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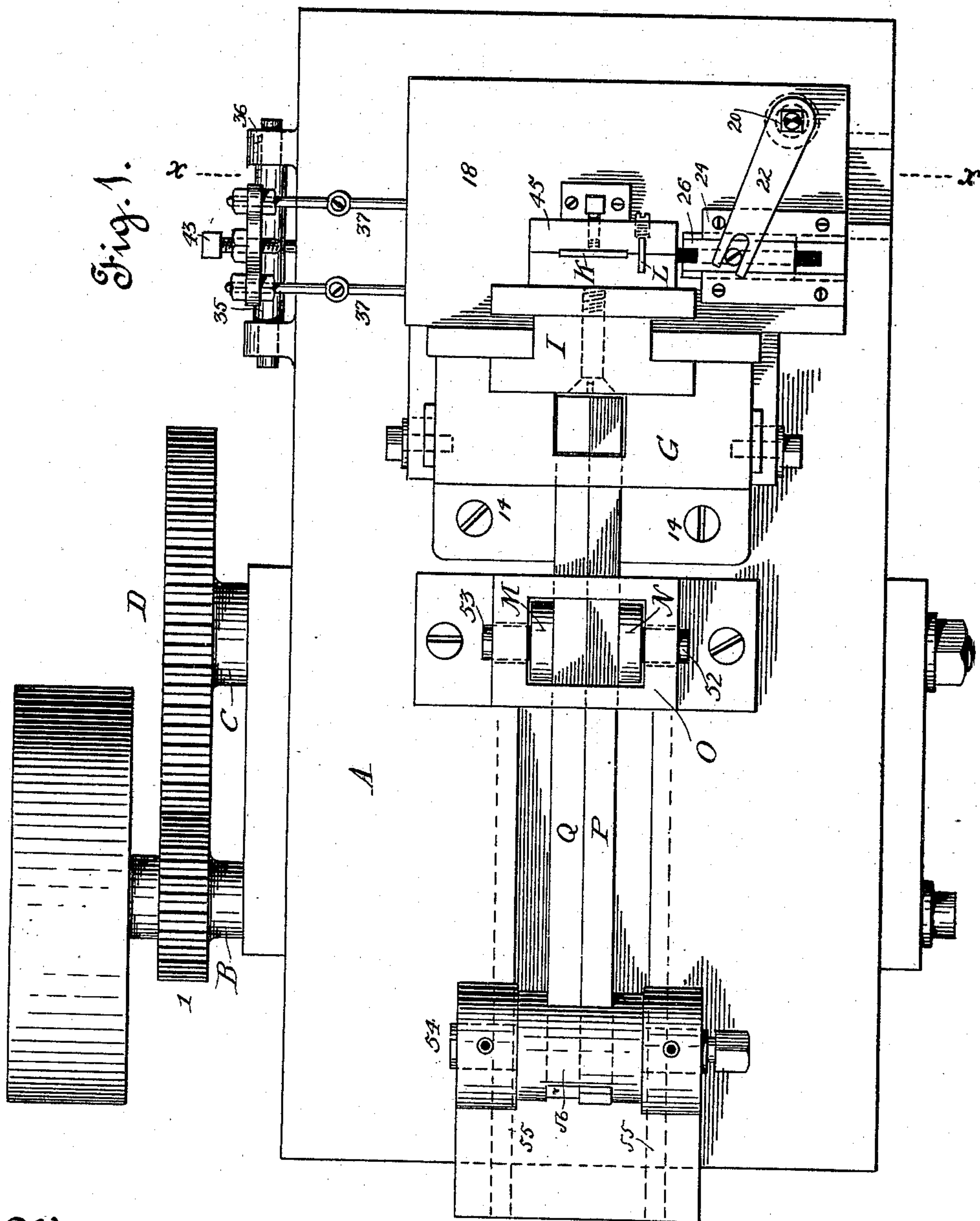
5 Sheets—Sheet 1.

J. K. BIGELOW.

MACHINERY FOR MAKING TUBULAR LEATHER BLANKS.

No. 537,912.

Patented Apr. 23, 1895.



Witnesses.

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(No Model.)

