

(No Model.)

2 Sheets—Sheet 1.

W. HALKYARD.
MACHINE FOR MAKING STAPLES.

No. 405,090.

Patented June 11, 1889.

Fig. 2.

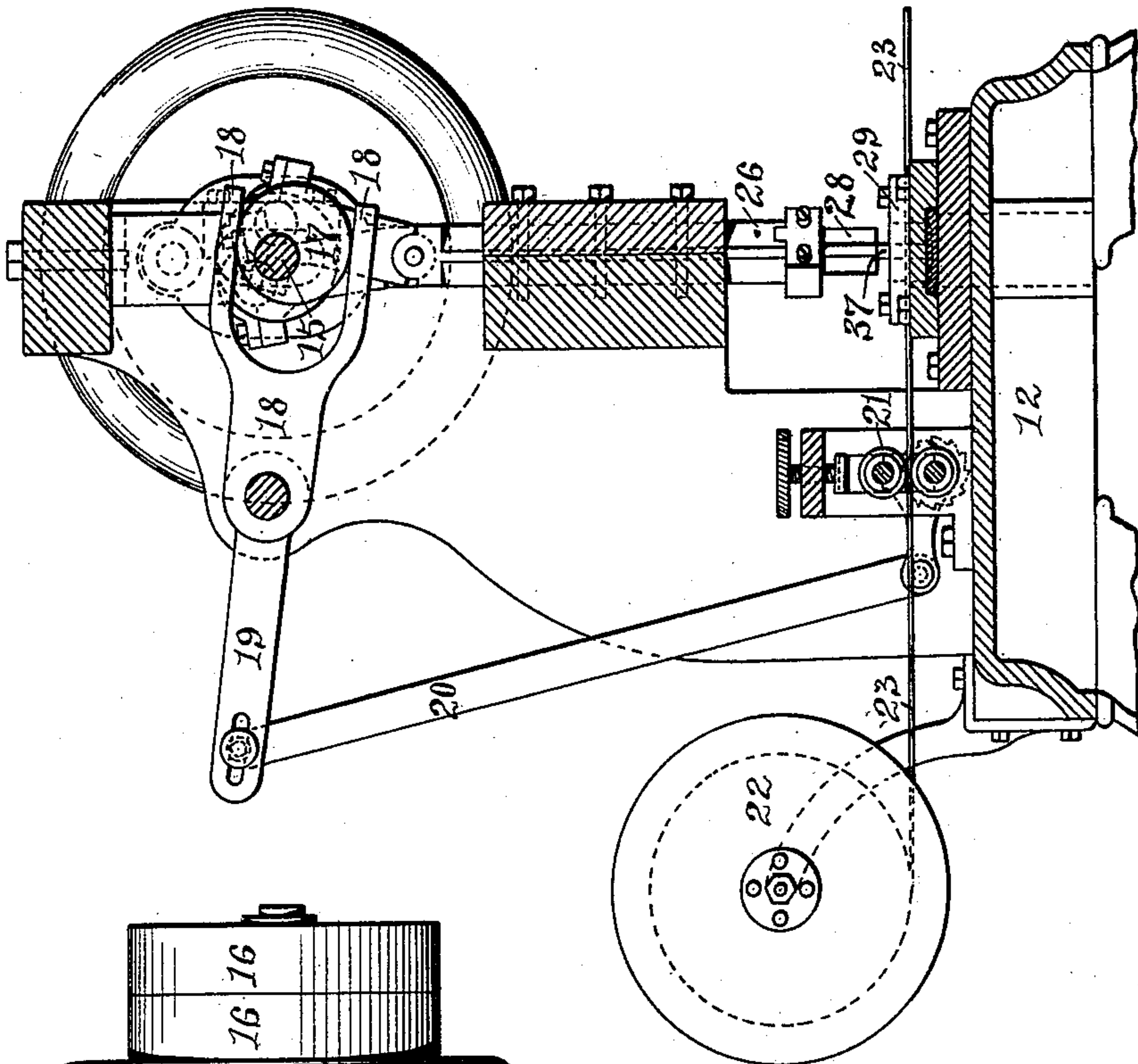
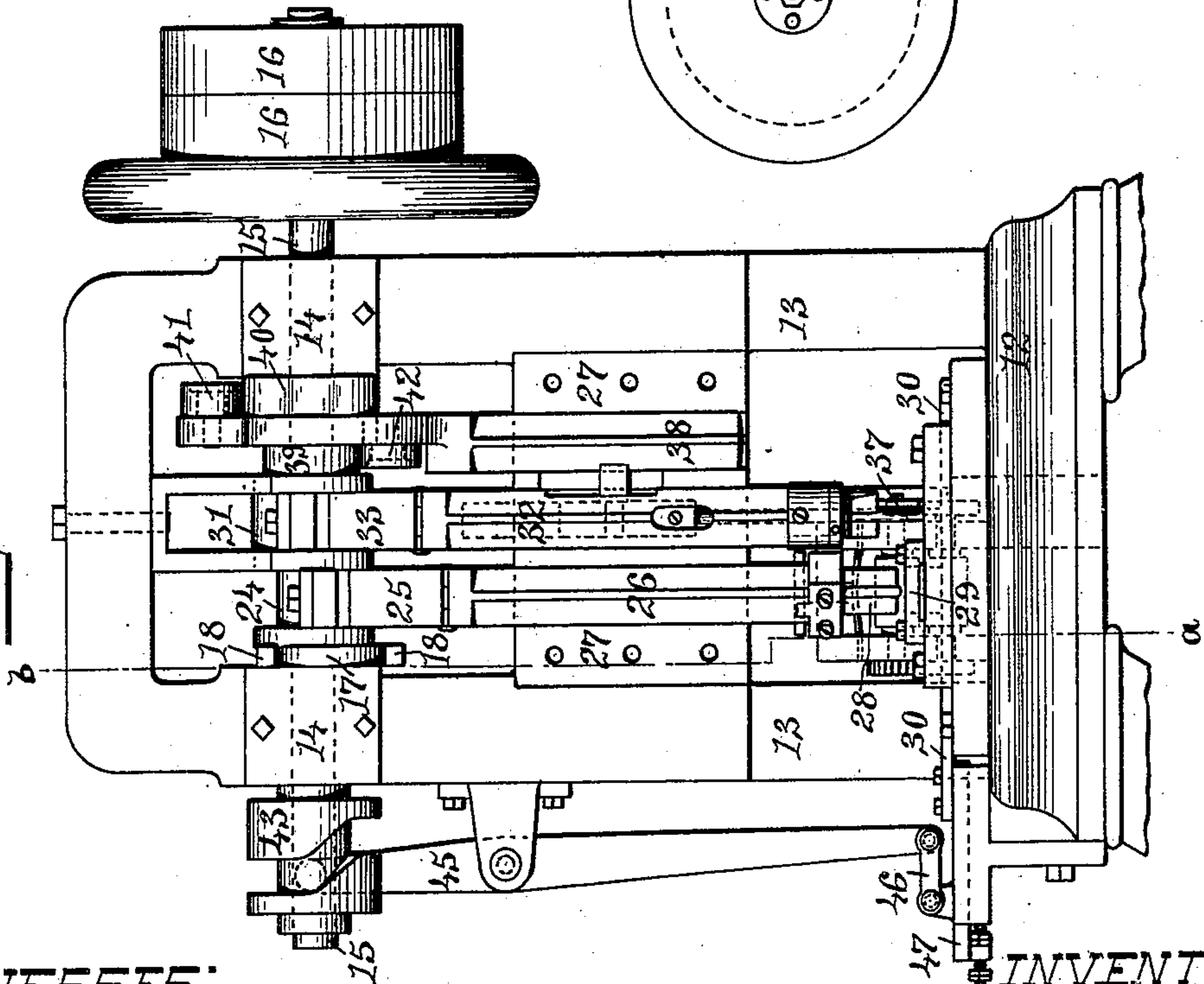


