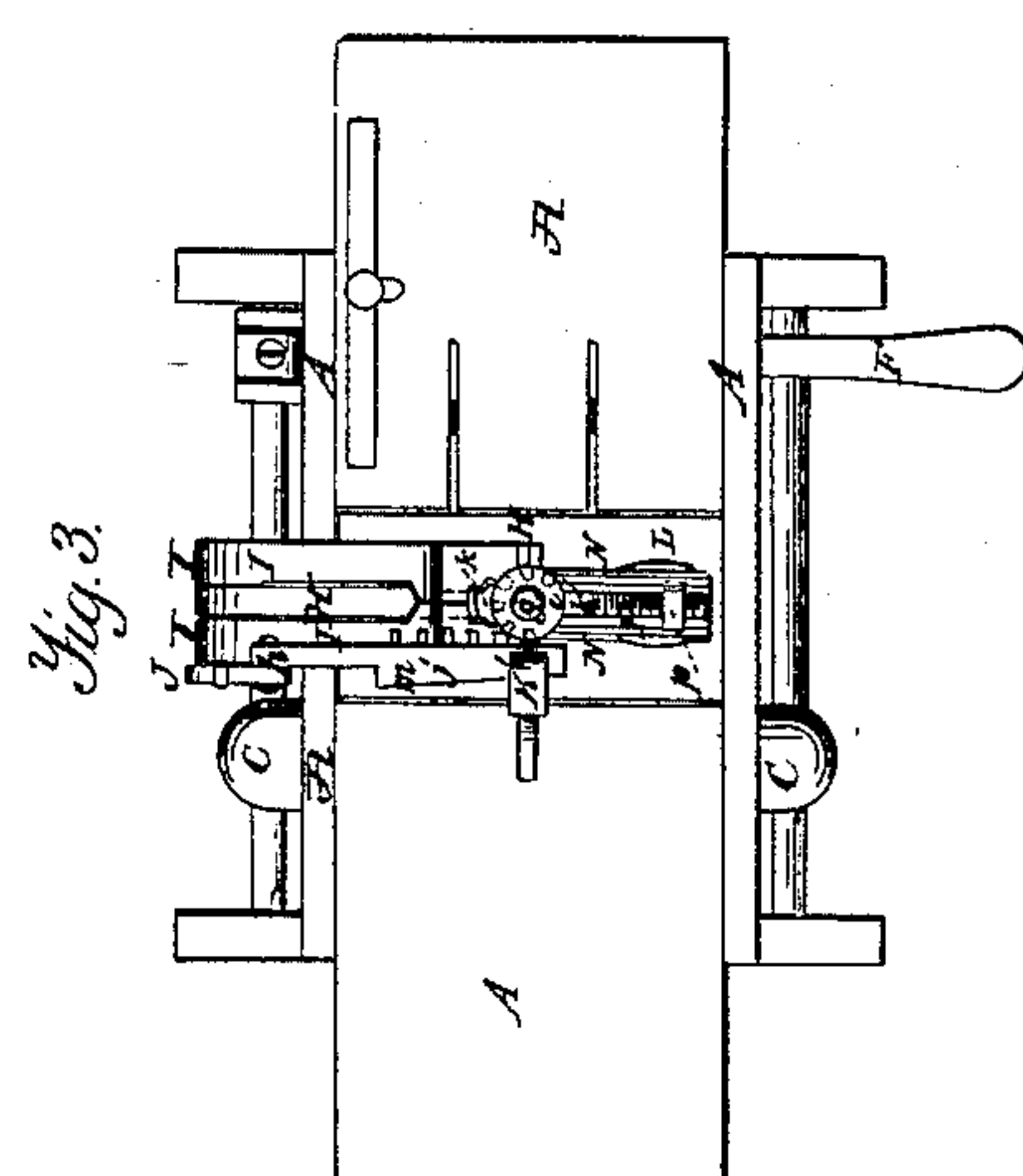