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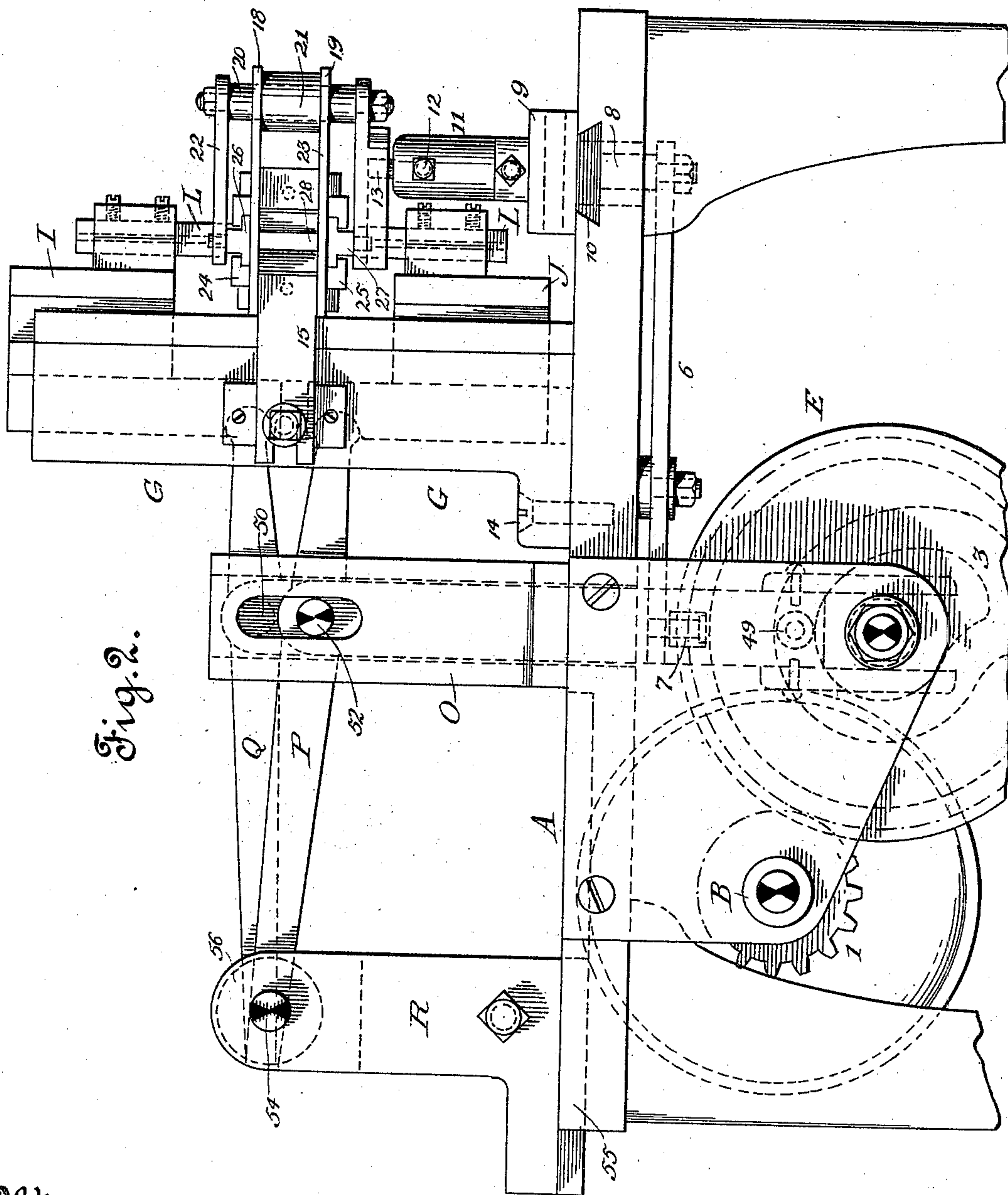


Fig. 2.

Witnesses.

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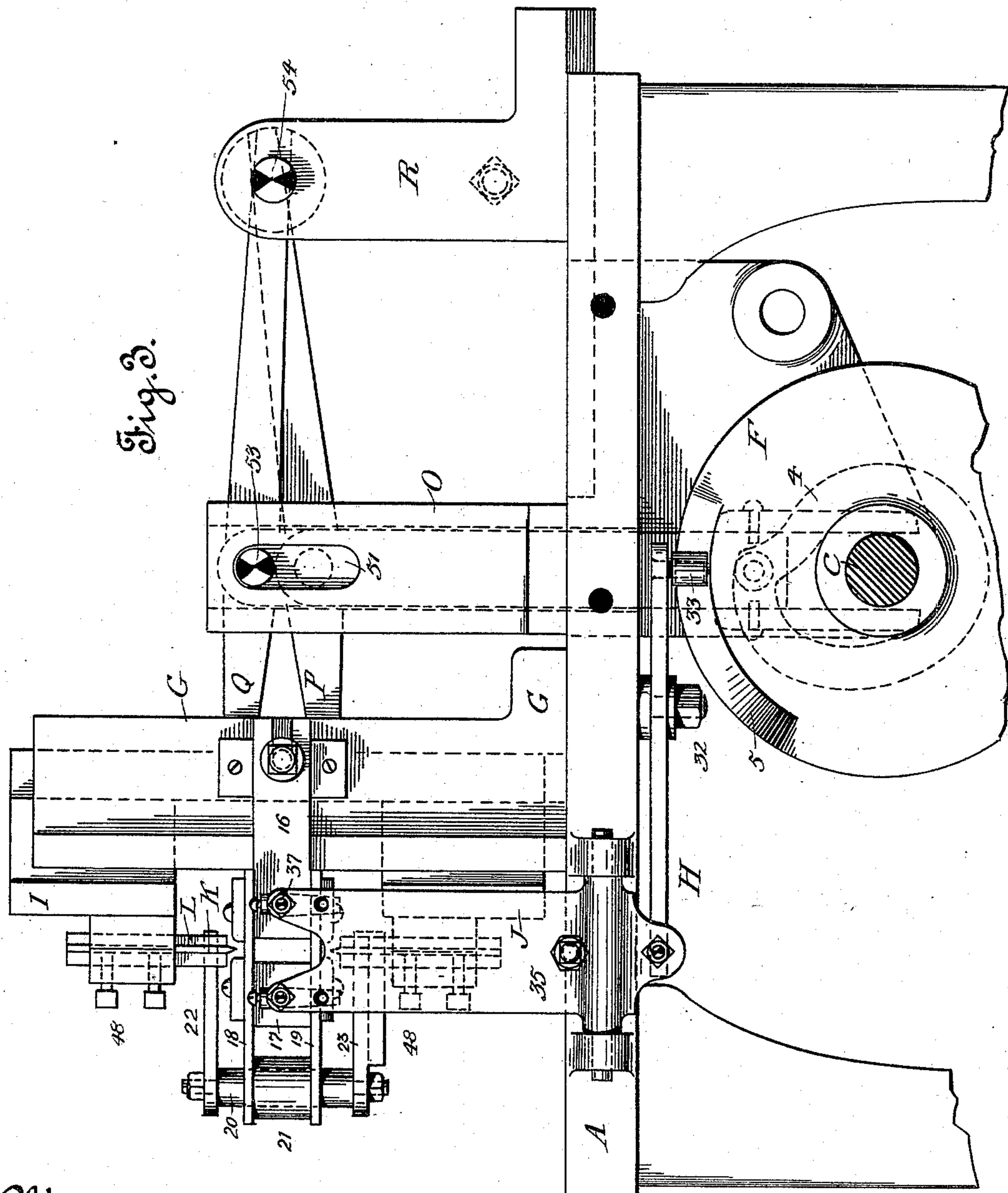
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Witnesses.

