

No. 780,685.

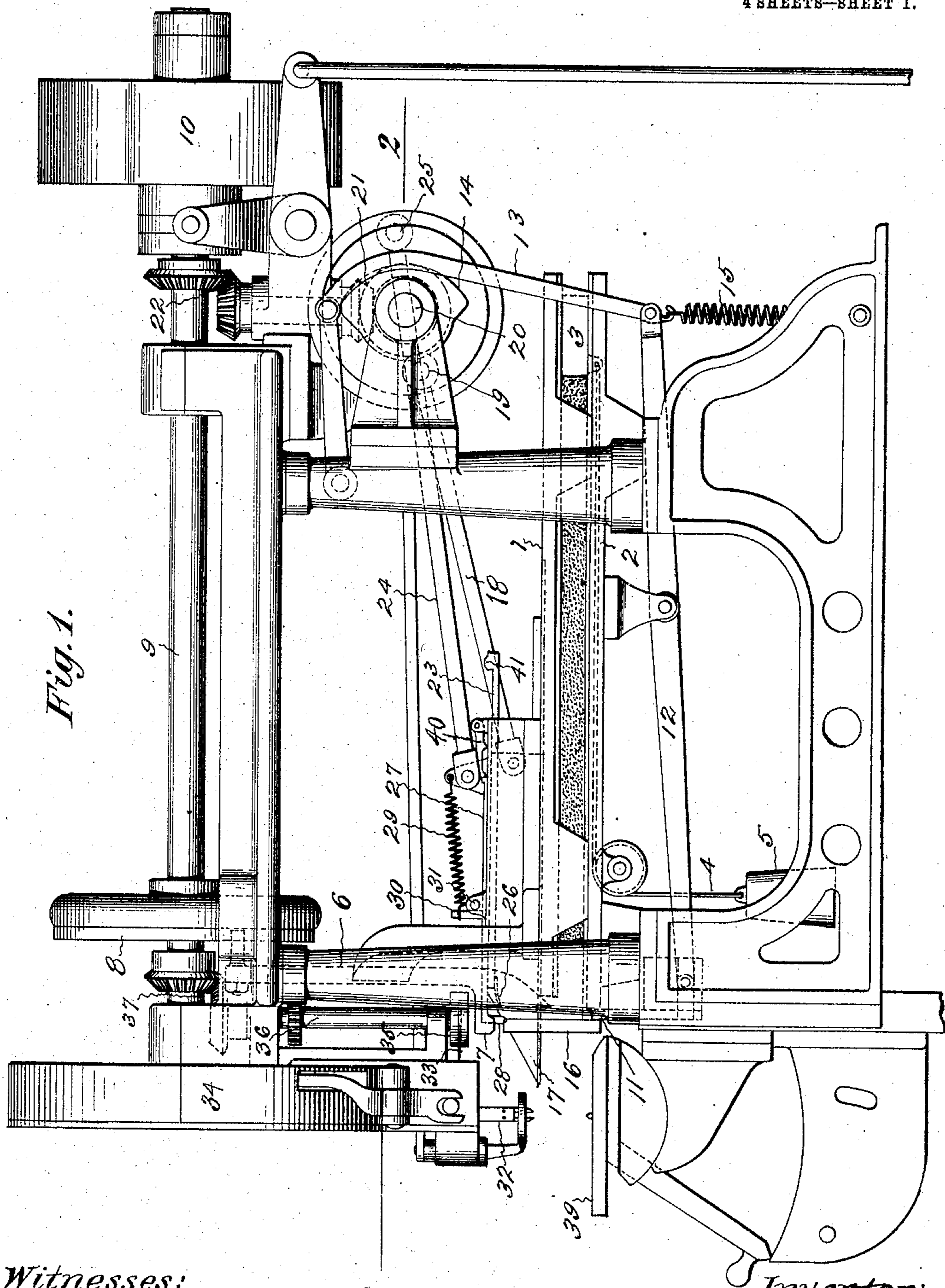
PATENTED JAN. 24, 1905.

E. S. ROOT.

MACHINE FOR MANUFACTURING BRUSHES.

APPLICATION FILED MAR. 28, 1904.

4 SHEETS—SHEET 1.



Witnesses:

Chas. F. Schuch
Ephel M. Lowe

Inventor:

Albert S. Root
By his Attorney
Harry P. Williams

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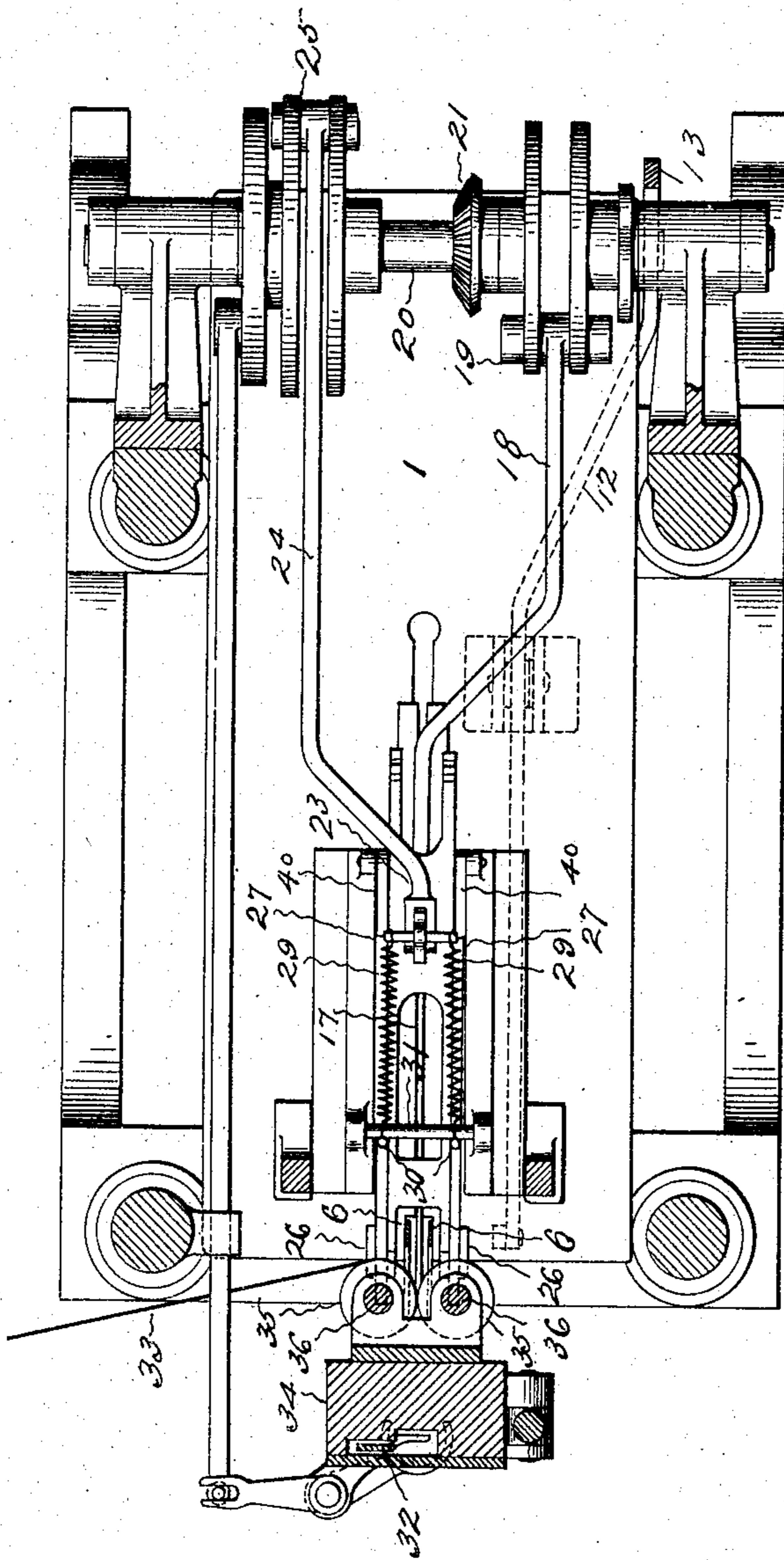
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4 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

