

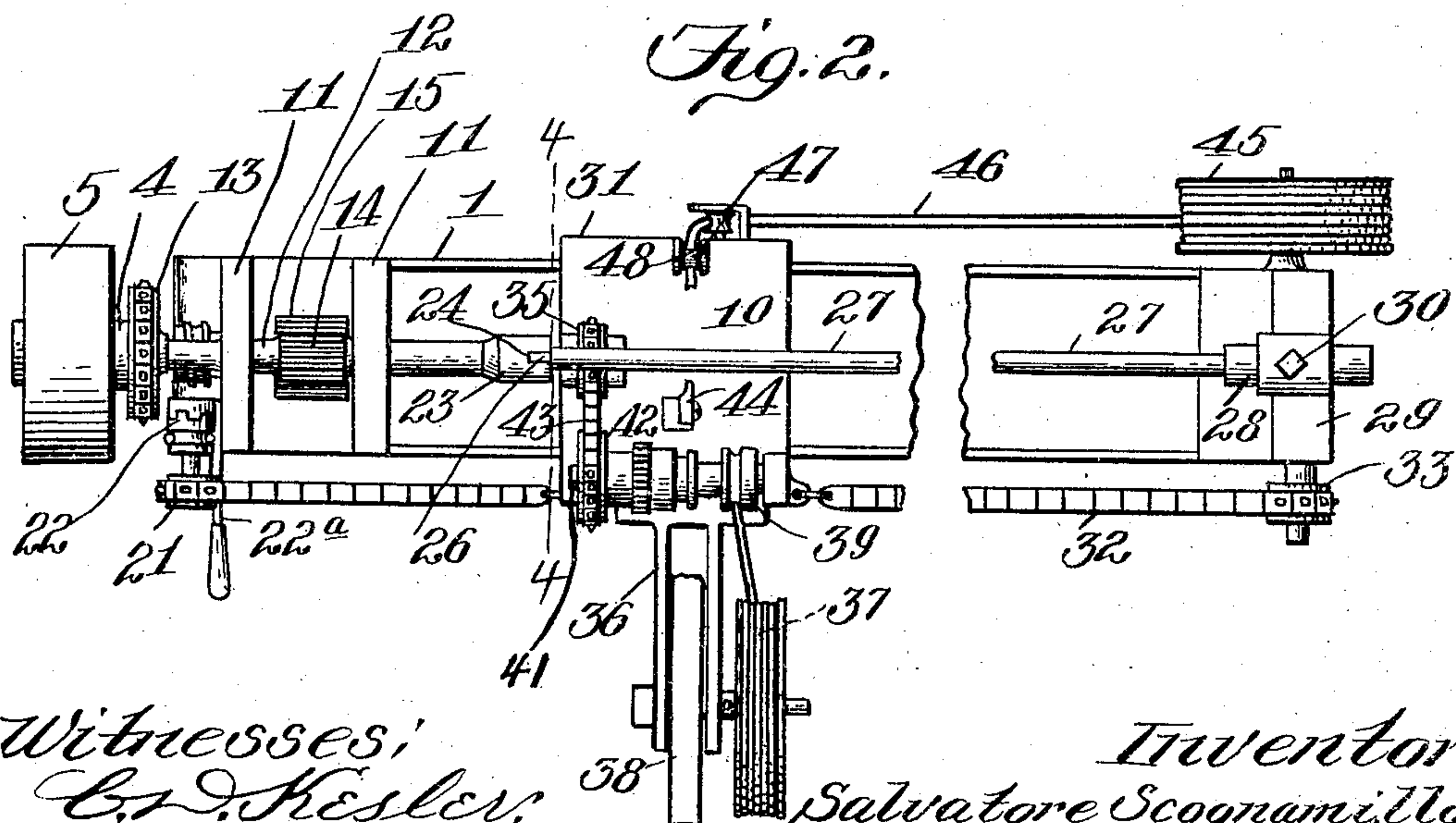
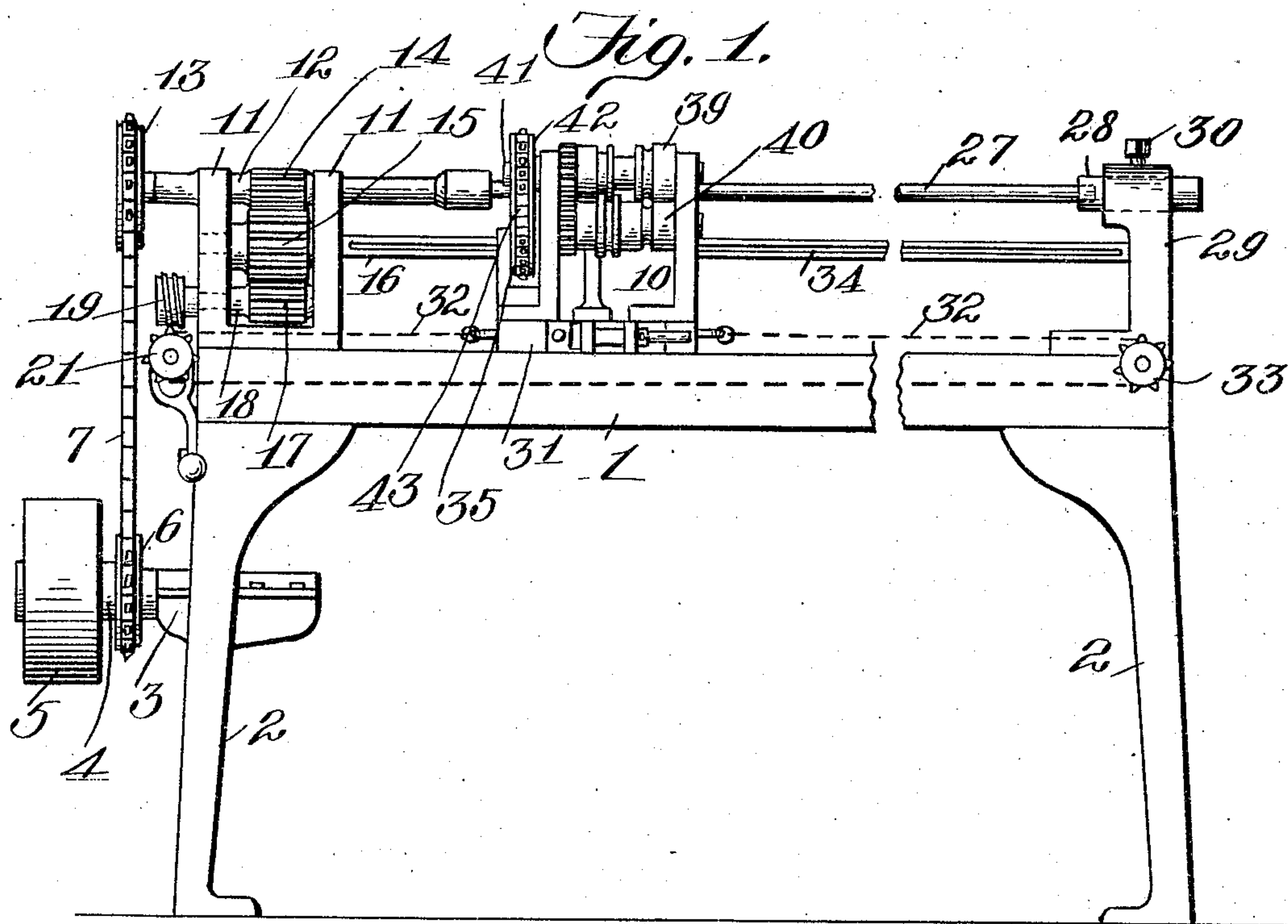
No. 785,523.