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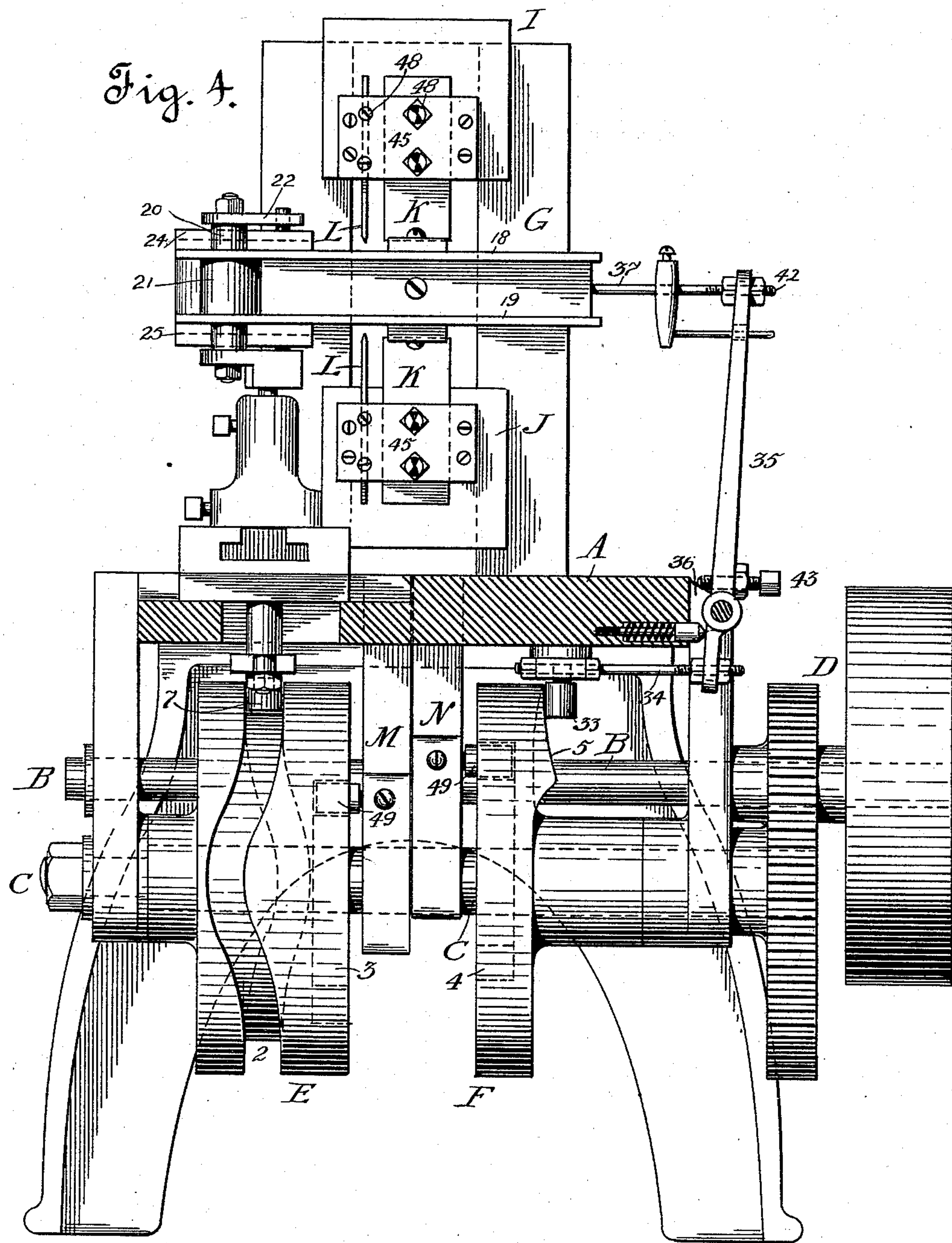
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