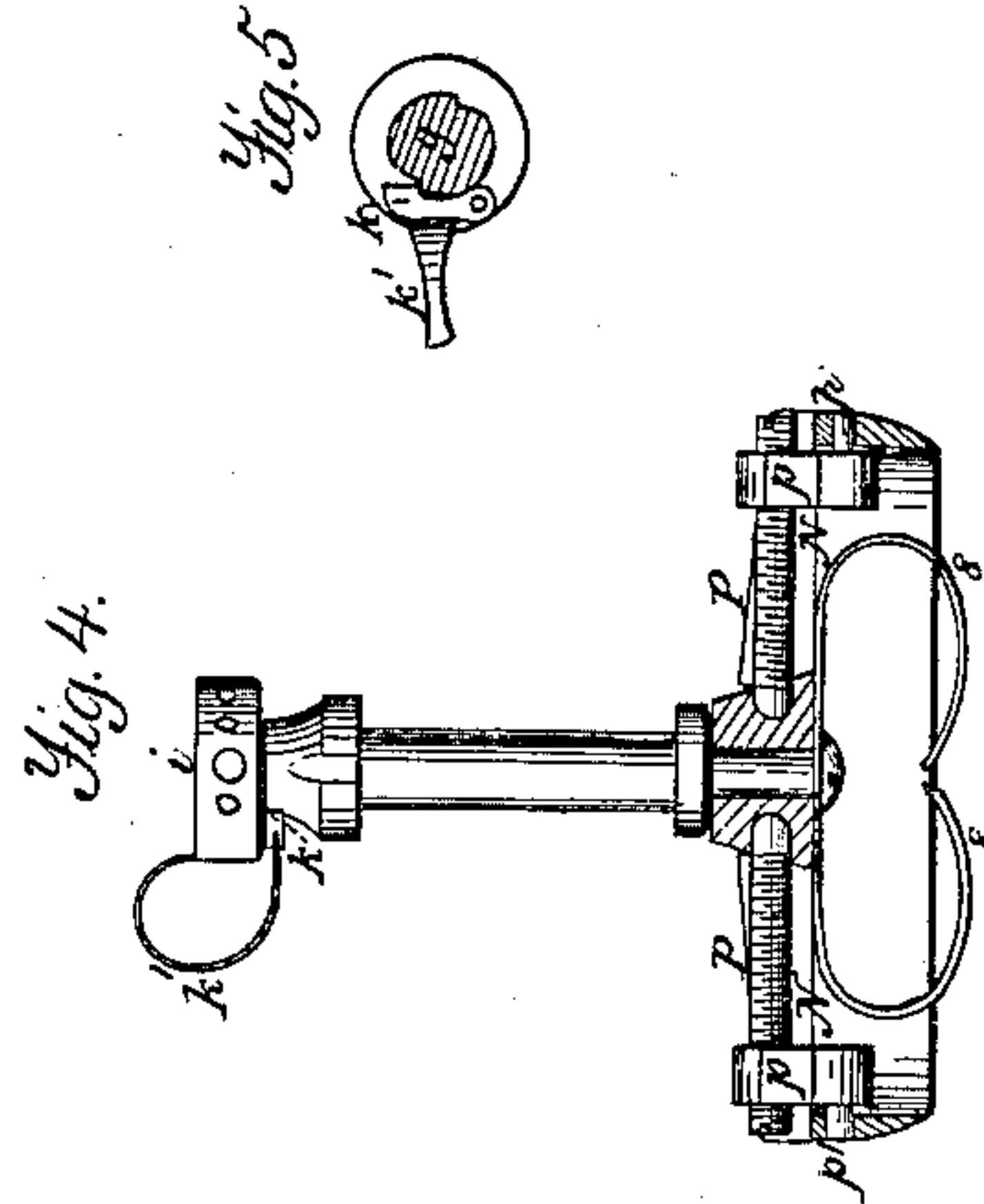
