connects the slide 12 to the sliding box 7 of the first pair of feed-rolls, so that in drawing the said box back, to admit the wire C between the rolls, the spring-bolt will be drawn into the notch in the rod 9; and the rod 13, which connects with lever L, will be drawn back out of reach of the projection 14 on the pipe 10, so that the latter can pass up or down without coming into contact with the knob or nut on rod 13. The wire, while passing between the friction-rolls of the first pair, keeps the two rods in the separated positions described. The lever q' of the third pair of rolls is attached to a rod,

q'' , the lower part of which passes through an eye-plate, 15, on the pipe 10, and has an adjusting-nut on its lower end, whereby the required parting of the rolls, to allow the wire C to be rotated between them, may be effected by the operation of the screwing machinery (not shown) to which my invention may be applied. The shaft X, whereby the loose pulley f'' on the main shaft f''' is forced into contact with the friction or clutch wheel G, as described, extends to the front of the machine, where it has an arm, x' , which passes across through the frame B of the machine, and connects with a rod, 16, which has a pin or a bend at 17, passing by a notch or projection, 18, on the pipe 10, and thence obliquely through a hole, 19, in the upper plate of a slotted slide, 20, the forward or front end of said slide 20 passing under the lower end of the spindle or wire-rotator U, there being a hole down through said front end, which can be brought into or out of line with the holes for the wire in the spindle U and nose Y of the screwing-machine, as will be explained. Another arm, x'' , extends, in an opposite direction, from the shaft X, and from the outer end of which arm a hand-cord, x^4 , or pull hangs down within reach of the attendant, and enables him to force the grooved loose pulley f'' into contact with the clutch-wheel G in starting the machine. The pipe 10, which carries the spring-bolt 11, and operates all the levers before described, is connected by a rod to the treadle W by passing down through the pedestal A through or alongside of a stiff spiral spring, 21, which draws the said treadle upward when the foot of the attendant is removed therefrom; and, at the same time, draws the band-shifter V''' over from the fast to the loose pulley of the shaft, which is attached to the screwing-machine, and stops the operation of the latter, and also carries up the rod 16, which puts in motion the machinery of the wire-feeding rolls.

In order to more fully explain the operation of my invention applied to a screwing-machine for the purposes specified, I will state that a reel or cylinder, C' , of the brass wire to be used is placed so that it may be easily rotated on its axis, and the end of the wire passed through the eye D; thence up between the grooved rolls 2 2 and 1, onward and upward through the first pair of feed-rolls and roller of slide-box thereof into the pipe H. The attendant now pulls on the hand-cord x^4 , hanging from the arm x'' of the shaft X, and forces the loose pulley f'' into contact with the clutch or friction wheel G, and thus, by means of the cords or bands R, f' , and z , starts the feed-rolls, which draw the wire through the straightening-rolls, and force it along through pipe or tube H; thence through die M of the cut-off, and down through the tubes P, S, and S' , into and through the spindle or rotator U, and finally through the hole in the front projection of the slide 20 into the nose y of the screwing-machine. (Not shown.) The attendant now lets

go of the pull or cord attached to the arm x'' of shaft X, and thus releases the loose pulley f'' from the friction or clutch wheel G, and stops the feed-rolls. He now presses down the treadle W, which draws down the pipe or tube 10 and the lever O, and thus cuts the wire off at the die M, and pulls open the third pair of feed-rolls in the frame Q, shifts the driving cord or band z' of the screwing-machine from the loose to the tight pulley, and thus puts the rotator U in motion, which rotates the wire in the tubes P, S, and S' . After the first cut-off piece of wire is worked up, the attendant removes his foot from the treadle W, which, being drawn upward by the spring 21, shifts the driving-cord z' from the fast to the loose pulley, and thus stops the screwing operation. The slide 20, in contact with the lower end of rotator or spindle U, having been drawn backward and tilted a little downward by the spring t' , lets the wire C pass by it into the nose y , and allows the rod 16 of the starting-shaft X to move upward into position to be caught by the projection 18 on the tube 10, and the feed-rolls put in motion, and immediately afterward the oblique bend of said rod 16, being drawn upward through its hole in the slide 20, forces the latter into the proper position for another part of the wire C to pass through and keep the slide forward, and also the rod 16 clear of the projection 18 on the tube 10, so that the screwing-machine (not shown) may be stopped or started without running in any more of the wire C until the piece already in has passed through the lower end of the rotator or spindle U, and the slide again slipped back.

This operation is repeated until the other end of the wire on the reel C' comes through and requires no attention or watching on the part of the attendant.

When the end of the wire C passes through the friction-rolls of sliding box of the first pair of rolls, the spring-bolt 11 in tube 10 flies forward or out of the notch of the rod in the latter, and draws the knob or nut on rod 13 of feed-roll of the second pair in position to be caught by the shoulder 14 on tube 10. The treadle W of the screwing-machine (not shown) being now pressed downward, the cut-off lever O does not operate, and, consequently, the wire C is not cut off, but the lever of the second pair of rolls is drawn downward, and the rolls separated. This leaves the wire free to be rotated all the way back to the sliding box of the first pair of rolls. By this arrangement the cutting off of short pieces of the wire at the reel is entirely avoided; and as the feed-rolls of the three sets are placed at such a distance apart that any piece of wire C that may be entered at the first pair will come through to the spindle or rotator U without requiring any attention or watching by the attendant, except to resupply the reel or cylinder C' with a new supply of wire when the first has been used up, because all the other operations of the machine are performed

automatically by the machine when put in motion, as described, I would remark that, as the slide 20 has a rocking or tilting motion, when its forward end slides under the lower end of the rotator U, it presses up against the same between it and the nose *y*, and thus is kept at all times in contact with said rotator.

I claim as my invention—

1. The guide D and the adjustable rolls 1 2 2 for straightening the wire C, in combination with one or more pair of feed-rolls for drawing the said wire from the reel through the said guide and straightening rolls, and passing the same through the tube H and die M of cut-off tube P, and onward to the nose *y* of the screwing-machine, substantially as set forth and described.

2. The sliding box 7, in connection with the lever 6 of the first pair of feed-rolls, in combination with the spring-bolt 11 and rod 9, substantially as and for the purposes set forth and described.

3. The tube 10, provided with projections 14 and 18, in combination, respectively, with the rods 13 and 16, the said parts being con-

structed and arranged to be operated by a treadle, W, substantially as and for the purposes hereinbefore set forth and described.

4. The slide 20, in contact with the lower end of the rotator-spindle U, in combination with the spring *t'* at its rear end, to draw it back, and with the rod 16 of the starting-lever X, the said parts being constructed and arranged to operate substantially as and for the purposes hereinbefore set forth and described.

5. The combination, with the wire-conducting tube S beneath the third pair of feed-rolls, of the slip tube S', arranged to be moved up and down, substantially as and for the purpose hereinbefore set forth and described.

6. The die M and its cutter *m'*, in combination with lever O, rod 9, tube 10, and treadle W, arranged to operate substantially as described, for the purpose of cutting off the wire, which is to be rotated in the tube P, as described.

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