PATENTED MAR. 21, 1905.

S. SCOGNAMILLO.
MACHINE FOR FORMING FLEXIBLE TUBING.

APPLICATION FILED JUNE 22, 1904.

2 SHEETS—SHEET 1.



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Fig. 3.

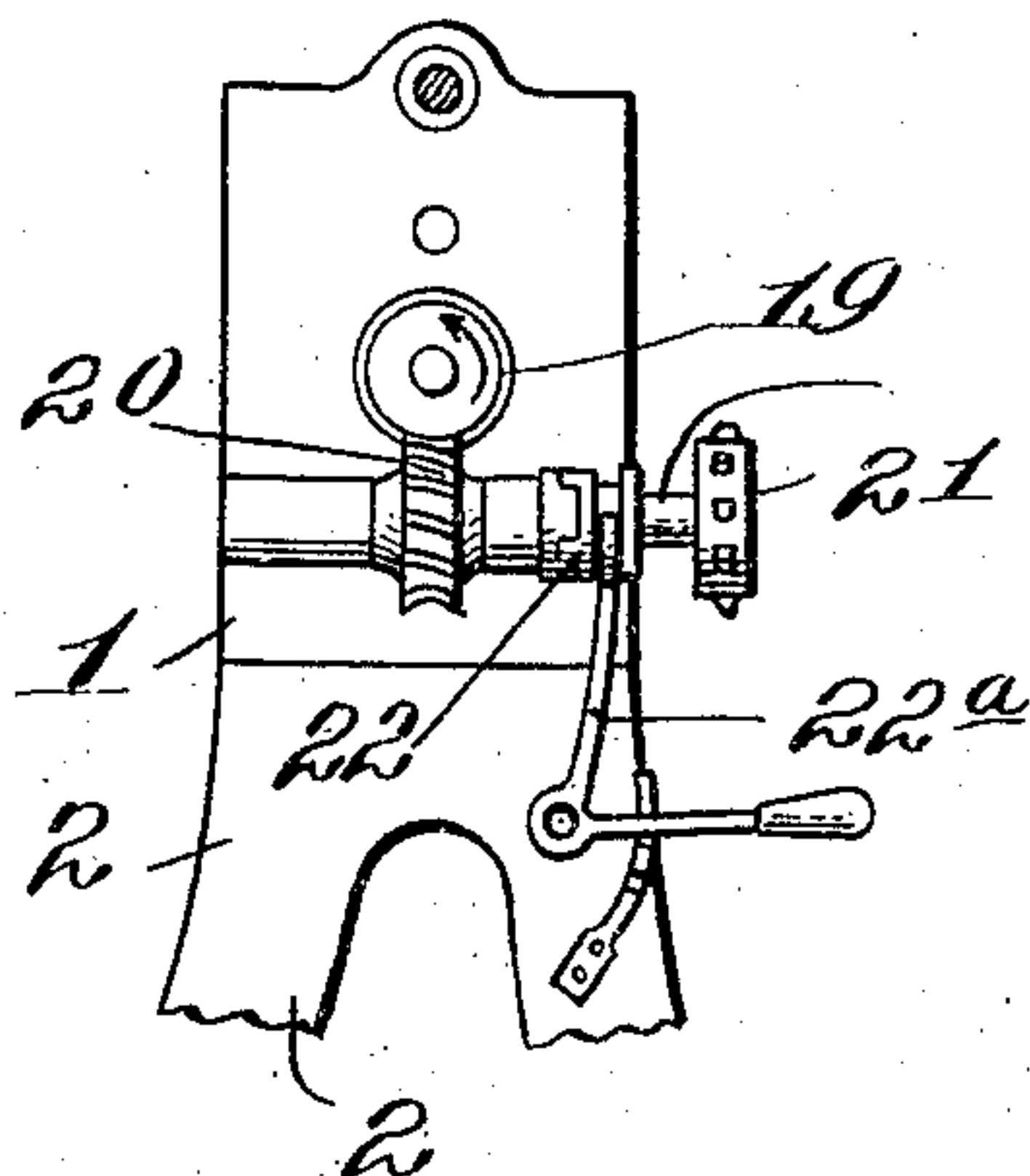


Fig. 4.

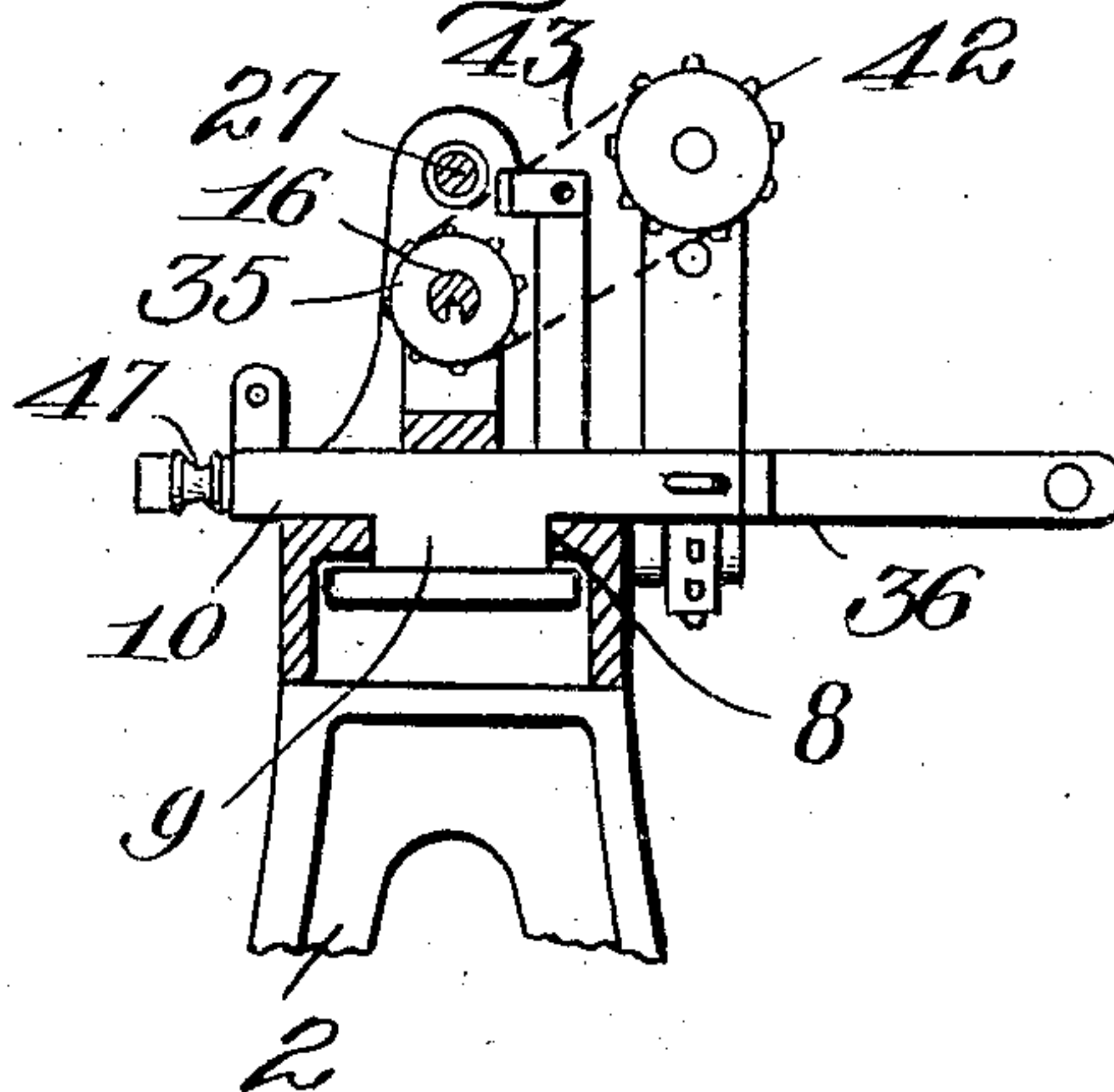


Fig. 5.