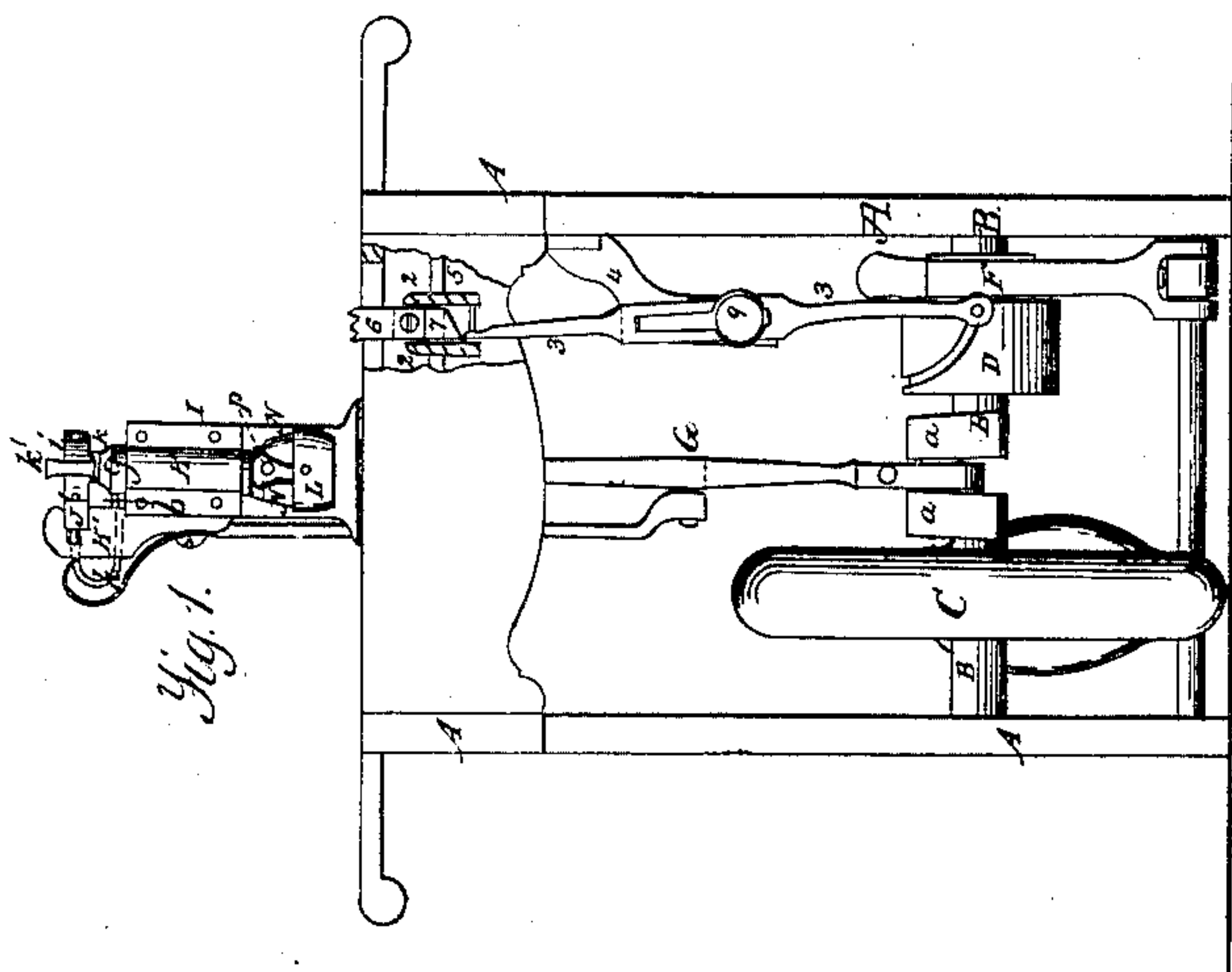