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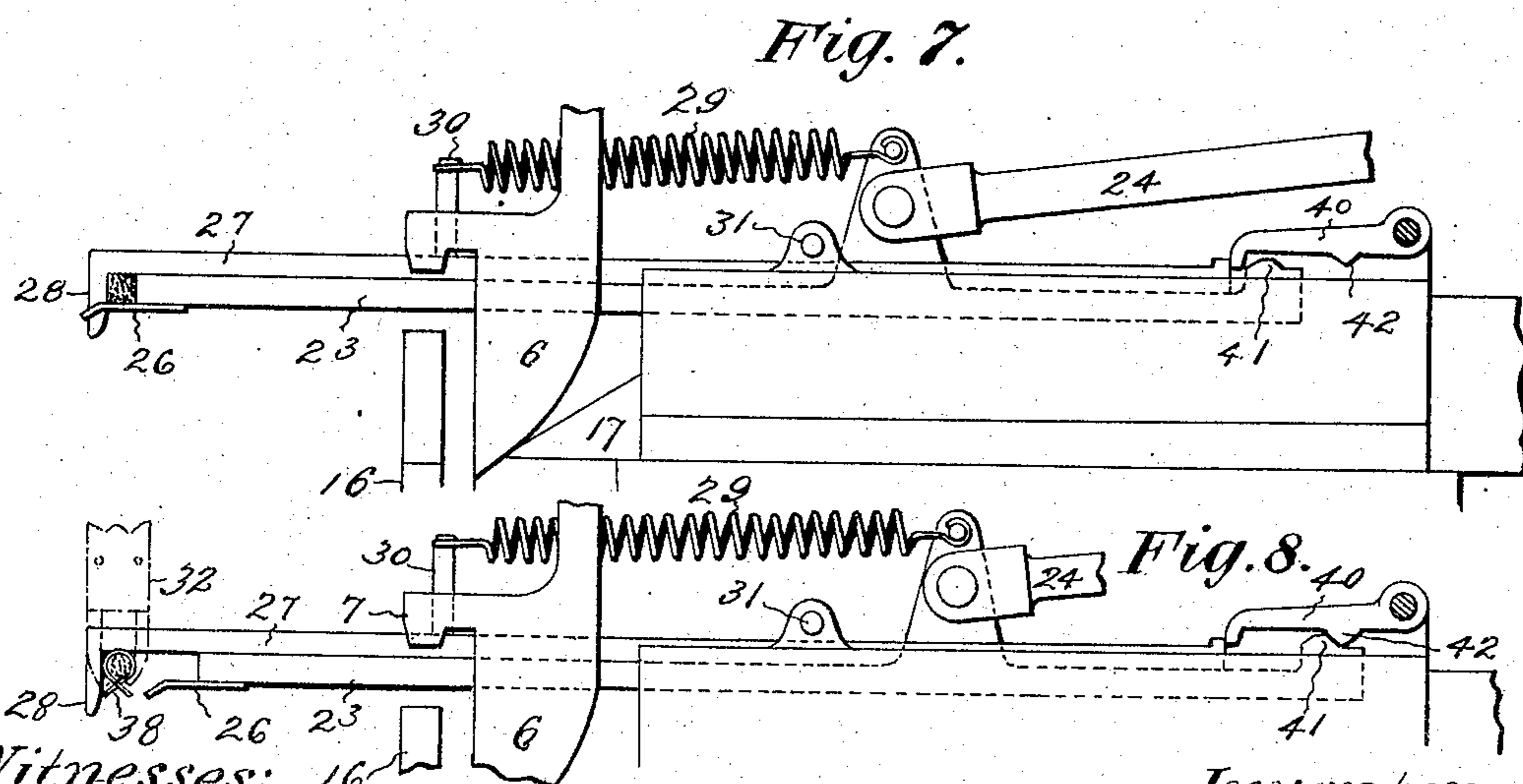
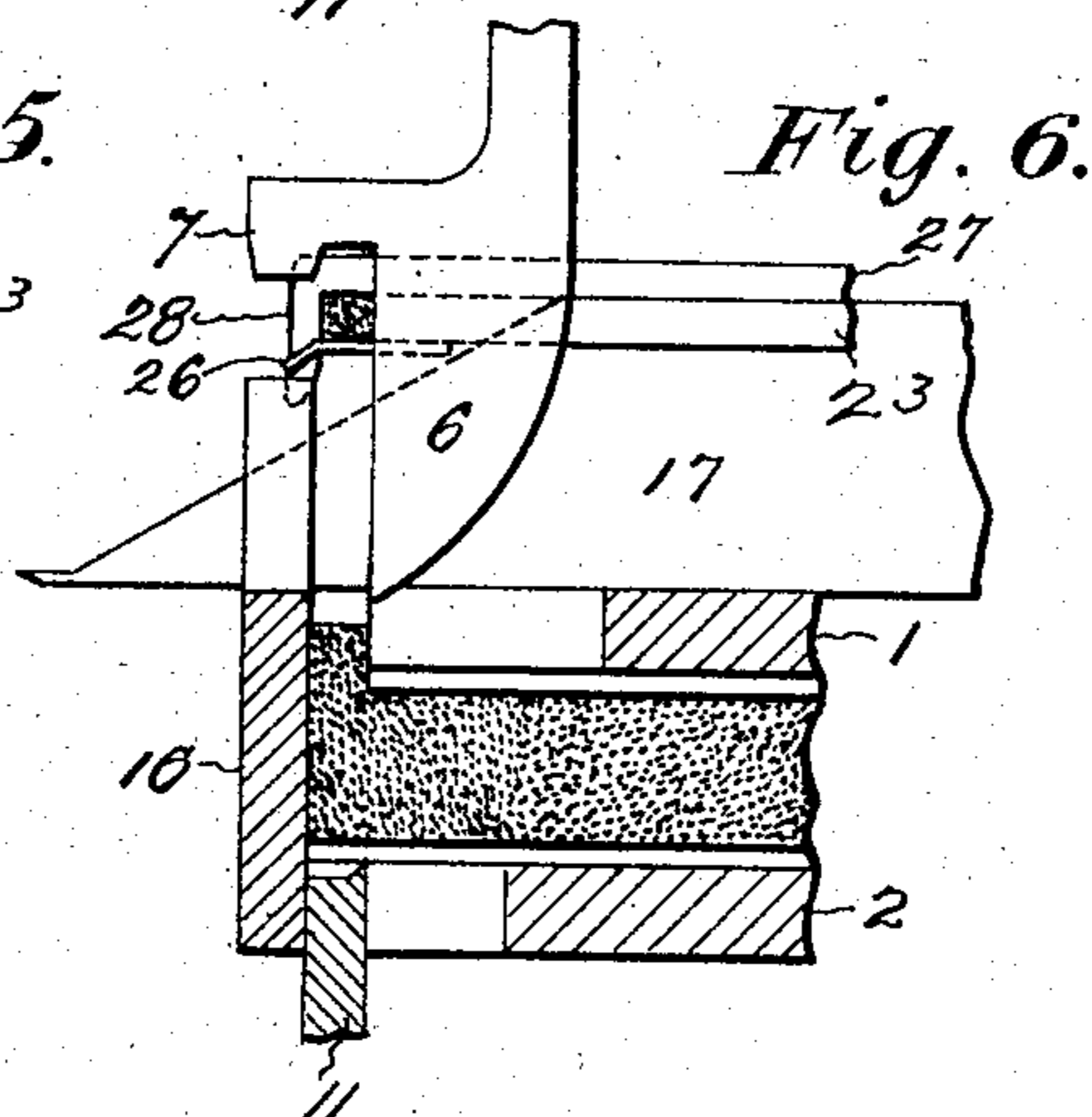