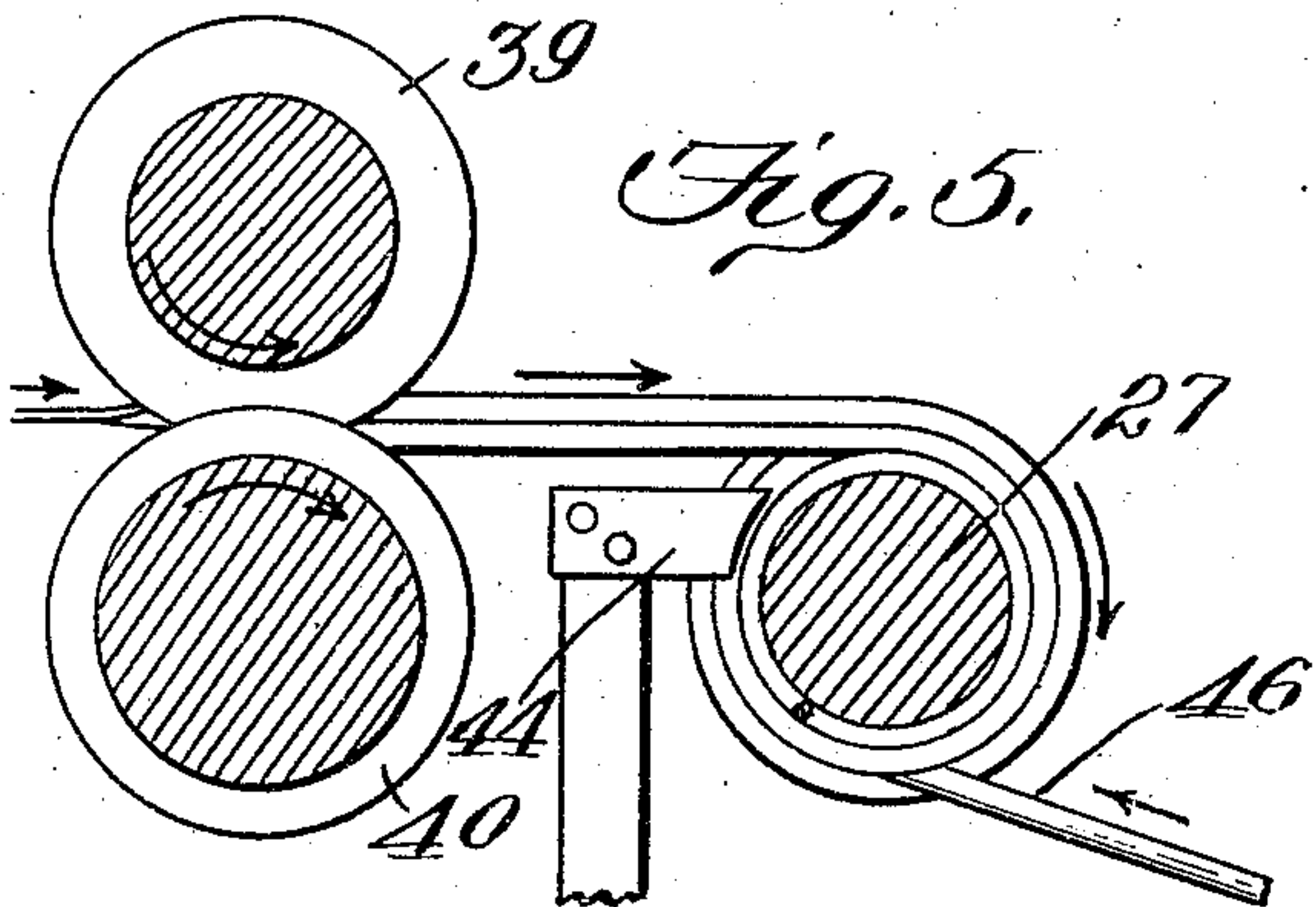


Fig. 7.