Fig. 1.



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2 Sheets—Sheet 2.

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Fig. 3.

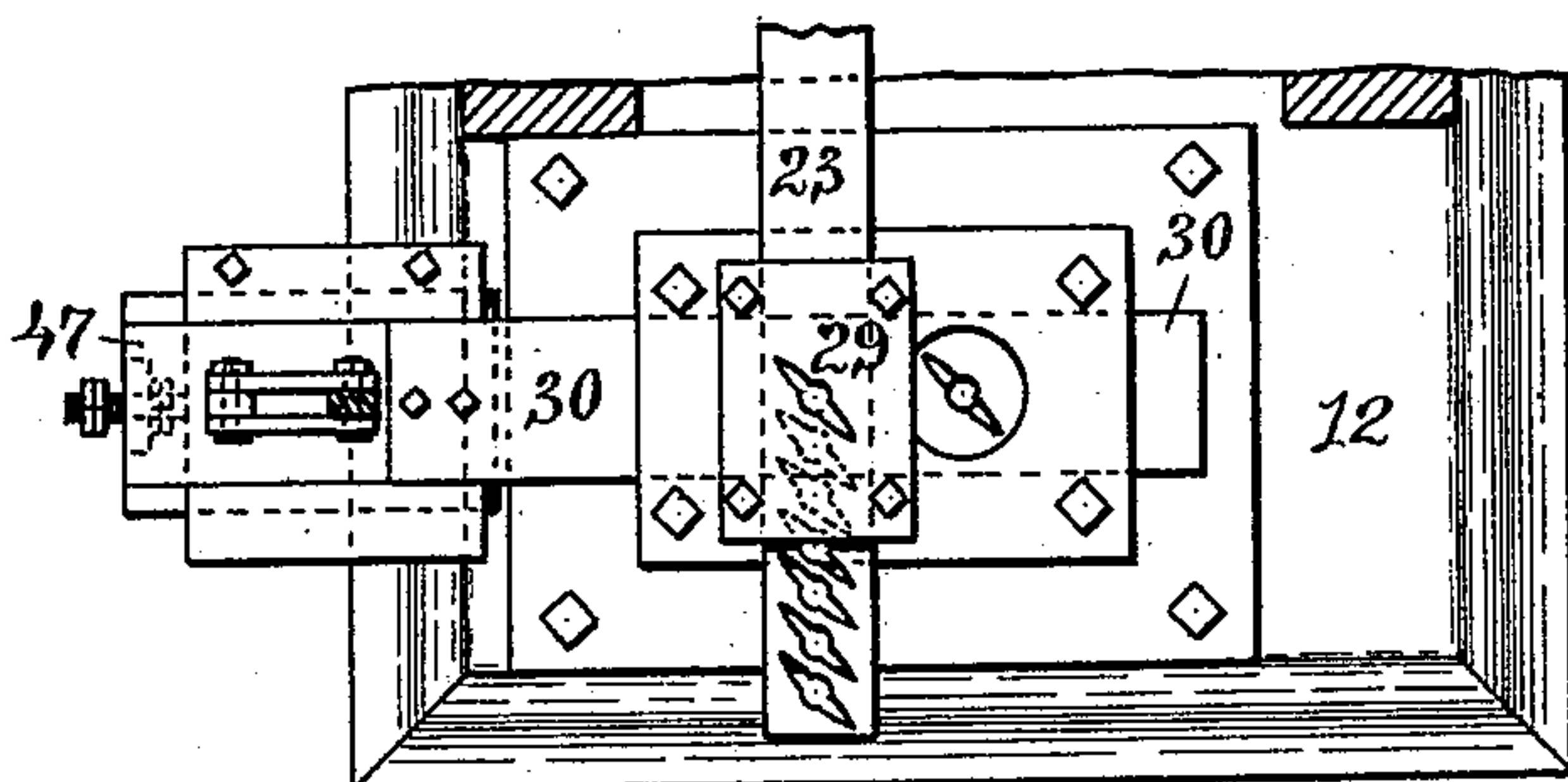


Fig. 4.