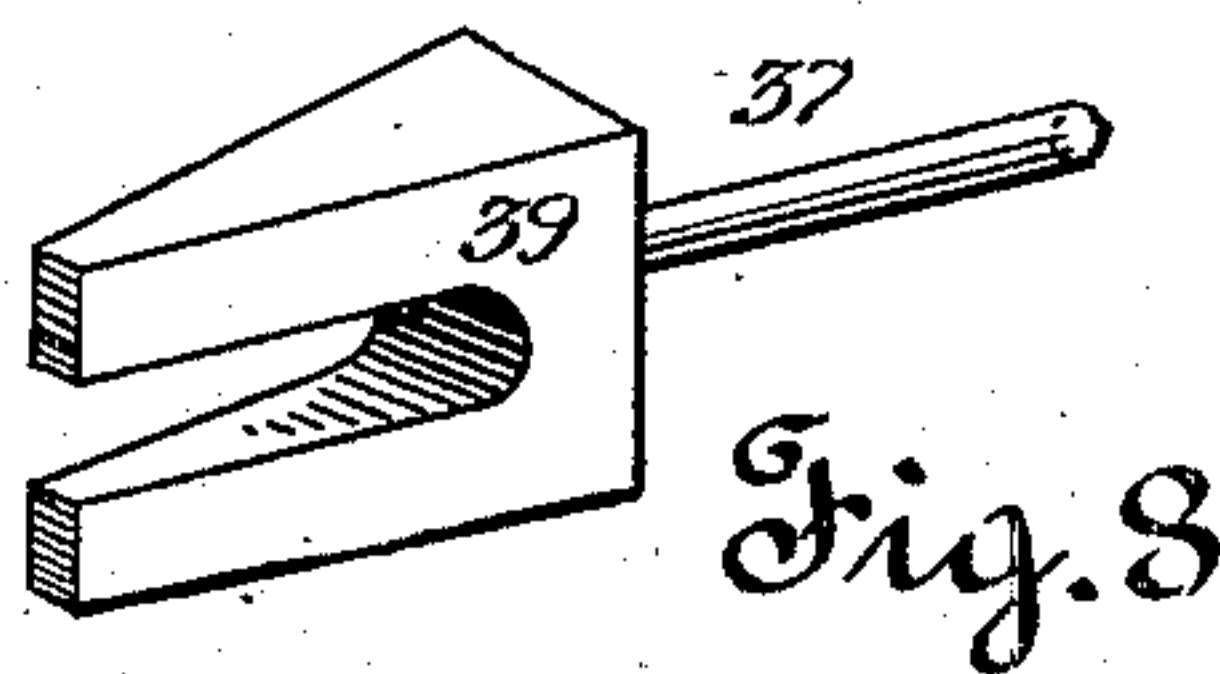
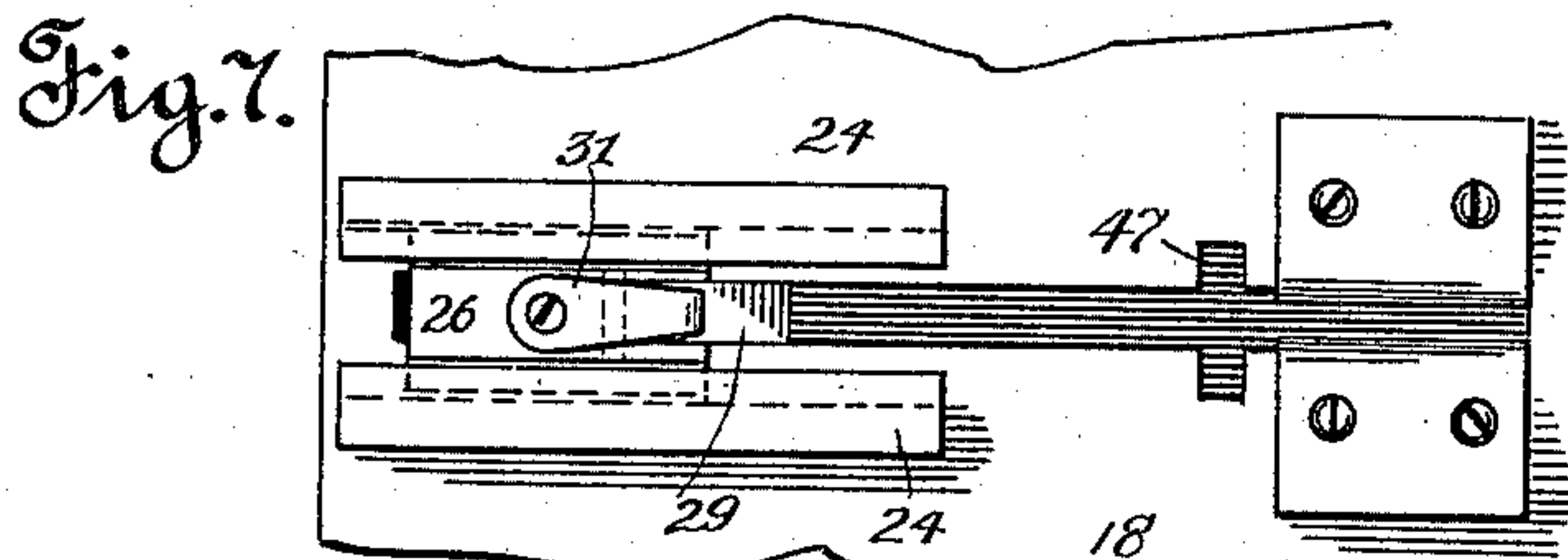
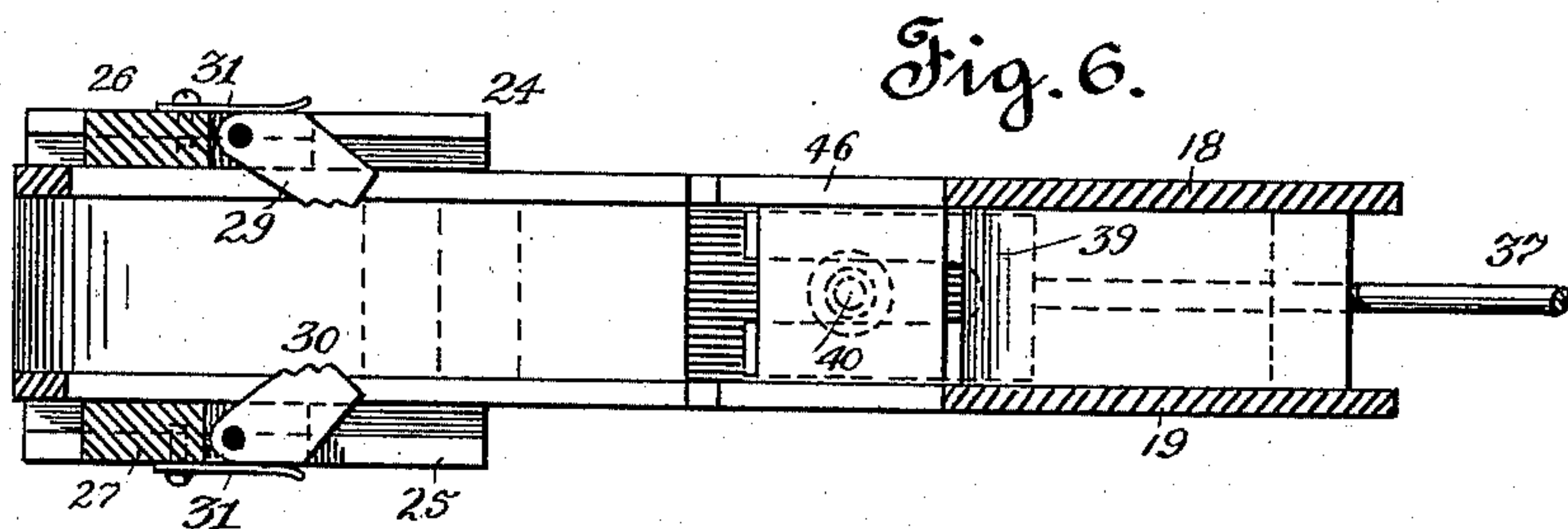