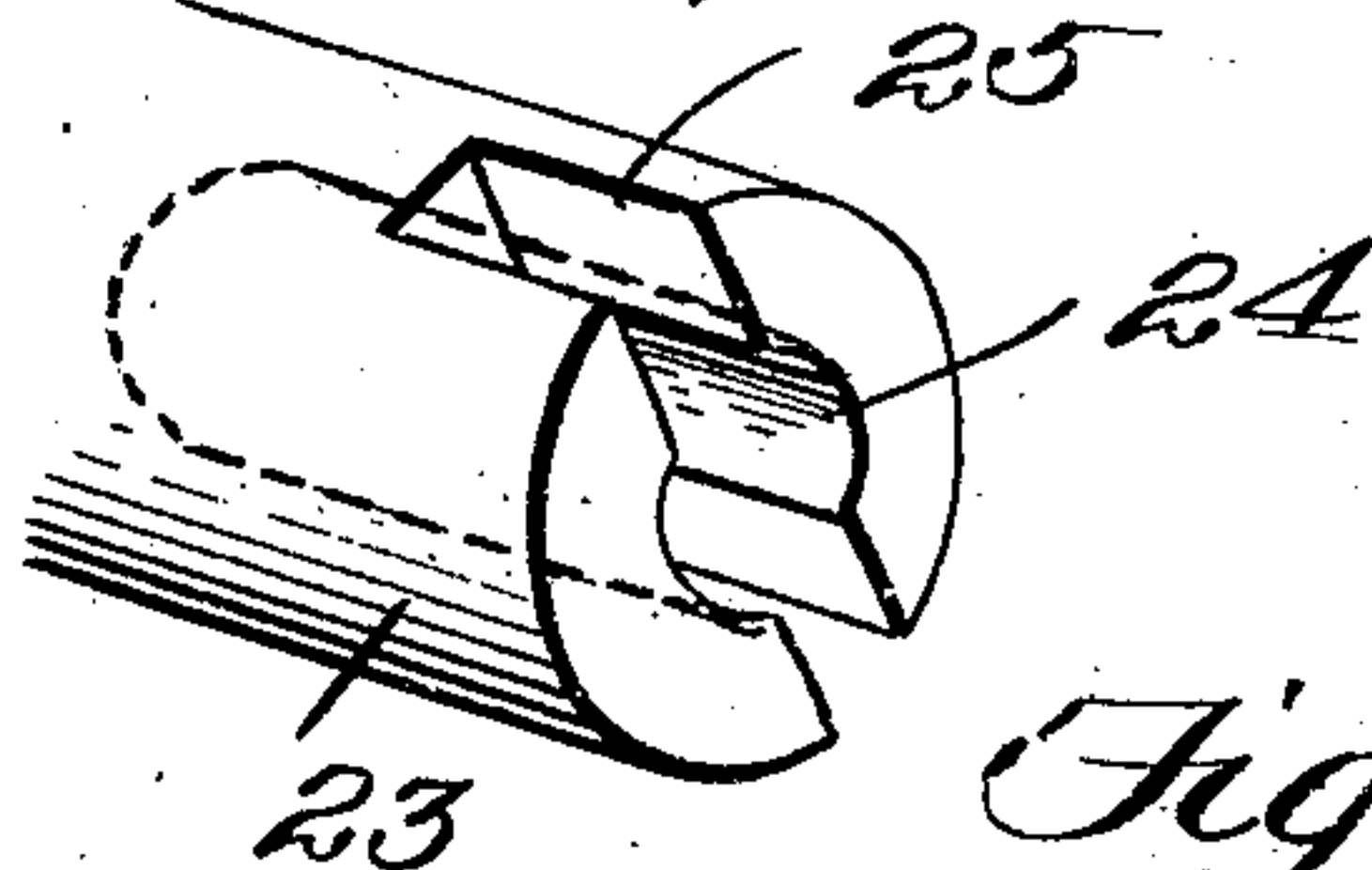


Fig. 8.