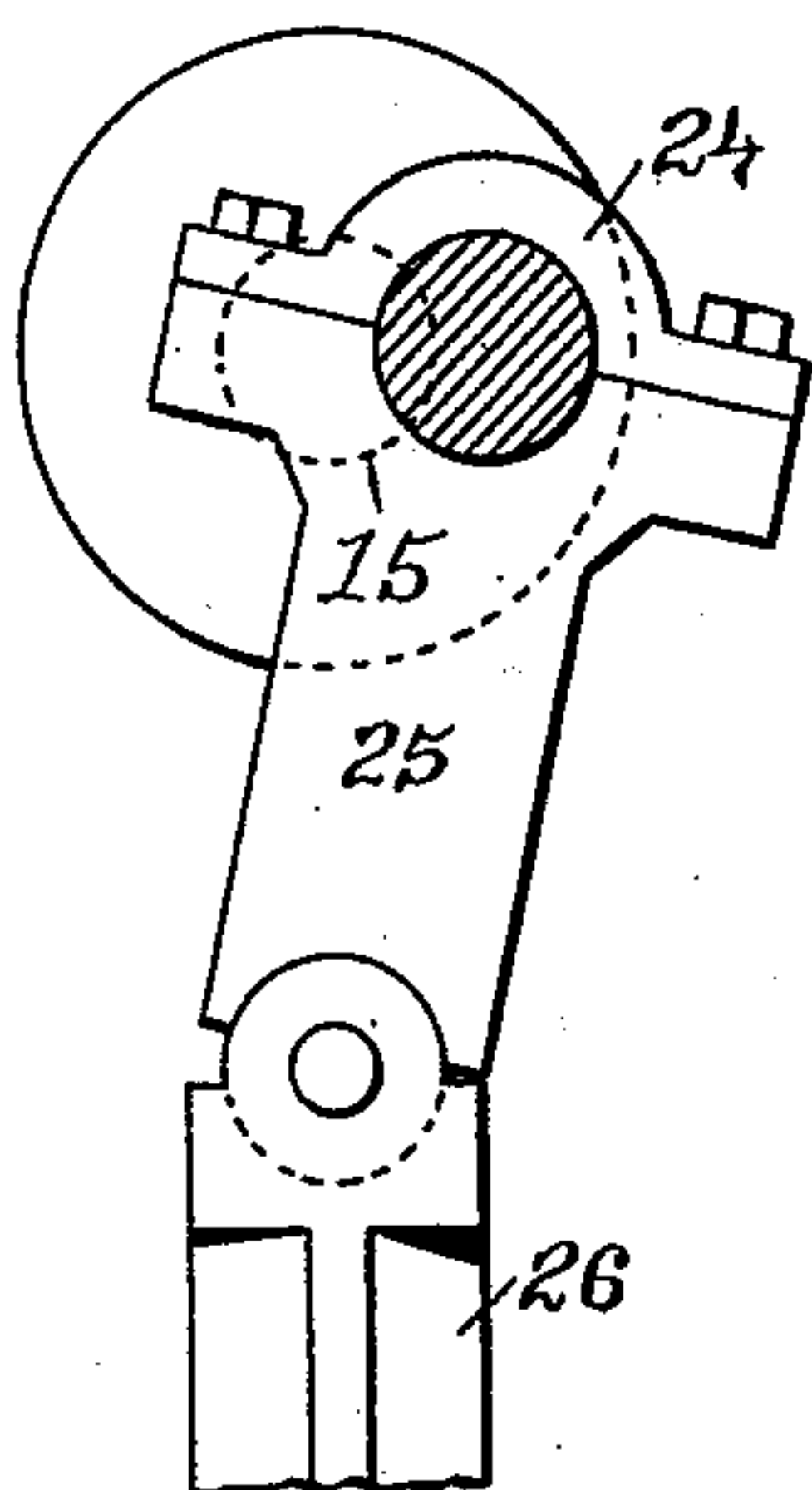


Fig. 5.