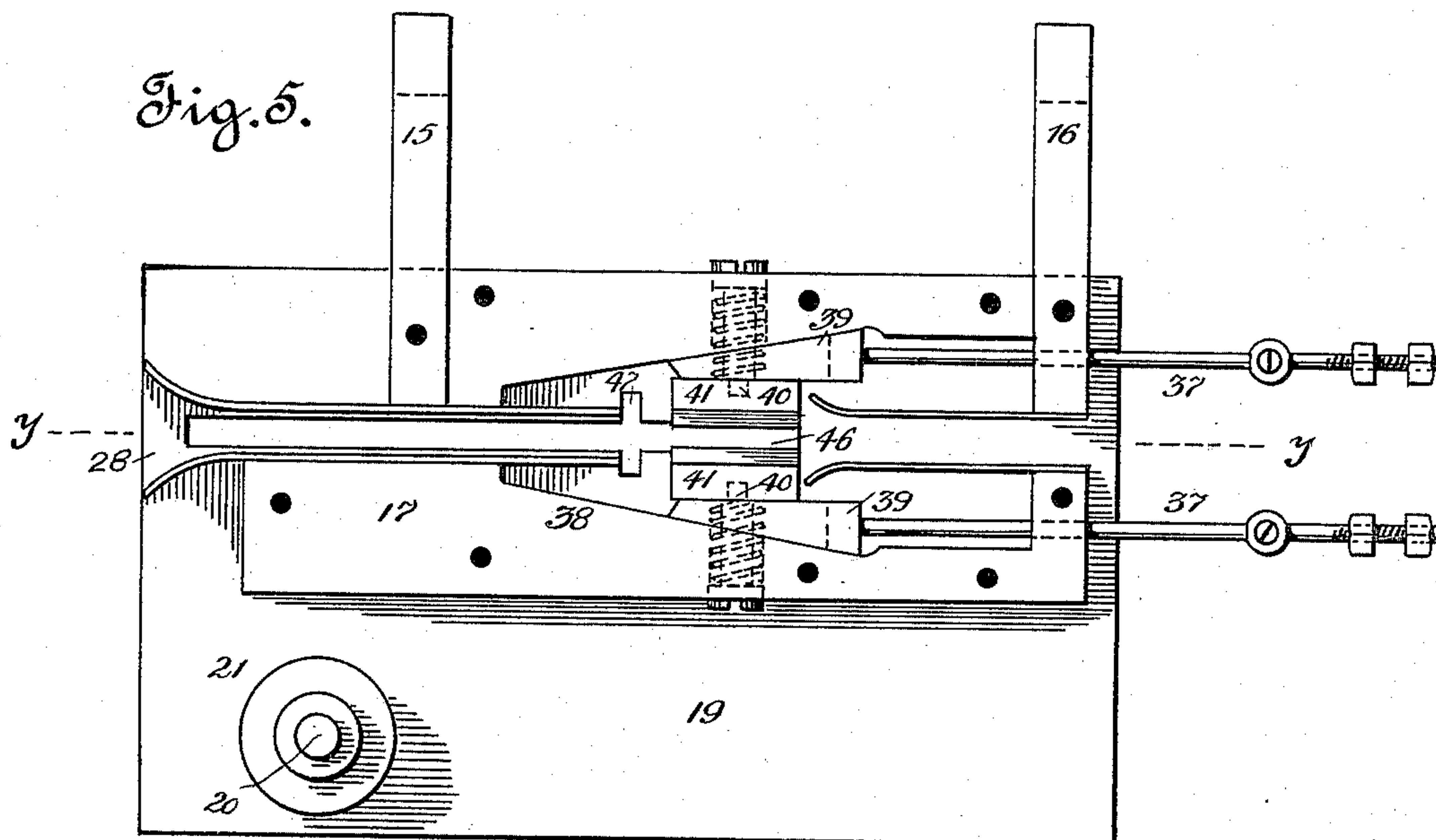
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MACHINERY FOR MAKING TUBULAR LEATHER BLANKS.