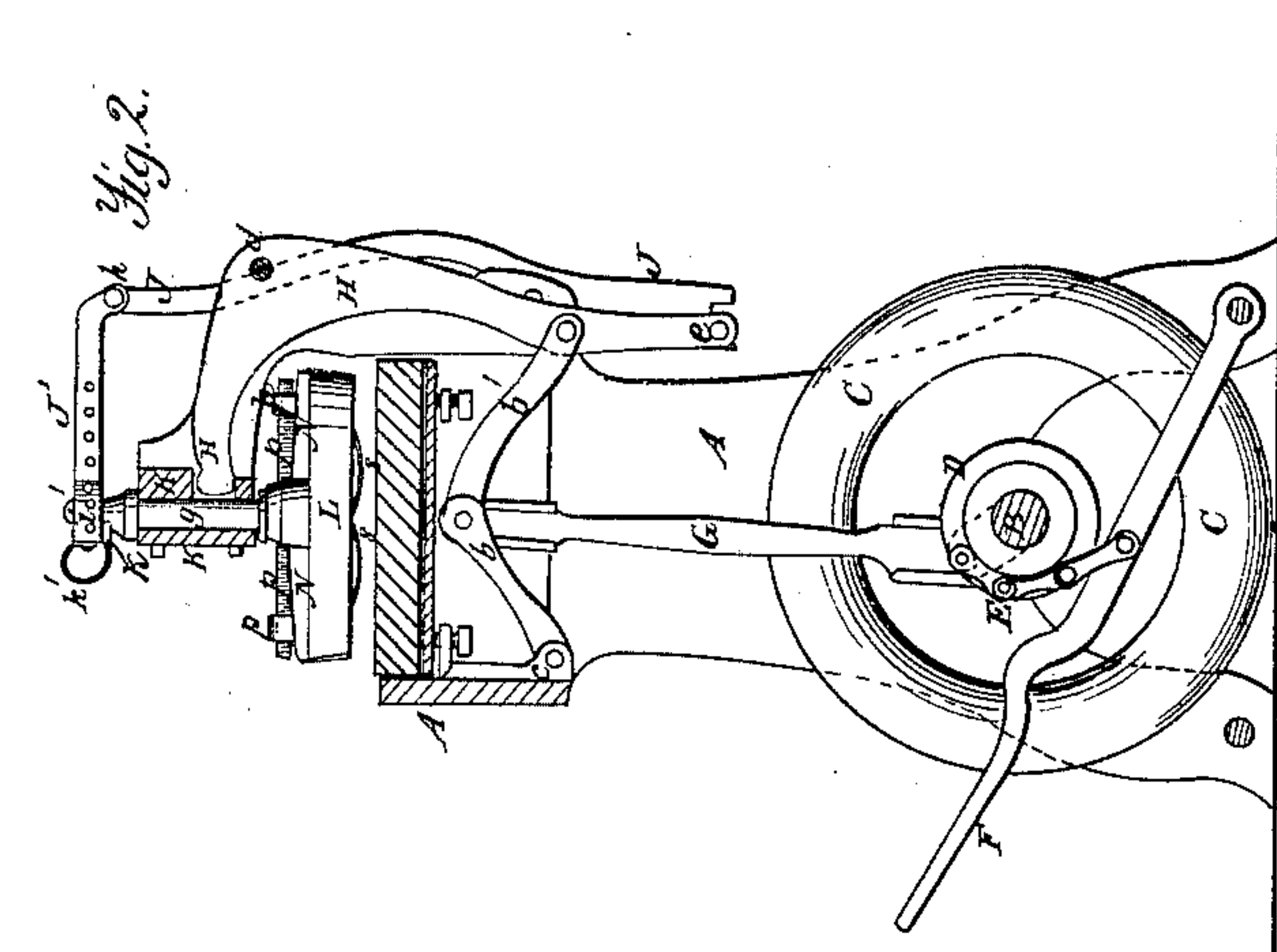