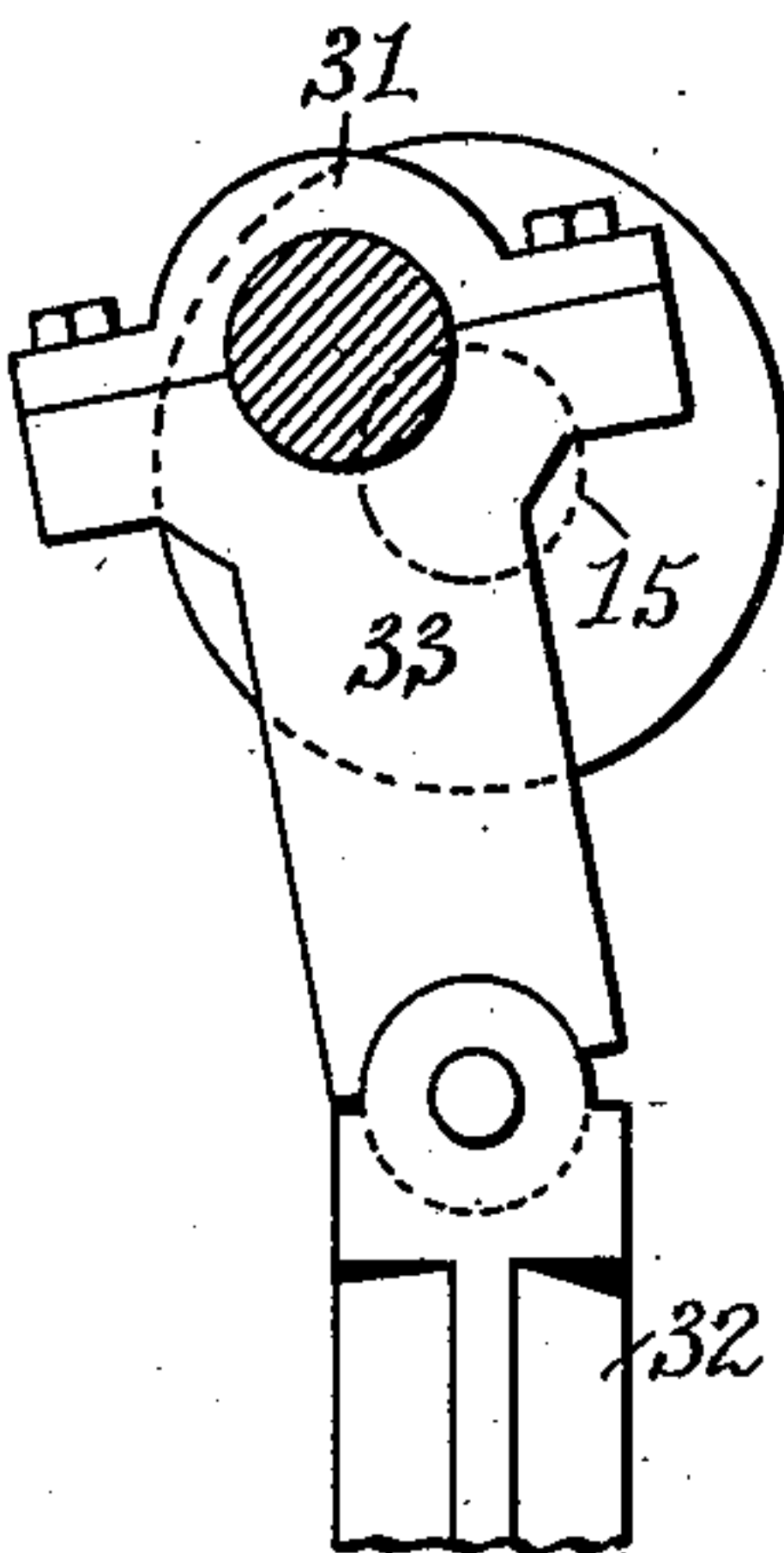


Fig. 6.