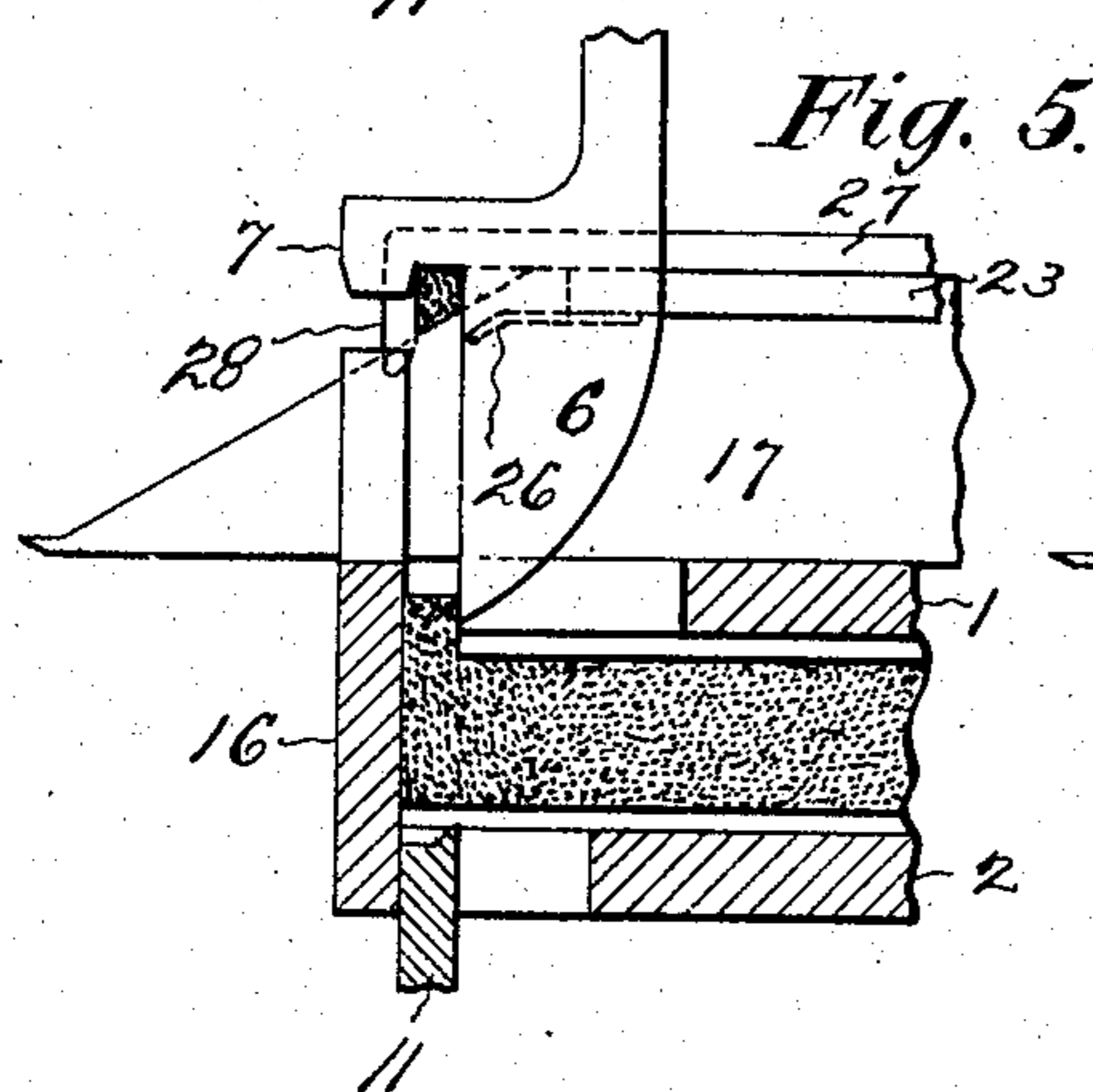
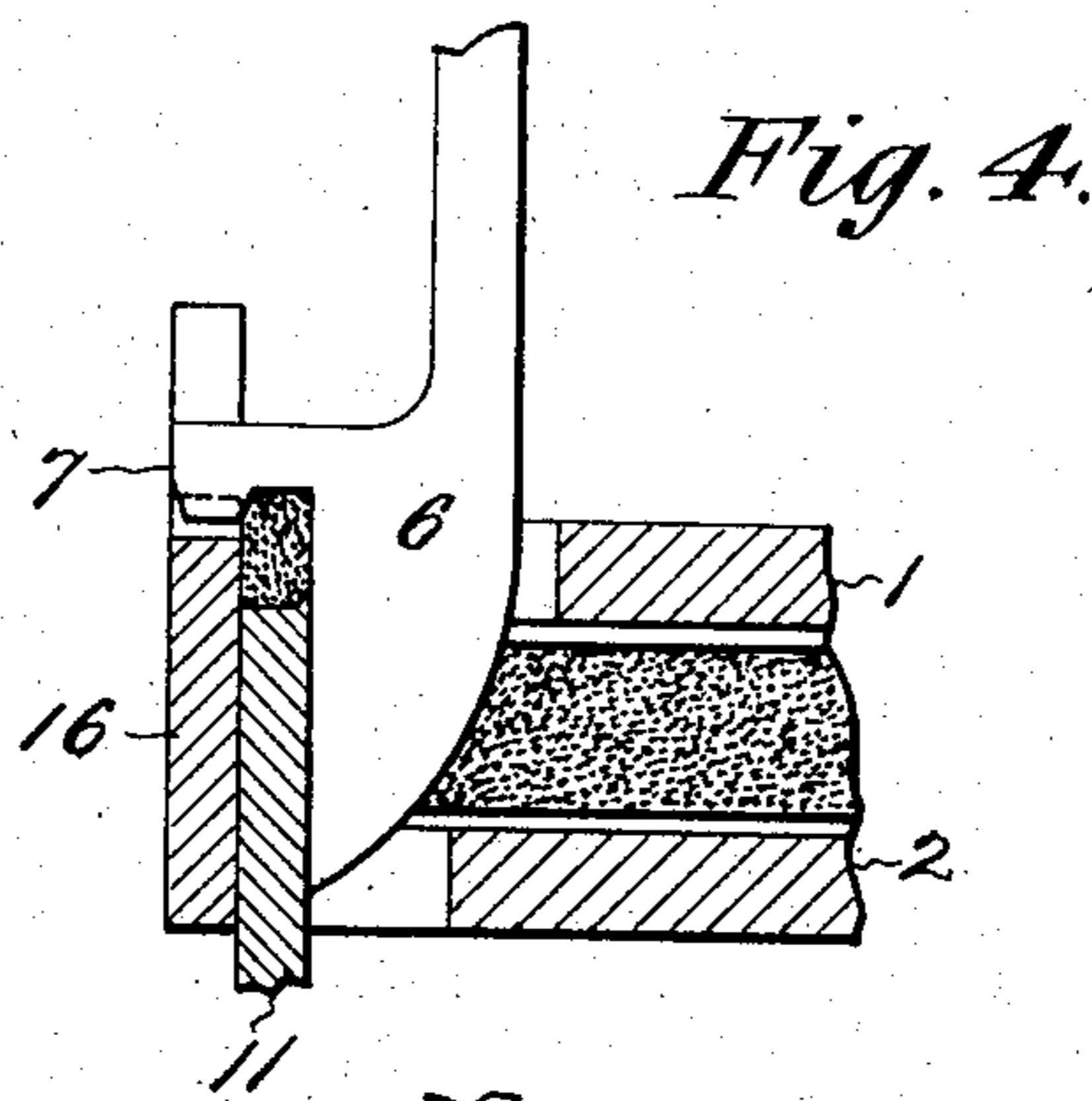