L. S. GRAVES.  
SHOE SOLE MACHINE.

No. 30,060.

Patented Sept. 18, 1860.



Witnesses:  
J. W. Comly  
R. S. Spencer.

Inventor:  
L. S. Graves.  
per Munroe & Co.  
Attorneys.

# UNITED STATES PATENT OFFICE.

L. S. GRAVES, OF ROCHESTER, NEW YORK.

## MACHINE FOR CUTTING BOOT AND SHOE SOLES.

Specification of Letters Patent No. 30,060, dated September 18, 1860.

*To all whom it may concern:*

Be it known that I, L. S. GRAVES, of Rochester, in the county of Monroe and State of New York, have invented certain  
5 new and useful Improvements in Machines for Cutting Leather Soles for Boots and Shoes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accom-  
10 panying drawings, making part of this specification, in which—

Figure 1 represents a front view of the improved sole cutter with a portion of its front broken out to show the feeding device.  
15 Fig. 2, shows a transverse vertical middle section taken through Fig. 1. Fig. 3, is a top view of Fig. 1. Fig. 4, is a detached view of the cutter and spindle, showing a longitudinal section taken through the cutter or die.  
20 Fig. 5, is a horizontal section taken through the head of the cutter-stock or spindle showing the ratchet that turns it.

Similar letters of reference indicate corresponding parts in the several figures.

25 This invention is an improvement in machinery for cutting out leather soles. It consists, first, in a certain novel combination of toggle levers operated by a connecting rod that receives its motion from a  
30 crank shaft, and a vibrating bent lever operated by the toggle levers, so as to impart to the cutter-stock a vertical reciprocating movement as will be hereinafter described.

It consists, secondly, in the employment of  
35 a reciprocating box for carrying the feeders, in conjunction with a vibrating lever whose fulcrum is made adjustable, the latter being operated by a cam slot in such a manner as to give a reciprocating movement to the  
40 feeders and at the same time an up-and-down motion to the feeders, as will be hereinafter described.

It consists, thirdly, in a novel manner of securing the sole cutter or die to its stock  
45 by screws, wedge blocks, and grooves, as will be hereinafter described.

To enable those skilled in the art to fully understand my invention, I will proceed to describe its construction and operation.

50 In the drawing A, is a frame, or table, of a suitable strength.

B, is a crank shaft with a bell crank *a*.

55 C is a weighted fly wheel keyed to the shaft B, and D is a slotted cam-drum also keyed to the shaft B. E is a link chain attached to the shaft B, and to a foot treadle

F. By working the treadle, the shaft will make about a three-quarter revolution back and forth. The shaft B, is placed in a horizontal state and works in bearings in each  
60 side of the table legs A.

G is a connecting rod extending from the crank *a*, up to the bifurcated joints of the toggle levers *b*, *b'*, which levers are placed under the bed of the table as shown in Fig. 65  
2. The lever *b* is jointed at its front end to the table at *c*, and the lever *b'* is jointed at its back end to a vibrating bent lever H, (Fig. 2) both levers are jointed together and also are jointed to the connecting rod G as  
70 above stated. The bent lever H, is pivoted, or has its fulcrum at *d* in the overhanging bracket I, one end, the lower end of this lever H, has a pin *e* projecting from it which plays in the slotted end of a second lever J  
75 and gives a vibrating motion to this lever J, while the other end of lever H plays in a slot in the block K, that carries the stock of the cutter L, and imparts to this block a vertical reciprocating motion. The block K plays  
80 up and down in a dovetail slot cut in the end of the bracket I and carries with it the sole cutter L, the stock or spindle *g*, of which has its bearings in this block K.

J', is a rack with teeth, or pins, project- 85  
ing from one side which is pivoted at *h* to the upper end of the lever J, which rack passes through a slot cut through a block K' that is attached to one side of the bearing  
90 block K. This slot serves as a guide for the rack J', and keeps its teeth engaged with a perforated wheel *i* which wheels play around the top end of the spindle *g*.

*k* is a pawl and *k'* its spring. This pawl is pivoted to the underside of wheel *i* and  
95 engages this wheel with the spindle *g* at every half turn of the wheel *i*, so that the spindle will receive a half revolution forward and back again at every vibration of the lever J. 100

The rack bar J' has a wedge cam *m* along its back side which acts upon one end of a V shaped spring bolt *n*, that locks the spindle in its proper position at each half turn, and releases this bolt from the spindle *g* to allow  
105 it to be turned by the rack J', in its receding movement.