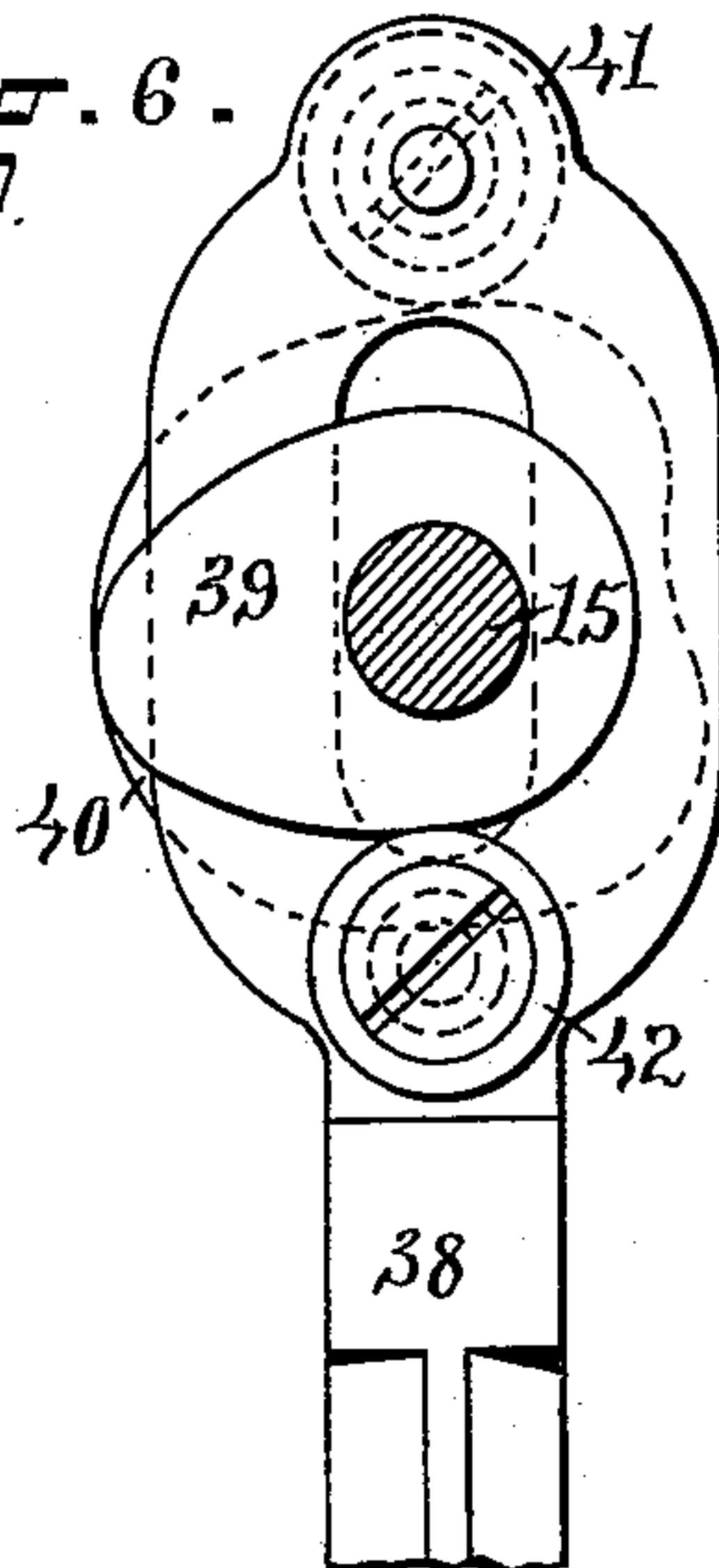


Fig. 7.