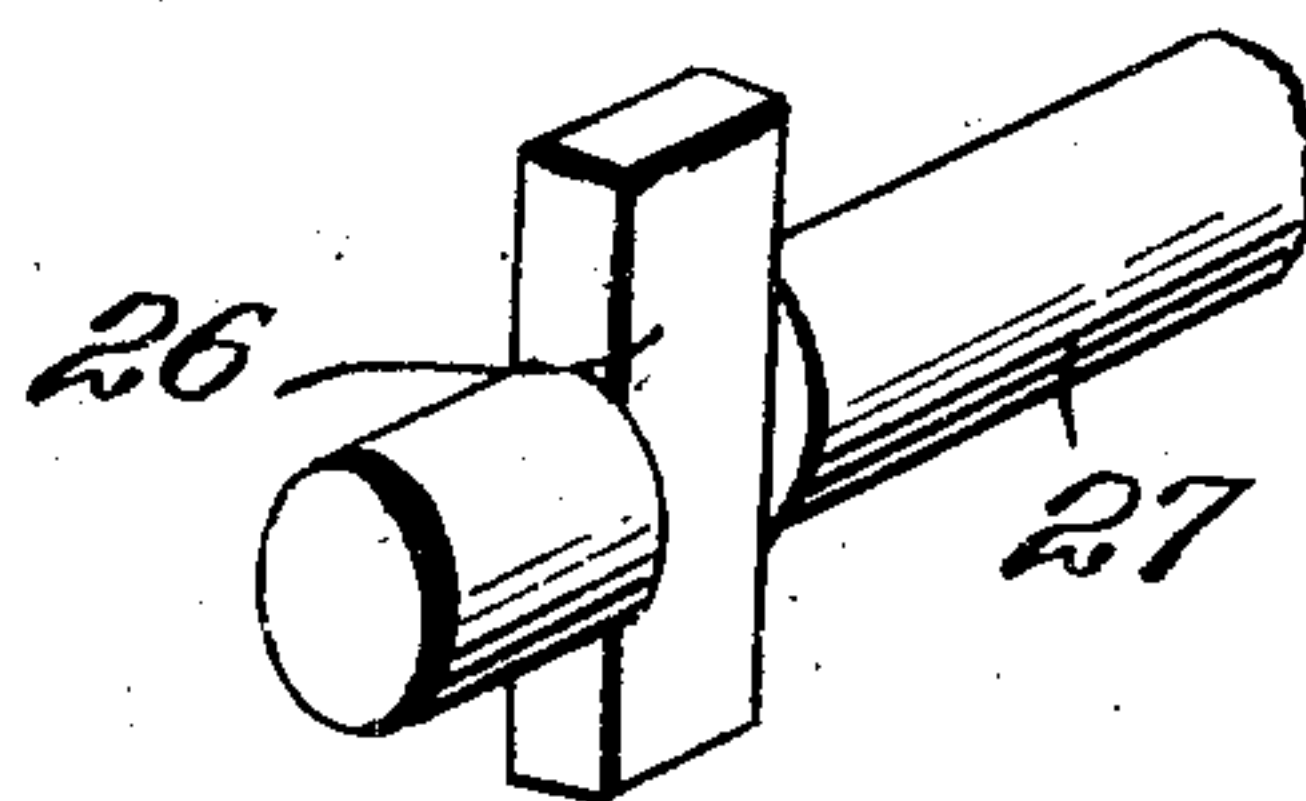
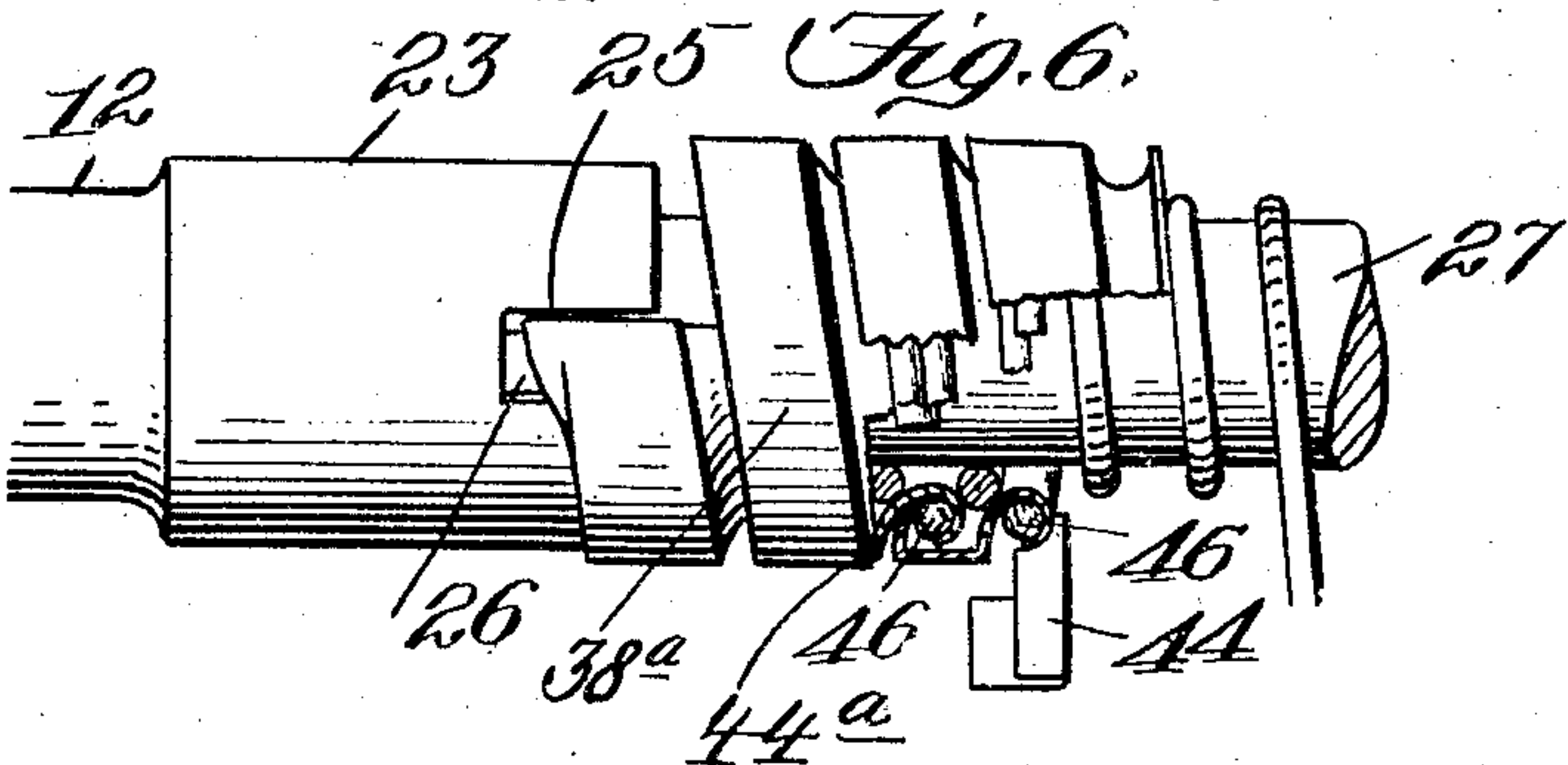


Fig. 6.



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UNITED STATES PATENT OFFICE.

SALVATORE SCOGNAMILLO, OF NEW YORK, N. Y., ASSIGNOR TO AUTOMOBILE SUPPLY MANUFACTURING COMPANY, OF BROOKLYN, NEW YORK.

MACHINE FOR FORMING FLEXIBLE TUBING.

SPECIFICATION forming part of Letters Patent No. 785,523, dated March 21, 1905.