No. 537,912.

Patented Apr. 23, 1895.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN K. BIGELOW, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SEAMLESS LEATHER COMPANY, OF CHICAGO, ILLINOIS.

MACHINERY FOR MAKING TUBULAR LEATHER BLANKS.

SPECIFICATION forming part of Letters Patent No. 537,912, dated April 23, 1895.

Application filed November 13, 1893. Serial No. 490,793. (No model.)

To all whom it may concern:

Be it known that I, JOHN K. BIGELOW, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Machinery for Making Tubular Leather Blanks; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to the manufacture of tubular seamless articles of leather produced by slitting leather edgewise so as to form a slitted leather blank. Such a blank can be afterward expanded and shaped into such articles as loops for harness and various kinds of straps, sheaths for the spindles in cotton and other spinning mills, and various other articles which are at present produced by stitching, riveting or cementing together the meeting edges of a piece of leather, so as to form a tube.

The object of the invention is to provide a machine for producing these slitted blanks rapidly, cheaply and perfectly, by a connected mechanism which feeds the leather, holds it in position to be slitted, slits it edgewise and cuts off slitted blanks of the proper size successively. These are the general features of the machine, but it also comprises special features of construction which are hereinafter particularly described in this specification and pointed out in the claims following.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view. Fig. 2 is an elevation of the side opposite the driving pulley. Fig. 3 is an elevation from the side where the driving pulley and gearing are placed. Fig. 4 is a front elevation and part section on line $x-x$ of Fig. 1. Fig. 5 is a detail plan of the leather guide and feed, and clamp, with top plate removed. Fig. 6 is a section on line $y-y$ (Fig. 5). Fig. 7 is a detail top plan of the feed shown in Fig. 6. Fig. 8 is a detail perspective of one of the wedge clamps.

A is a supporting frame or table which carries all the operative parts of the machine.

B is the driving shaft, journaled below the table and having the main belt pulley and a

pinion 1, which drives the transverse shaft C, through the gear D. This shaft C, through various connections, drives the whole working mechanism placed above and upon the table. This working mechanism comprises feeding mechanism, holding or clamping mechanism, and slitting and cutting mechanism, all operated automatically and properly timed so as to co-operate in producing slitted leather blanks of the character before specified. Each must be described separately; but the specification will be rendered more intelligible by stating in advance that they are all driven by cams upon the shaft C. Four of these cams are provided, formed in or upon disks E, and F. (See Figs. 4 and 2.) The cam 2 is a peripheral groove formed upon the disk E, and drives the feeding devices. The cam 3 is a groove upon the inner face of the disk E, and drives the lower vertical slitting and cutting knives. The cam 4 is a similar groove upon the inner face of the disk F, and drives the upper vertical slitting and cutting knives. The cam 5 is a surface incline upon the outer face of the disk F, and withdraws the devices for holding or clamping the leather while it is being slitted and cut.

I first describe the operation of feeding the leather, supposing it to be a long strip of suitable thickness and diameter to form the required sizes of slitted blanks. I refer to Figs. 2 and 4 and to the details in Figs. 6 and 7.

A lever 6, is pivoted below and to the table, which carries at one end a roller 7, engaging with the cam groove 2, in the disk E. The rotation of the disk gives this lever a horizontal oscillation. The forward end of the lever is connected by a pin 8, to a slide 9, moving in a dove-tailed guide 10, formed in the top of the table. Within a T-shaped groove in the guide 10, is set and adjustably held a hollow pillar 11, the adjustment of which by means of a set screw regulates the throw of the feed. Within the pillar 11, is secured by set screws 12, a pin 13, which projects above the top of the pillar. The parts operated by the movement of the slide, pillar and pin are supported above the table by a vertical standard G, fixed to the table as at 14, (Fig. 2.) To

the sides of this standard is secured a forwardly projecting frame composed of arms 15, 16, and a plate 17, the shape of which is best shown in top plan in Fig. 5. To this frame are secured upper and lower plates 18, and 19, which project forward beyond the frame, (Figs. 2 and 3.) A pin 20, is journaled in a stationary sleeve 21, located between the plates, upon the upper and lower ends of which are fixed arms 22 and 23. The pin 13, engages with the arm 22, and oscillates it, the arm 23 also oscillating in unison as the motion is communicated to it through the pin 20. Above the upper plate 18, and below the lower plate 19, are fixed coincident guides 24, 25, in which are movable slides 26, 27, with which the arms 22, 23, respectively engage. These slides are placed above and below, in line with the opening 28, through which the strip of leather is inserted. Pivoted in each slide and projecting slightly from above and below into the passage for the strip are toothed pawls, 29 and 30, held by yielding springs 31. The movement of the governing cam 2, transmitted through the connections described, gives a transverse reciprocation to the slides and pawls, so that the strip of leather inserted edgewise is seized by the pawls and pushed forward the proper distance to or toward the middle longitudinal line of the machine, or just under and above the oppositely moving slitting and cutting knives. As soon as the feed has pushed the leather into position, but before the knives are permitted to operate, a device for clamping or holding the end of the strip rigidly comes into operation. The positive movement of this part of the machine is derived from a spring 44, and its withdrawal is effected by the surface cam 5, upon the disk F. These movements are best shown in Figs. 3 and 4, in connection with detail views 5 and 8. Fig. 3 is an elevation with the driving gear removed so as to show the outer face of the disk F, and its cam 5.