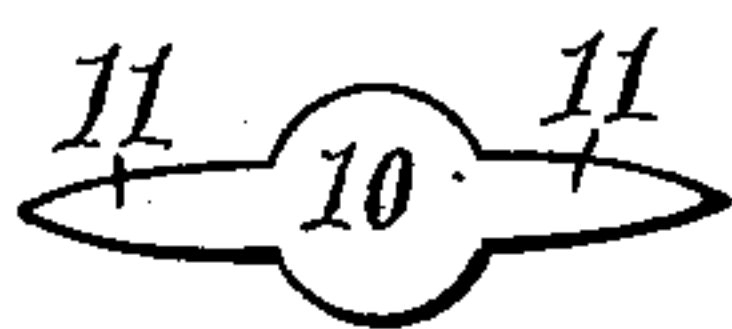
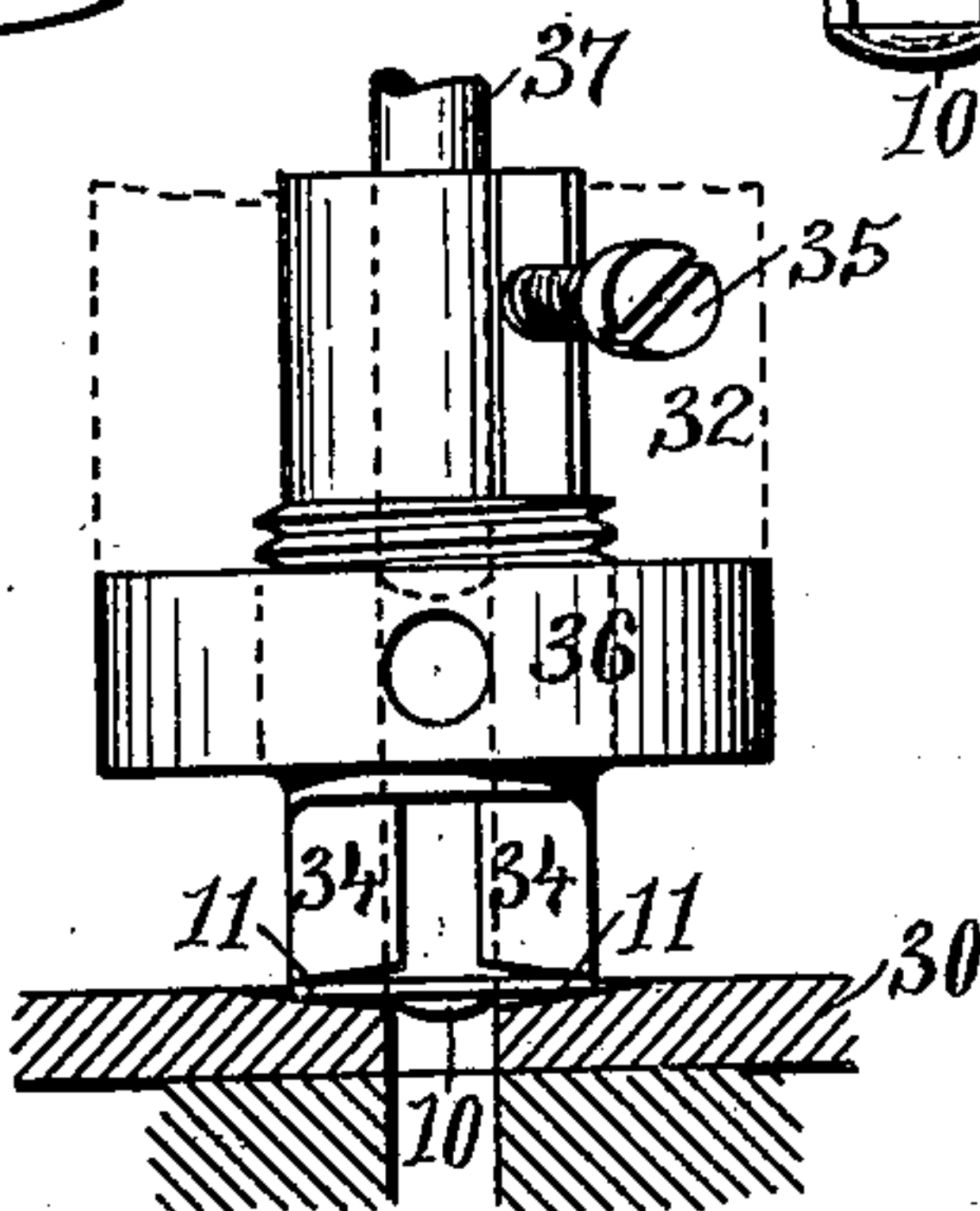