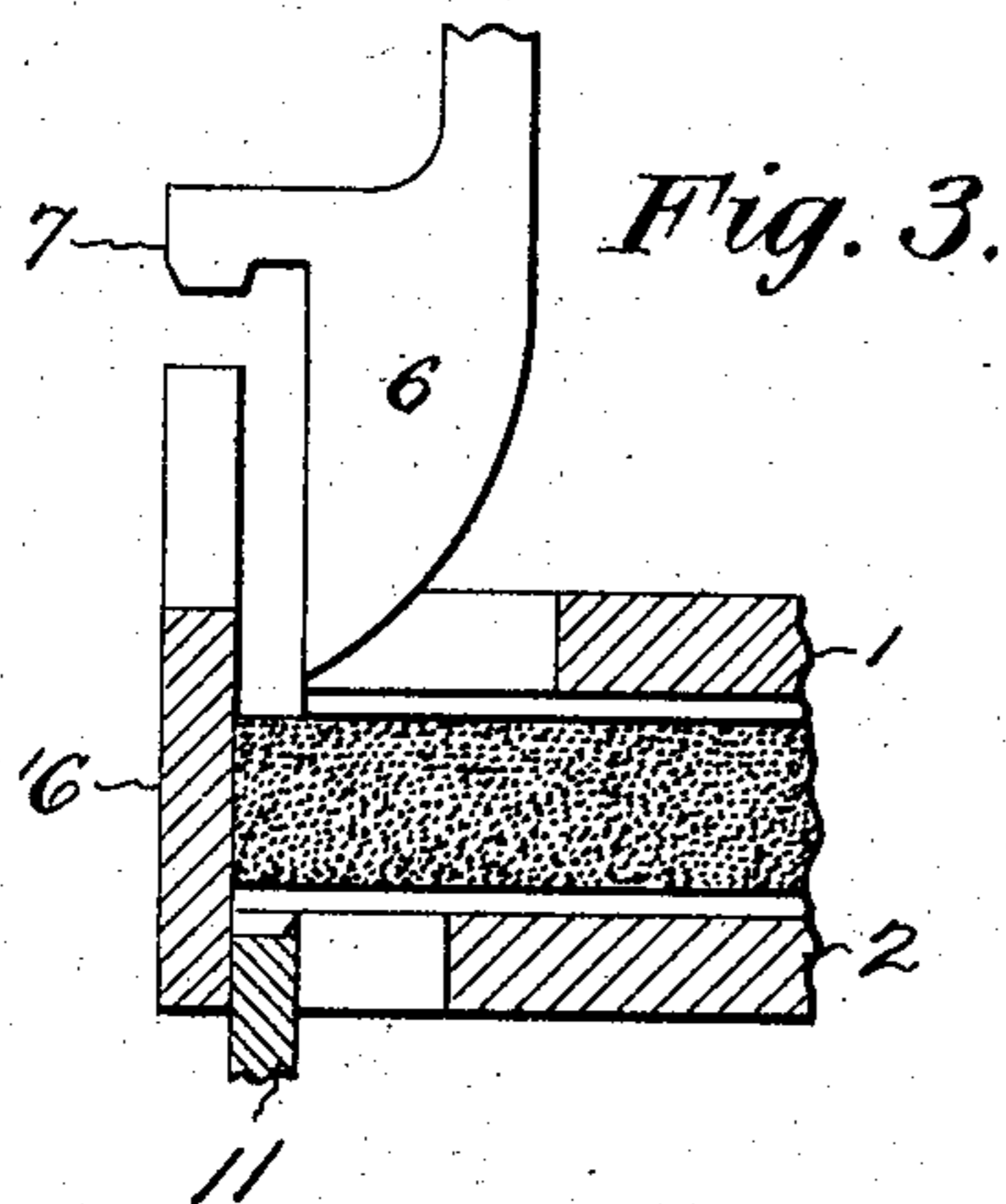
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MACHINE FOR MANUFACTURING BRUSHES.