Application filed June 22, 1904. Serial No. 213,688.

To all whom it may concern:

Be it known that I, SALVATORE SCOGNAMILLO, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Machines for Forming Flexible Tubing, of which the following is a specification.

This invention relates to a machine for forming flexible tubing or metallic spiral hose; and the primary object of the same is to provide a comparatively simple organization of contributing elements for regularly shaping an inner core or sustaining-coil of resilient material, applying a casing composed of a spirally-bent metallic strip and shaping the latter in such manner as to form interlocking joints and at the same time regularly feed a packing-strip to the said joints, these several operations being pursued regularly and evenly in a substantially automatic manner without requiring manual interference or assistance except at such times when it is desired to stop the mechanism or to reset the parts after a length of the tubing or hose has been completed.

The invention primarily consists in a supporting means carrying a removable mandrel, a controlling drive-shaft, and a carriage regularly fed longitudinally of the supporting means and carrying bending and feeding mechanisms having a timed operation to properly position and apply the several constituents of the tubing or hose.

The invention further consists in the details of construction and arrangement, which will be more fully hereinafter set forth.

In the drawings, Figure 1 is a side elevation of the machine intermediately broken through. Fig. 2 is a top plan view. Fig. 3 is an end elevation of a part of the left extremity of the machine. Fig. 4 is a transverse vertical section on the line 4-4 of Fig. 2 through the upper part of the machine. Fig. 5 is an enlarged detail cross-section of the bending-rolls, mandrel, and bending-anvil. Fig. 6 is a detail elevation of a portion of the mandrel, showing the manner of forming the tubing thereon. Fig. 7 is a detail perspective

view of the socket end of the mandrel-shaft. Fig. 8 is a detail perspective view of the end of the mandrel to engage the socket of the mandrel-shaft.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The numeral 1 designates an elongated bed or support having end legs 2 arranged in pairs at each extremity of the said bed, and at one end of the machine a suitable bearing 3 is attached to or formed with the legs for the reception of a power-receiving shaft 4 having a belt-wheel or pulley 5 on its outer end, which may be connected to a suitable source of power. On the shaft 4 a sprocket-wheel 6 is keyed, from which power is taken by a chain belt 7 and transmitted to mechanism on the adjacent end of the bed and which will be presently set forth. The bed is formed with a longitudinal groove or guideway 8, in which a depending projection or drop 9 of a carriage 10 extends to hold the said carriage in feeding relation to the bed and obviate lateral play or displacement thereof, but at the same time allow said carriage to run sufficiently loose to overcome any tendency to frictional obstruction. At one end of the machine, or that adjacent to the power-shaft and rising from the bed, are spaced uprights 11, in the upper portion of which a mandrel-shaft 12 is rotatably mounted and has a sprocket-wheel 13 on its outer end surrounded by the belt 7. The mandrel-shaft 12 between the uprights 11 has a gear or pinion 14 keyed thereto and held in continual mesh with an intermediate larger gear 15, directly thereunder and secured to a feed-shaft 16. The gear 15 is of such increased proportions relatively to the gear or pinion 14 that the shaft 16 will be given a required speed of rotation. Below the gear 15 is a third pinion or gear 17 on a short motion-transmitting shaft 18, having a worm-wheel 19 on its outer end meshing with a transversely-extending worm 20, with which a sprocket-wheel 21 is adapted to be thrown into connection by means of a clutch 22, the said clutch being quickly operative to disengage the sprocket-

wheel 21 from the worm at any time desired by a shifting lever 22^a.

The mandrel-shaft 12 has a head or socket 23 on its inner end, the said head or socket 5 being formed with a circular socket-recess 24, extending longitudinally thereof, and a cross-slot 25 of angular contour to receive the correspondingly-shaped terminal 26 of a mandrel 27. It will be understood that these co-
10 operating parts, including the socket-recess 24 and a cross-slot 25, will be so proportioned with relation to the shape of the terminal 26 of the mandrel that said terminal will be readily insertible into and withdrawable from
15 the recess and slot. The opposite end of the mandrel 27 is fitted in the inner end of a centering-head 28, fixedly held in the upper end of an upright 29 by a clamping-screw 30. The mandrel 27 is freely removable by shift-
20 ing the centering-head 28, it being understood that said mandrel must be withdrawn from the machine when it is desired to remove the completed tubing or hose.

The carriage 10 has its bed 31 terminally
25 attached to a feeding-belt 32 of link form, which surrounds the toothed or sprocket wheel 21 and also engages a similar wheel 33 at the opposite end of the machine. By this means the said carriage is regularly fed length-
30 wise of the machine-bed under the feed-controlling shaft 16, this latter shaft operating the mechanisms carried by the carriage and regulating the feed of the several constituents of the tubing or hose to the mandrel 27. The
35 shaft 16 has a groove 34 extending longitudinally through the same, and slidably splined on the said shaft and having a forked or loose connection with one end of the carriage is a sprocket or chain wheel 35, which is given
40 a continuous rotation by the shaft without obstructing the longitudinal feed of the carriage. The carriage has an outwardly-extending support 36 for holding a wire-reel 37 and a metallic-strip spool or carrier 38 in such
45 position that the wire may be first fed to the mandrel 27 and the metallic strip properly bent and afterward disposed on the wire, the interval between the application of the wire and metallic strip being determined with ac-
50 curacy and by a particular arrangement as to timed movement of the several cooperating parts. On the carriage are a pair of grooved bending-rolls 39 and 40, having interlocking
55 ribs or projections for properly shaping the metal strip, the shaft 41 of the upper roll being projected and supplied with a sprocket-wheel 42, which is surrounded by a chain belt 43, also engaging the sprocket-wheel 35.
60 The carriage also has an edge-bending anvil or former 44, rising therefrom between the bending-rolls and the mandrel, said anvil or former having an inclined concave face for engaging the edge of the metal strip and
65 turning said edge inwardly to provide in-