It is an oscillating lever pivoted at 32, to the bottom of the table, and having a roller 33, to bear upon the cam 5. This lever is connected to a rod 34, (Fig. 4,) which has a transverse reciprocating motion, and which at its outer end is connected to a lever 35, pivoted in ears 36, on the edge of the table, its long arm extending up to a point between the plates 18 and 19, on the side of the machine opposite the feed. The holding and clamping of the leather strip is accomplished by movable wedges operating in connection with the plate 17, and moved by rods 37, connected to the lever 35, the latter being positively moved by the spring 44, (Fig. 4.) It will be seen by reference to Fig. 5, that the plate 17, is cut out so as to form inclines 38. The wedges 39, having opposing inclines, move upon the plate 19, and are slotted to receive guide pins 40, each having a tension spring. While the wedges might be arranged so as to bear directly upon the sides of the leather, I prefer to employ blocks

1, connected to the guide pins, which are forced toward each other by the forward movement of the wedges, hold the leather firmly until the knives have performed their part of the operation, and are withdrawn by the tension springs as the wedges retreat. The throw of the wedges can be limited and regulated by stops, such as 43, adjusting the lever 35, on the screw-threaded ends of the rods 37. The wedges are withdrawn by the cam 5, through the connections described. It will be seen that by using these positively operating wedges the clamp is made self-adjusting so as to always center the edges of the leather in relation to the slitting knives. This is very important, because the strip of leather may vary slightly in thickness. The leather must be held rigidly, and this is always accomplished by the two wedges, no matter how the thickness of the strip may vary at different points in its length.

I have described the feeding and holding devices before the slitting and cutting mechanism, in order to follow the proper sequence in the operation of the whole machine; but it must be understood that the functions performed by the knives are by far the most important. Slitted blanks could be produced by these knives without using auxiliary feeding and holding mechanism; but the rapidity of the operation and perfection of the product are greatly increased and secured by using the combined mechanism.

The knives, which slit the leather edgewise and cut it off in proper lengths as each slit is formed, reciprocate vertically, a pair, (slitter and cutter) above the feeding and clamping devices, and a similar pair below. The standard G, mounted upon the table, forms the guide for the movement of both sets of knives. By reference to Figs. 1, 2, and 3, it will be seen that the standard is formed into a T-shaped vertical guide which extends from top to bottom. In these guides are sliding blocks I, J, to the front of each of which is secured a head or holder 45. Each holder is slotted to receive the slitting knives K, and the cutting knives L, the latter being set at right angles to the former, and all working through registering slots 46, 47, (Fig. 5,) in the plates 17, 18, and 19. The knives are held and adjusted by set screws 48. When the leather is in place the pairs of knives are moved vertically toward each other, and the slitting knives slit or divide the leather edgewise for a distance equal to the width of the blades, the two knives meeting, and the upper knife following the lower down a trifle so as to slightly overlap near the middle of the strip. The cutting knives moving in the same way from above and below, cut off the leather near the end of the slit toward the feed side of the machine, leaving a perfectly slitted and separated tubular seamless blank, adapted to be finished by expanding and shaping, into loops or any other articles which can be made from leather tubes.

The mechanism for driving the knife slides is shown in all the figures excepting the detail views; and I shall refer to them separately in the course of the description of the different parts. The motion of the knives is derived from the cam grooves 3 and 4, on the inner faces of the disks E, and F, respectively. The shape of these grooves is clearly shown in dotted lines (Figs. 2 and 3), and they are precisely similar, excepting that they oppose one another in order to give the simultaneous motion in opposite directions to the knives. (Compare Figs. 2 and 3.) These cams give motion by means of roller 49, to vertical connecting rods M, n, the lower ends of which are forked so as to straddle the shaft C. These rods move vertically in a guide standard O, on the table, having slots 50, 51, near its upper end, through which pass pins 52, 53, which pivot the rods to levers P, Q. The levers are both pivoted at their rear ends upon a pin 54, in a standard R, at the rear end of the table. The forward ends of levers P, Q, are connected respectively to the rear of the upper and lower blocks I and J, which carry the knives. Thus the cams through these connections act simultaneously in opposite directions upon the knife holders and give them an alternate reciprocating motion toward and from each other. In order to adjust the throw of the knife levers, and also change the speed, the standard R, is made adjustable in a guide 55, formed at the rear of the table. The pin 54, is inclosed by a slotted sleeve 56, through which the levers P, and Q, pass. This construction enables the standard R, and pin to be adjusted so as to change the common fulcrum for both levers, thus adjusting the stroke and making it longer or shorter as the case may be. This construction is best shown in Fig. 1.

The operation of the whole connected mechanism has been described in connection with the detailed description; but it may be briefly summarized.

When the machine is ready to commence work a strip of leather, of the width and thickness to which the knives have been adjusted, is inserted into the machine. It is grasped by the feed and pushed forward a proper distance, that is, to a point between the sets of knives. Before the feed slides commence to withdraw the wedge clamps advance, clamp and hold the end of the strip firmly in position; the knives from above and below enter the leather and slit and cut off the slitted blank simultaneously; the feed slides withdraw as soon as the knives have commenced to enter the leather; the clamps and knives withdraw; the feed pushes the strip forward again, and thus the operation is repeated with great rapidity, producing slitted blanks of leather, tubular and seamless, and ready for finishing.