APPLICATION FILED MAR. 28, 1904.

4 SHEETS—SHEET 3.



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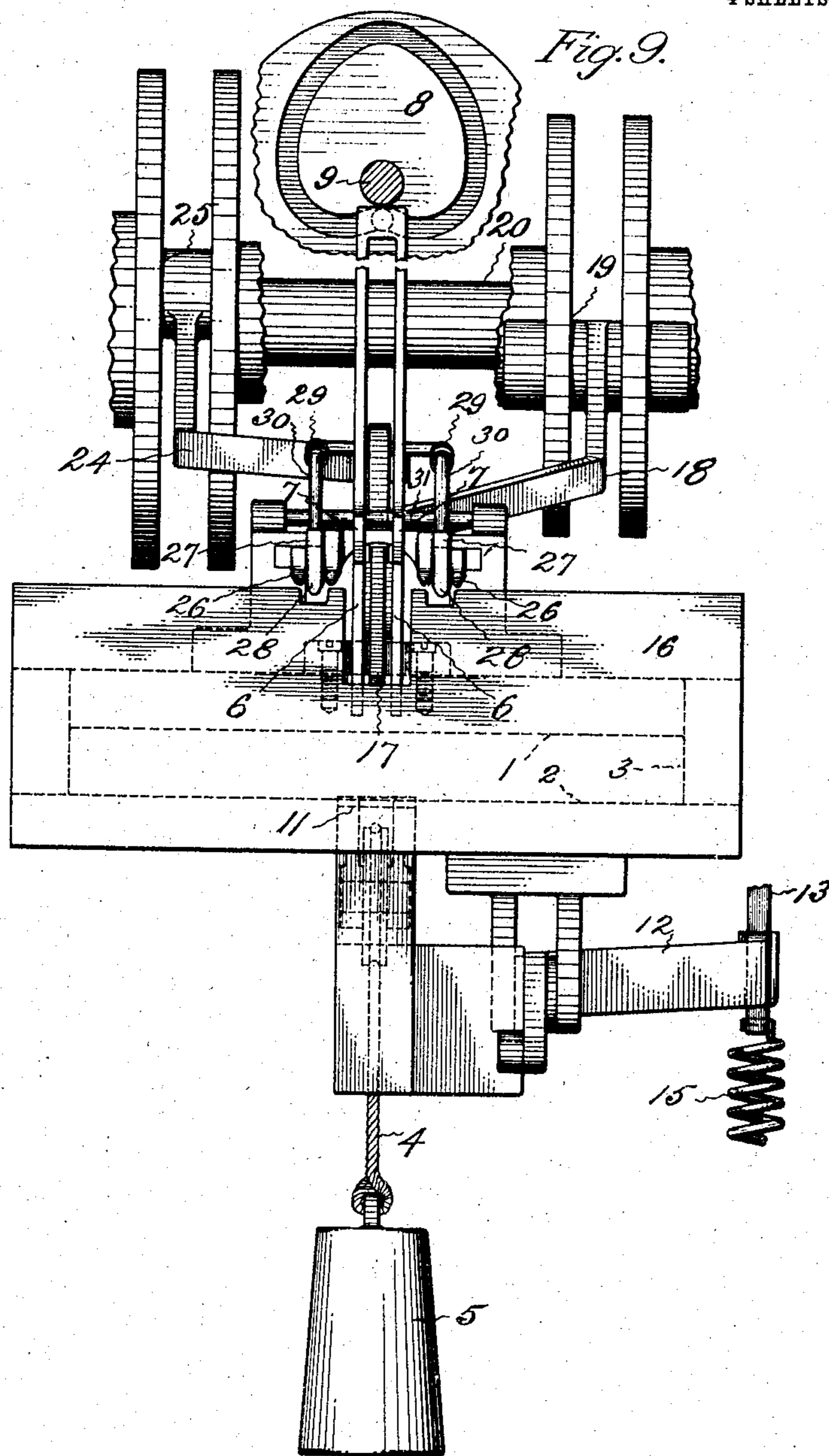
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4 SHEETS—SHEET 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

ELBERT S. ROOT, OF NEW HARTFORD, CONNECTICUT, ASSIGNOR, BY
DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO CHARLES S.
ROOT, OF NEW HARTFORD, CONNECTICUT.

MACHINE FOR MANUFACTURING BRUSHES.

SPECIFICATION forming part of Letters Patent No. 780,685, dated January 24, 1905.