terlocking seats throughout the convolutions of the said strip. From a feed-reel or analogous device 45, mounted on one end of the machine, a packing-strip 46, preferably circular in cross-section, is loosely led up to the
70 carriage and caused to engage a guide device 47, having a sheave or roller 48 therein, (see Fig. 2,) the said guide being so positioned on the carriage that the packing-strip 46 will be regularly laid in the seats formed by the in-
75 terlocking convolutions of the metallic strip. The edge-bending operation of the metallic strip, which ensues through the medium of the anvil or former 44, takes place just prior to the full disposition of the packing-strip be-
80 tween the bent members of the metal strip, and the metal strip is applied over the mandrel in such manner as to regularly engage the convolutions of the wire, the latter fitting
85 snugly in between the seats and providing an inner sustaining means to resist crushing strain and also maintain the several seats or interlocking members of the convolutions of the metal strip in flexible relation.

It will be understood that the bending-rolls 90
39 and 40 give the metallic strip 38^a the contour shown by the extreme right-edge portion of said strip as illustrated by Fig. 6 by reason of the engagement thereof with the in-
95 terlocking coinciding grooves and circumferential ribs of the bending-rolls first engaging the said strips, and as the edges of successive coils of the strip 38^a thus preliminarily prepared overlap, due to the specific feed of said
100 strip after leaving the bending-anvil 44, the free edge 44^a of each strip-coil opposite that bent by the anvil will be forced into the preceding anvil-bent edge of the strip and be
105 caused to assume a curved contour, owing to the resistance set up by the wire preliminarily applied regularly around the mandrel from the reel 37 and intersecting the inner joined
110 edges of the convolutions or coils of the strip 38^a. The coils of the strip 38^a are positively held in position by the coils of wire first dis-
115 posed on the mandrel, and the certainty of the bending operation just explained is assured, and particularly the interlocking of the edges which are completed by the several wire con-
120 volutions or coils.

The open structure of the socket 23 relatively to the end of the mandrel engaging the same and the shape of said mandrel end provides for the insertion therein of the termi-
125 nals of the wire and metal strip at proper intervals to obtain an anchorage or fastening means for the wire and strip in the preliminary coiling operations.

After the length of tubing or hose has been completed the constituents thereof are sev-
130 ered and the mandrel 27 removed, the completed hose being slipped longitudinally off the mandrel and subsequently treated and finished by the application of end sleeves or heads or any other devices that may be desired to

be applied thereto. The mandrel is then replaced, and the carriage 10 run back to the starting-point, when another length of tubing or hose may be formed, and thus the operation 5 will continue.

From the foregoing it will be seen that flexible tubing or hose may be expeditiously produced and a strong structure result, owing to the regularity of the assemblage of the constituents with mechanical positiveness. 10

Changes in the proportions, dimensions, and minor details may be resorted to without departing from the spirit of the invention.

Having thus fully described the invention, 15 what is claimed as new is—

1. A machine for forming flexible tubing, having supporting means, a removable mandrel, a shaft arranged below the mandrel, a carriage movable longitudinally on the shaft 20 and carrying bending and feeding devices, and mechanism for operating the several parts.

2. A machine for forming flexible tubing, having a removable mandrel, a supporting-bed, a carriage movable longitudinally of the 25 bed, and carrying bending and feeding devices, a controlling-shaft, a rotatable element slidable on the controlling-shaft and loosely attached to the carriage and also connected to the operative parts of the latter, and means 30 for actuating the several mechanisms.

3. A machine for forming flexible tubing, having a bed, a carriage movable longitudinally of the bed and supporting bending and

feeding devices, an actuating element movable longitudinally with the carriage for imparting 35 motion to the bending and feeding devices of the latter, a shaft on which said element is slidably mounted, means terminally connected to the carriage for moving the latter over the bed, and mechanism for operating the several 40 parts.

4. A machine for forming flexible tubing, having a bed, a carriage movable longitudinally of the bed, a removable mandrel above the carriage, devices on the carriage for successively feeding the constituents of the tubing 45 to the mandrel, bending devices supported on the carriage, and an edge-former on the carriage between the bending devices and mandrel, and means for operating the several 50 parts.

5. A machine for forming flexible tubing having supporting means, a removable mandrel, a carriage movable longitudinally of the supporting means below the mandrel and supporting bending and feeding devices including 55 bending-rolls, an edge-former, and rotatable members holding wire and a metal strip, a packing-strip-feeding means, and mechanism for operating the several parts. 60

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

SALVATORE SCOGNAMILLO.

Witnesses:

FANNIE E. DIMMICK,
GEO. W. REA.