Fig. 8.



Fig. 9.



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UNITED STATES PATENT OFFICE.

WILLIAM HALKYARD, OF PROVIDENCE, RHODE ISLAND.

MACHINE FOR MAKING STAPLES.

SPECIFICATION forming part of Letters Patent No. 405,090, dated June 11, 1889.

Application filed October 9, 1888. Serial No. 287,656. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HALKYARD, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Machines for Making Staples, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 This invention has reference to an improvement in a power-machine adapted to make continuously and automatically a peculiar staple used for securing together the edges of leather.

15 The invention consists in the peculiar and novel construction of the machine by which the cut blank is swaged so as to point the legs of the staple and draw the head and legs into their proper relative positions to form the complete staple, as more fully described hereinafter.

Figure 1 is an elevation showing a front view of the machine. Fig. 2 is a sectional view of the machine through the line *a b* of Fig. 1, showing the feed mechanism by which the ribbon-blank is fed to the cutter. Fig. 3 is a view of the cutter-die and the reciprocating carrier. Fig. 4 is an enlarged view showing the crank-connection of the cutter with the driving-shaft. Fig. 5 is a view showing the connection of the swaging-plunger with the driving-shaft. Fig. 6 is a view showing the double cam for actuating the discharge-plunger. Fig. 7 is a view of the blank from which the staple is made. Fig. 8 is a view of the finished staple. Fig. 9 is a view, partly in section, of the swaging-die, showing the nut for adjusting the die. The lower end of the plunger is shown in broken lines.

40 In the drawings similar letters of reference designate corresponding parts throughout.

The object of this invention is to produce a machine by which staples are made having pointed and tapering prongs which will readily pierce leather or other material, the points of which will readily bend to clinch the staple, as is more fully described hereinafter.

50 In the drawings, 10 indicates the head of the staple. This head is formed convex on the outside and concave on the inside of the staple.

11 11 indicate the prongs of the staple. These prongs are made tapering to a point on their flat sides as well as in the thickness of the blank or sheet metal. By reason of this taper of the prongs the staples can be driven through leather or other similar material without injuring the material and will tightly close the opening made in passing through the same. The thin pointed ends of the prongs can be readily turned both inward to clinch the same without bending the prongs. In leather-work this is important, as the bending of the prong will open a space between the prong and the leather, and thus produce a leak.

The machine consists of the bed 12, provided with the standards 13, near the upper ends of which the journal-bearings 14 for the driving-shaft 15 are placed. The driving-shaft 15 is provided with the loose and tight pulleys 16 for driving the machine by means of a driving-belt. On the driving-shaft 15 is secured or formed the eccentric 17. The forked lever 18 bears against the upper and lower face of the eccentric 17. The arm 19 extends rearward and is provided with a slot, in which the connecting-rod 20 is adjustably secured. The lower end of the connecting-rod is connected with a pawl-lever, which operates the feed-rollers 21 by means of the ordinary pawl-and-ratchet device.

The stock, in the form of a ribbon of sheet metal 23, is wound on the spool 22, and is fed to the machine by the feed-rolls 21, operated by the eccentric through the forked lever 18, arm 19, connecting-rod 20, and the pawl-and-ratchet device.

On the driving-shaft 15, close to the eccentric 17, is the crank 24, to which the link 25 is journaled. The lower end of the link 25 is secured by a hinged pin to the reciprocating plunger 26, as shown enlarged in Fig. 4. The plunger 26 reciprocates in the slides 27 and carries in its lower end the cutter 28.

29 indicates the plate through which the stock 23 passes horizontally and the cutter vertically.

The cutter 28 is provided with a raised convex dome, so that the blank shown in Fig. 7 is cut with the head or central portion convex on the under side. This convex part of

the blank, when cut, rests in the circular hole in the carrier 30, which slides in the plate 29 horizontally below and at right angles with the direction in which the stock 23 passes.