Application filed March 28, 1904. Serial No. 200,328.

To all whom it may concern:

Be it known that I, ELBERT S. ROOT, a citizen of the United States, residing at New Hartford, in the county of Litchfield and State of Connecticut, have invented certain new and useful Improvements in Machines for Manufacturing Brushes, of which the following is a specification.

This invention relates to a machine which separates bunches of bristles from a mass, forms and places a staple about the middle of each bunch, and drives the staple and middle of each bunch into a socket in the body of a brush.

The object of this invention is to simplify the construction of the bristles feeding, separating, and bunching mechanism of a machine of this nature, whereby the machine can be operated rapidly and efficiently and will have long life.

The machine which is illustrated as embodying the invention has a channel through which the mass of bristles are fed and from which the bunches are successively separated, compacted, and lifted into the grasp of thumbs and fingers which carry them to the plunger, which applies a staple cut from a continuous length of wire to the middle of the bunch, then drives the staple and the middle of the bunch into a socket in the body of the brush that is laid upon the table beneath the plunger.

Figure 1 of the accompanying drawings shows a side elevation of the machine. Fig. 2 shows a horizontal section on the plane 2 2 of Fig. 1. Fig. 3 shows the separator and packer about to separate bristles from the end of the mass in the channel. Fig. 4 shows the separator and packer in the positions occupied after they have effected a separation of some of the bristles from the mass in the channel. Fig. 5 shows the position of the parts after the bristles which are to form a bunch have been lifted into position to be grasped by the carrying thumbs and fingers and the packer is lowered. Fig. 6 shows the carrying thumbs and fingers grasping the bunch of bristles with the separator raised and the lifter drawn back. Fig. 7 shows a

side view of the carrying thumbs and fingers and their supports. Fig. 8 shows a side view of the same mechanism with a staple applied to the bristles and the thumbs drawn back in order to permit the plunger to drive the middle of the bristles and the staple into a socket in the body of a brush. Fig. 9 shows an end view of the bristle-gathering part of the machine.

The bristles are placed in a horizontal channel formed between plates 1 and 2, that are fastened to the frame in any desired manner. These bristles, which may be of any material, are advanced to the forward end of the channel by the pressure of a follower 3, which is drawn forwardly by a cord 4 and weight 5.

Supported above and movable vertically across the forward end of the bristle-channel are separating-plates 6, Figs. 1 and 2. The lower ends of these plates have straight front edges and curved rear edges, and they also on their front edges have hooked lugs 7, Figs. 3 and 4. These plates are reciprocated vertically by a properly-timed cam 8 on the shaft 9, which has a driving-pulley 10, Fig. 1.

Supported below and movable vertically across the forward end of the bristle-channel is a packing-plate 11, which is drawn down by the lever 12, link 13, and cam 14 and is pushed up by the lever 12 and spring 16, Fig. 1. The upper end of this packing-plate has a sharp edge and is arranged to move across the forward end of the bristle-channel into and out of the space between the wall 16 in front of the end of the bristle-channel and the straight front edges of the separating-plates, Figs. 3, 4, 5, and 6.

The weighted follower forces the bristles forwardly against the wall at the end of the bristle-channel. At the proper time the separating-plates, which are above the channel, descend and separate a quantity of bristles from the end of the mass in the channel, and simultaneously the packing-plate, which is below the bristles, rises and packs the separated bristles beneath the hooked lugs between the separating-plates and the front wall, Figs. 3 and 4.

Located in a guideway on the upper face

of the top channel-plate is a horizontal lifting-blade 17. A crank-rod 18 connects this blade with a crank 19 on a horizontal shaft 20, that by means of the pairs of beveled gears 21 and 22 is driven from the driving-shaft, Figs. 1 and 2. The forward end of this blade has a separating-point and an inclined edge. After the bristles have been separated by the downward movement of the separating-plates and compacted by the upward movement of the packing-plate, Fig. 4, the lifting-blade is thrust forwardly, so that the point will separate and the inclined edge will lift just the desired quantity of bristles to form the required tuft. As this takes place the separating-plates are raised and the packing-plate is lowered, Fig. 5.

Movable in the guideway above the lifting-blade is a carrier 23, that is connected by a crank-rod 24 with a crank 25 on the horizontal shaft, Figs. 1 and 2. The forward end of this carrier is provided with thumbs 26. Mounted on the carrier are a pair plates 27. The forward ends of these plates are provided with downwardly-pointing fingers 28. These finger-plates are connected by springs 29 with the carrier, Figs. 1 and 2. The studs 30 on the finger-plates to which the springs are connected are arranged to engage with a pin 31, held by lugs on the guide-frame to limit the backward movement of the fingers, Figs. 1 and 2. When the bristles are raised by the lifting-blade, they are carried up back of the fingers 28 and then the carrier is advanced, so that the thumbs 26 pass beneath and hold up the bristles. As the carrier is moved forwardly the springs 29 hold the fingers back, so that the bristles are grasped between the fingers on the finger-plates and the thumbs on the carrier. When the bristles are held in this manner, the separating-plates are raised farther and the lifting-blade is drawn back, Fig. 6. Then the carrier is moved forwardly and carries the bristles held by the thumbs and fingers beneath the staple-plunger 32, Figs. 7 and 8.