It will be understood of course that the knives are interchangeable with others, so that different sizes of blanks can be produced

within reasonable limits. The machines shown in the drawings is more especially designed to produce harness and strap loops; but any modifications of it which might be required to make tubular seamless leather blanks for other purposes such as sheaths for spindles, would require only such a re-arrangement as would accommodate the shapes and sizes of the leather from which such blanks would be made.

I also state, to avoid any misapprehension, that I have used the term "blank" throughout this specification to denote a piece of leather, slitted through edgewise for a portion of its extent, cut off, and thus made ready for subsequent shaping and finishing into a complete leather article, seamless and tubular.

I also regard it as within my invention to arrange the machine so that the knives shall move horizontally instead of vertically, although I prefer the construction shown and described. It would also be possible by removing one set of knives and changing the throw of the other set to produce seamless pockets of leather instead of tubes.

What I claim, and desire to secure by Letters Patent, is—

1. In a machine for forming seamless tubular blanks from leather, knives moving in opposite directions for slitting the leather inwardly from opposite edges, said knives cutting independently of each other substantially as set forth.

2. In a machine for forming seamless tubular blanks from leather, knives cutting independently of each other moving in opposite directions for slitting the leather edgewise, and knives for cutting off the slitted piece, substantially as set forth.

3. In a machine for forming seamless tubular blanks from leather, the combination of oppositely moving knife carriers, connections for moving said carriers simultaneously toward and from one another, and a slitting knife and cutting knife held by each carrier at right angles to one another, substantially as set forth.

4. In a machine for the purpose set forth, and in combination, a frame or table, a vertical guide-standard thereon, an upper and a lower knife carrier in said guide having simultaneous vertical reciprocation in opposite directions, and a slitting knife and a cutting knife carried by each knife carrier, substantially as described and shown.

5. A machine for forming tubular seamless blanks from leather, consisting of a positively acting feed for the leather, a movable holder or clamp, reciprocating knives for slitting and cutting off the leather blanks, and mechanism for operating said feed, holder and knives successively, substantially as set forth.

6. In a machine for the purpose set forth, a positively acting feed, a movable holder or clamp, reciprocating knives moving simultaneously in opposite directions, a shaft as C, having a series of cams and connections from

each of said cams for operating said feed, holder and knives, substantially as set forth.

7. In combination with the feed, the leather clamp or holder and the oppositely moving
5 knives, the shaft C, the disk E having cam grooves 2 and 3, the disk F having cam groove 4 and the surface cam 5, and connections from said cams to the feed, clamp and knives, substantially as set forth.

10 8. In a machine for the purpose set forth and in combination with the table and the vertical standard G, the slotted plates 18 and 19 forming the top and bottom of a passage for the leather, reciprocating feed slides guided
15 upon said plates and having feed pawls, the shaft C having the disk E and cam groove 2, and connections from said cam to the feed slides, substantially as set forth.

9. The combination with the disk E having
20 the cam 2 of an oscillating lever, a transverse slide connected to said lever, plates 18, 19, forming part of the frame work of the machine, a pin journaled in said plates, and crank arms secured to said pin, and connected
25 to feed slides guided transversely in the plates 18 and 19, substantially as set forth.

10. In combination with a slitting knife and a strip of leather fed at right angles thereto with its edge in line with said knife, a cen-
30 tering device comprising a pair of reciprocating wedges operating to clamp said strip centrally of the slitting knife, substantially as described.

11. The combination with cutting and slit-
35 ting knives for the purpose set forth of a guide plate, a pair of wedges forming a clamp and operated positively by a spring through connections, substantially as described, and a cam operating through the same connections
40 for withdrawing said wedges, substantially as set forth.

12. In combination with reciprocating knives for the purpose set forth and with the slotted plate 17, having inclines, movable
45 wedge clamps for holding the leather under the knives, and a connected mechanism for

advancing and withdrawing said clamps, substantially as set forth.

13. In combination with the wedge clamps and connections for operating them, the
50 clamping blocks located between the wedges, and the tension springs connected to said blocks, substantially as described and shown.

14. In combination with the vertical guide standard having upper and lower reciprocating
55 slitting and cutting knives, the plates 18, 17, 19, the feeding slides and the wedge clamps guided by said plates and registering slots in said plates to permit the passage of both sets of slitting and cutting knives, substantially
60 as set forth.

15. The combination with the wedge clamps of the shaft C, the disk F, having the cam 5, a horizontally oscillating lever moved by said
65 cam and connected to the vertical oscillating lever 35, and rods connecting the upper end of said lever 35 to the said wedge clamps, all substantially as described and shown.

16. In combination, the guide standard G, upper and lower knife holders sliding there-
70 in the knives, a pivoted lever connected to each knife holder, a shaft C, rods operated vertically by cams on said shaft and connected to said pivoted levers, whereby said
75 levers and knife carriers derive a simultaneous movement in opposite directions, causing the knife holders to approach toward and recede from each other, substantially as set forth.

17. In combination with the knife carriers, 80 of the levers P and Q, a common fulcrum pin, a slotted sleeve upon said pin, and an adjustable standard supporting said pin and sleeve, substantially as set forth.

In testimony whereof I have affixed my sig- 85 nature, in presence of two witnesses, this 3d day of November, 1893.

JOHN K. BIGELOW.

Witnesses:

L. W. SEELY,
JOHN COFFEE.