The sole cutter or die L, which is the size and shape of the soles to be cut, is secured to slotted holding arms N which are secured  
110 to the lower end of spindle *g*. The securing of this cutter to the holder is effected by



two V shaped blocks  $p, p$ , having pins  $p', p'$  projecting from them, which pins pass into perforations in the ends of the cutter L where the blocks are placed in the V groove 5 formed between the arms N of the holder. The V grooves in the arms of the holder incline from their ends toward the axis of the spindle and with the screws P, P. The blocks  $p, p$ , may be moved so as to approach 10 or recede from the axis of the spindle, which movement of the block draws the cutter up tight against the holder and keeps it in place, or else loosens it so that it may be taken off, by this attachment, cutters of 15 different lengths may be readily applied to the spindle.

The operation of this part of my invention is as follows: By placing the foot on the treadle F, and bearing it down, the connecting rod G will draw down the toggle levers  $b, b'$ ; this will force the lower arm of bent lever H, outward and bring the upper arm down carrying with it the bearing box K and cutter L and, cutting out one sole 25 from the sheet of leather lying on the table top; at the same time the lever J will be acted upon by lever H and the rack arm J' will be impelled forward through its slot in the block K' turning the wheel  $i$ , a half 30 revolution, the spindle  $g$  remaining stationary, which brings the pawl  $k$  into a notch in the spindle. At the next movement the bolt  $h$ , is also forced out. Now when the treadle is allowed to raise, the toggle levers act 35 directly upon the lever H and move the cutter L up to its original position, at the same time the rack arm J' recedes and this time it moves the spindle and cutter a half revolution, in which position the next movement 40 of the treadle carries it down to perform its cut. In this way the ends of the cutter, with respect to the work, are reversed after every cut, turning half around at each upward movement after it leaves the work. The ob- 45 ject of giving this movement to the cutter will be readily understood, it is to obtain economy of stock in cutting out the soles.

The next part of my invention refers to the feeding of the leather up to the work 50 in an exact ratio with the movement of the cutter. To do this a reciprocating portion 2 Fig. 1, receives its motion from a lever 3 which has its fulcrum in a bracket 4, and which is acted upon by a cam slot in drum 55 D, the upper end of this vibrating lever 3

plays back and forth in the portion 2, besides moving this portion, which might be termed a carriage, back and forth on its guide bars 5 the toothed feeders 6 6 are 60 screwed to the ends of a T shaped block 7 that fits loosely into the carriage 2 so that it may play up and down, the end of this T piece is beveled as shown in Fig. 1, and as the lever 3 plays back and forth this T piece is raised and depressed by it, in consequence 65 of the lever acting against its beveled end. The degree of feed motion is regulated by making the fulcrum of the lever 3 adjustable, thereby increasing or diminishing the length of the upper arm thereof. The op- 70 eration of the feeder is to raise as it moves forward and thus move the leather, placed on the table top, with it, and to fall down below the surface of the table in its backward movement. The slot in the drum D 75 is cut in such a manner that the feed motion will cease while the cutter is performing its work, and as the cutter leaves the work it is moved forward the width of a sole to be cut, which movement is regulated to a nicety 80 by the slotted lever 3 and the fulcrum set screw 9. The sole after being cut is thrown off from the cutter by the curved springs 8, 8.

Having thus described my invention, 85 what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with toggle levers  $b, b'$  operate as set forth, of the bent lever H, cutter spindle  $g$ , and reciprocating block 90 K carrying the cutter; the lever J and rack arm J' with wheel  $i$ , and its engaging pawl  $k$ , all arranged in a suitable relation to each other and operating as herein set forth.

2. The slotted cam drum D, slotted lever, 95 3, and adjustable fulcrum screw 9, with the carriage 2 and block 7, movable in the carriage, all combined and arranged in the manner and for the purposes set forth.

3. The manner of securing the cutter L 100 to its holder N, N, by screw rods, or rod P running lengthwise of the cutter, and blocks  $p, p$ , with their pins  $p', p'$ , arranged and combined with the slotted and grooved arms of the holder, substantially as set forth.

L. S. GRAVES.

Witnesses:

LEWIS MILES,  
ROBERT H. SHAW.