The wire 33, from which the staples are formed, is fed into the head 34 by horizontal rolls 35 on the vertical shafts 36, that are driven by beveled gears 37 from the driving-shaft, Figs. 1 and 2. The head 34 and the wire-cutter and staple-plunger supported by the head and the means for operating these mechanisms are of common construction and arrangement and may be substantially the same as those which are shown and described in United States Patent No. 330,688, November 17, 1885. Therefore a detailed description of these parts is not given.

After the bunch of bristles for the tuft has been carried by the thumbs and fingers into line with the staple-plunger the plunger closes a staple 38 about the middle of the bristles, Fig. 8. At the same time the carrier is drawn back, so as to withdraw the thumbs

from beneath the bristles in order that the plunger may carry the middle downwardly and drive the staple into a socket in the body of a brush which has been laid on the table 39, Fig. 1. Latches 40 are arranged on the carrier so as to engage with the rear ends of the finger-plates and hold the fingers against movement until after the thumbs have been withdrawn from beneath the bristles and the plunger has driven the bristles downwardly. When the carrier-slide has been drawn back some distance, wedges 41, near its rear end, engage lugs 42 and lift the latches from the rear ends of the finger-plates and allow the fingers to be drawn backwardly by the springs until the spring-studs engage the stop-pin.

In this machine the bristles are separated, compacted, lifted, and carried forwardly by light slides which have simple rectilinear movements that can be conveniently adjusted so that they will operate accurately and that can be so mounted that there is but little wear.

The invention claimed is—

1. In a brush-machine having a wire-feed and staple forming and driving mechanism, a bristle-channel, means for advancing bristles through the channel, vertically-movable separating-plates, a vertically-movable packing-plate, a horizontally-movable lifting-blade, a horizontally-movable carrier having supporting-thumbs, plates having holding-fingers movably mounted on the carrier, and springs connecting the plates and the carrier and tending to hold the fingers and thumbs together, substantially as specified.

2. In a brush-machine having a wire-feed and staple forming and driving mechanism, a bristle-channel, means for advancing bristles through the channel, vertically-movable separating-plates, a vertically-movable packing-plate, a horizontally-movable lifting-blade, a horizontally-movable carrier having supporting-thumbs, plates having holding-fingers movably mounted on the carrier, springs connecting the plates and the carrier and tending to hold the fingers and thumbs together, and means for temporarily holding the finger-plates from backward movement, substantially as specified.

3. In a brush-machine having a wire-feed and staple forming and driving mechanism, a bristle-channel, means for advancing bristles through the channel, vertically-movable separating-plates, means for reciprocating the plates, a vertically-movable packing-plate, means for reciprocating the plate, a blade with a separating-finger and inclined lifting edge movable horizontally on the top channel-plate, means for reciprocating the blade, a carrier with supporting-thumbs mounted on the top channel-plate above the lifting-blade, means for reciprocating horizontally the carrier, plates with holding-fingers movably mounted on the carrier, and springs

connecting the plates and the carrier tending to hold the fingers and thumbs together, substantially as specified.

4. In a brush-machine having a wire-feed and staple forming and driving mechanism, a pair of plates forming a bristle-channel, a follower for advancing bristles through the channel, downwardly-movable separating-plates at the forward end of the channel, an upwardly-movable packing-plate at the forward end of the channel, a lifting-blade with a separating-finger and inclined lifting edge movable horizontally on the top channel-plate, a carrier with supporting-thumbs movable horizontally above the lifting-blade, plates with holding-fingers movable horizontally on the carrier, springs connecting the plates and the carrier and tending to hold the fingers and thumbs together, a pin for limiting the backward movement of the finger-plates, latches for temporarily holding the finger-plates against backward movement, wedges on the carrier for lifting the latches, and mechanisms for reciprocating the separating-plates, the packing-plate, the lifting-blade and the carrier, substantially as specified.

5. In a brush-machine having a wire-feed and staple forming and driving mechanism, a pair of plates forming a bristle-channel, a follower for advancing bristles through the channel, downwardly-movable separating-plates at the forward end of the channel, an upwardly-movable packing-plate at the forward end of the channel, a lifting-blade with a separating-finger and inclined edge movable horizontally on the top channel-plate, a carrier with supporting-thumbs movable horizontally above the lifting-blade, plates with hold-

ing-fingers movable horizontally on the carrier, springs connecting the plates and the carrier and tending to hold the fingers and thumbs together, a pin for limiting the backward movement of the finger-plates, latches for temporarily holding the finger-plates against backward movement, wedges on the carrier for lifting the latches, a cam for reciprocating the separating-plates, a lever, cam and spring for reciprocating the packing-plate, a rod and crank for reciprocating the lifting-blade, and a rod and crank for reciprocating the carrier, substantially as specified.

6. In a brush-machine having a wire-feed and staple forming and driving mechanism, a pair of plates forming a bristle-channel, a follower for advancing bristles through the channel, vertically-movable separating-plates at the forward end of the channel, a cam for reciprocating the separating-plates, a vertically-movable packing-plate at the forward end of the channel, a lever, cam and spring for reciprocating the packing-plate, a horizontally-movable lifting-blade with a separating-finger and inclined edge, a rod and crank for reciprocating the lifting-blade, a carrier with supporting-thumbs movable horizontally above the lifting-blade, a rod and crank for reciprocating the carrier, horizontally-movable plates with holding-fingers, and springs connecting the plates and the carrier and tending to hold the fingers and thumbs together, substantially as specified.

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