5 The carrier is made of steel. The metal surrounding the hole is slightly beveled. In the process of swaging the prongs the carrier 30 forms the lower die, as is shown in Fig. 9. Another crank 31 on the driving-shaft 15 operates the plunger 32, being connected with the same by the link 33. To the lower end of the plunger 32 is secured the swaging-die 34. (Shown enlarged in Fig. 9.) This die is secured in a cylindrical hole in the end of the

10 plunger. It is held by the clamp-screw 35, screw-threaded in the metal of the plunger and bearing against the flattened portion of the cylindrical upper end of the die, and is adjusted by the screw-nut 36, which bears

15 against the lower end of the plunger 32, so as to bear on the pointed ends 11 11 of the blank and force the metal outward, and thus produce the tapering pointed prongs shown in Fig. 8. The accurate adjustment of the die 34

20 is an essential feature in this machine. The thrust of the plunger 32 is directly on the nut 36, the clamp-screw 35 simply holding the die in the proper position.

Located within the plunger 32 is the discharge-plunger 37. This plunger pushes the cut and swaged blank through the circular hole in the carrier 30, and by this operation turns or bends the prongs 11 11 at right angles to the head 10 into the form shown in Fig. 8.

35 The discharge-plunger 37 is connected by an arm to the plunger 38, to which reciprocating motion is imparted by means of the cams 39 and 40, secured to the shaft 15. To reduce the friction to the minimum, the cams 39 and

40 40 bear against the rims of the rollers 41 and 42, rotating on studs secured to the plunger 38.

The reciprocating carrier 30 is operated by means of the cam 43, secured to the end of the driving-shaft 15, and the lever 45, one end of which enters the way in the cam 43, the other end being connected by means of the link 46 to the slide 47, to which slide the reciprocating carrier 30 is firmly secured.

The operation of the machine is as follows:

50 The sheet-metal ribbon 23 from the spool 22 is entered in the slot or way in the plate 29. The upper roll of the feed mechanism 21 is brought to bear on the "ribbon" or "stock," as the sheet-metal ribbon is called, by the hand-screw shown in the drawings. The machine is now started and the feed mechanism feeds the stock under the cutter 28, which in descending cuts the blank shown in Fig. 7 and deposits the same on the carrier

60 30. The convex head 10 enters the circular hole in the carrier and holds the blank in the proper position. The carrier now moves the blank under the swaging-die 34, where the prongs 11 11 are swaged out to the taper shown in Fig. 8. The discharge-plunger now descends and forces the cupped and swaged

blank through the circular hole in the carrier, from whence it drops into a box or other receptacle. The discharge-plunger now quickly rises above the carrier and the carrier returns to its first position, in which the circular hole is again under the cutter-die ready to receive the next blank and repeat the first operation.

All the operations are performed consecutively by one revolution of the driving-shaft 15, the number of staples made corresponding with the number of revolutions of the driving-shaft.

As the swaging and forming of the complete staple are of the greatest importance to its use, I will again refer to the manner of swaging and forming the said staples. It will be understood that the head 10 of the blank shown in Fig. 7 is concaved by the cutter-die, which is provided with a protuberance, and that the prongs 11 11 are swaged to a sharp point at the end. When, now, the so cupped and swaged blank is forced through the circular hole in the carrier, the horizontal section of the prongs on a line with the head form sections of a circle, the inner surface being concave and the outer surface convex. This form of the swaged tapering prongs secures a rigidity to the same when made of very thin sheet metal that allows of driving the staples through tough leather, and also facilitates the clinching of the pointed ends, which readily turn inward toward each other.

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

1. In a machine for making staples, the combination, with a main driving-shaft, of a stock-feeding device, a cutting-plunger provided with the convex projection, a swaging-plunger, a discharge-plunger located within the swaging-plunger, a reciprocating carrier provided with a circular hole and constructed to form the lower die for swaging the prongs, and mechanism for driving the same, as described.

2. In a machine for making staples, the combination, with the plunger 32, of the adjustable swaging-die 34, having the screw-nut 36, for adjusting the die and for receiving the thrust of the plunger, as and for the purpose set forth.

3. The combination, with the reciprocating plunger 32, of the swaging-die 34, the carrier 30, provided with a hole through which the staple is drawn, and the discharge-plunger 37, constructed to force the staple-blank through the hole in the carrier to bend the prongs, as and for the purpose described.

In witness whereof I have hereunto set my hand.

WILLIAM HALKYARD.

Witnesses:

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J. A. MILLER, Jr.