

No. 700,662.

Patented May 20, 1902.

F. W. KOFFLER.

MACHINE FOR UPSETTING TUBES WITH ANNULAR CORRUGATIONS FOR
RENDERING THEM FLEXIBLE.

(Application filed Oct. 31, 1901.)

(No Model.)

2 Sheets—Sheet I.

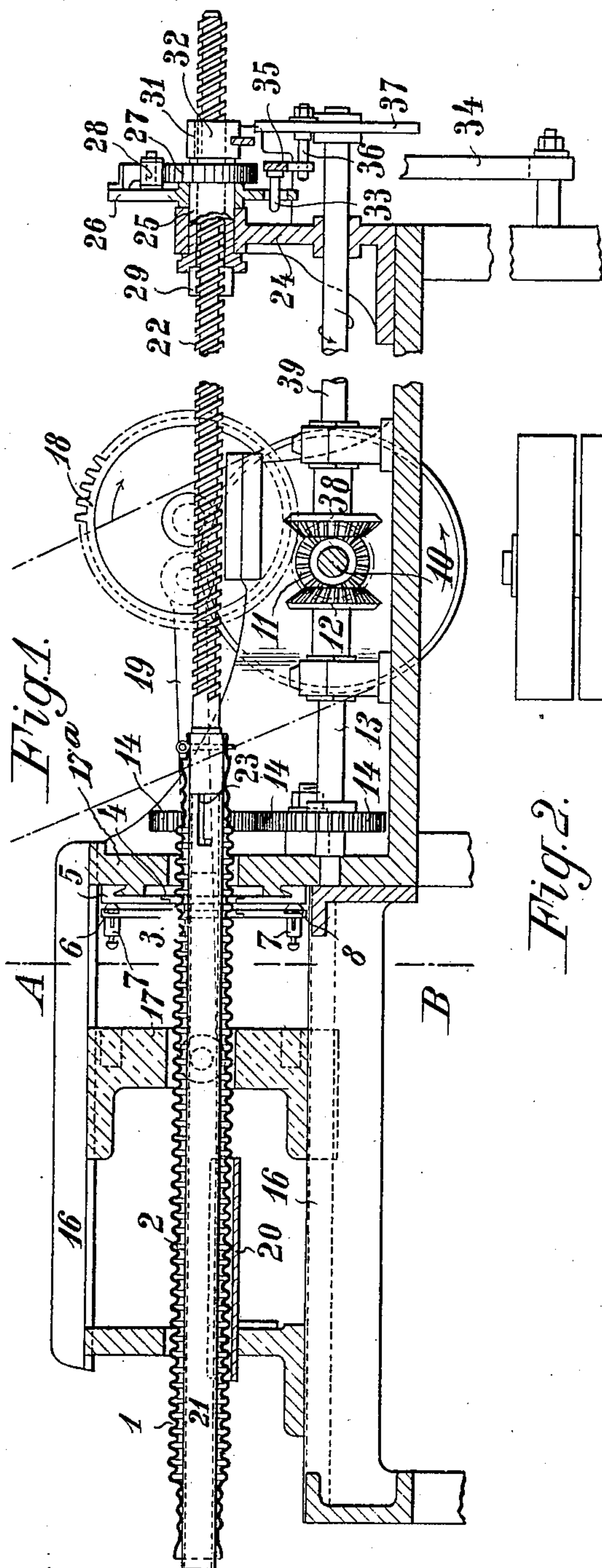
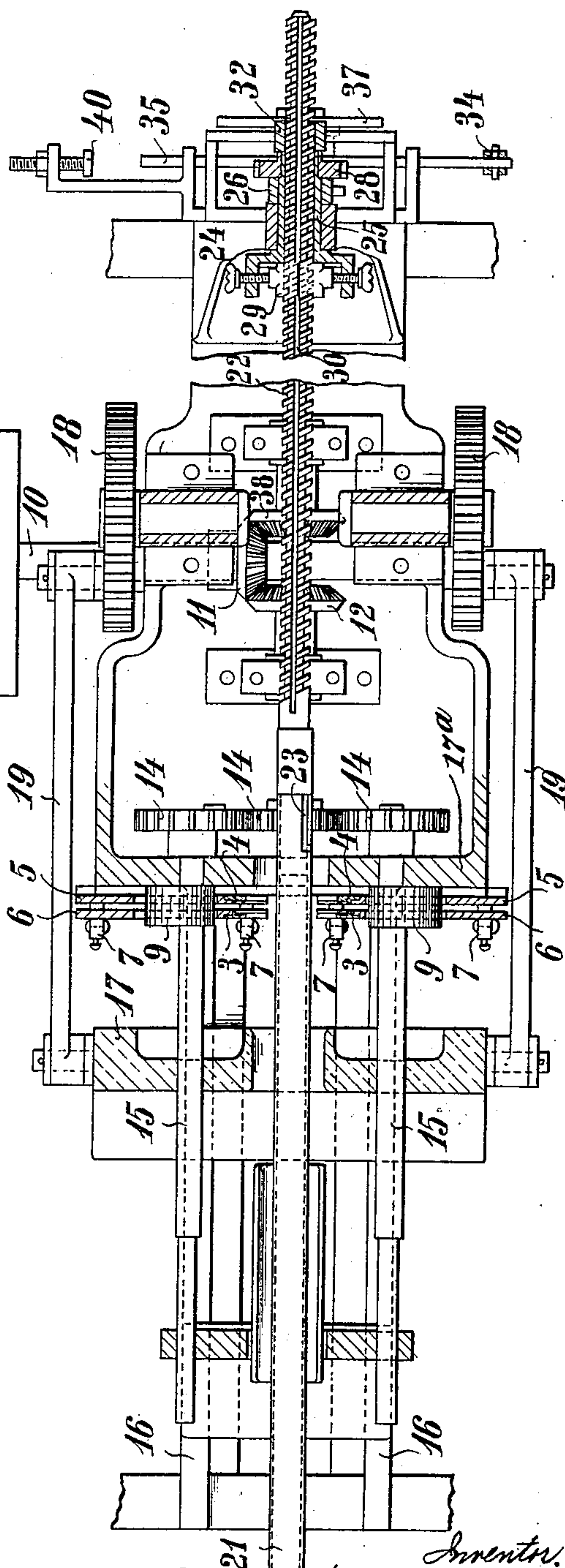


Fig. 1.



Fig. 2.



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Fig. 3.

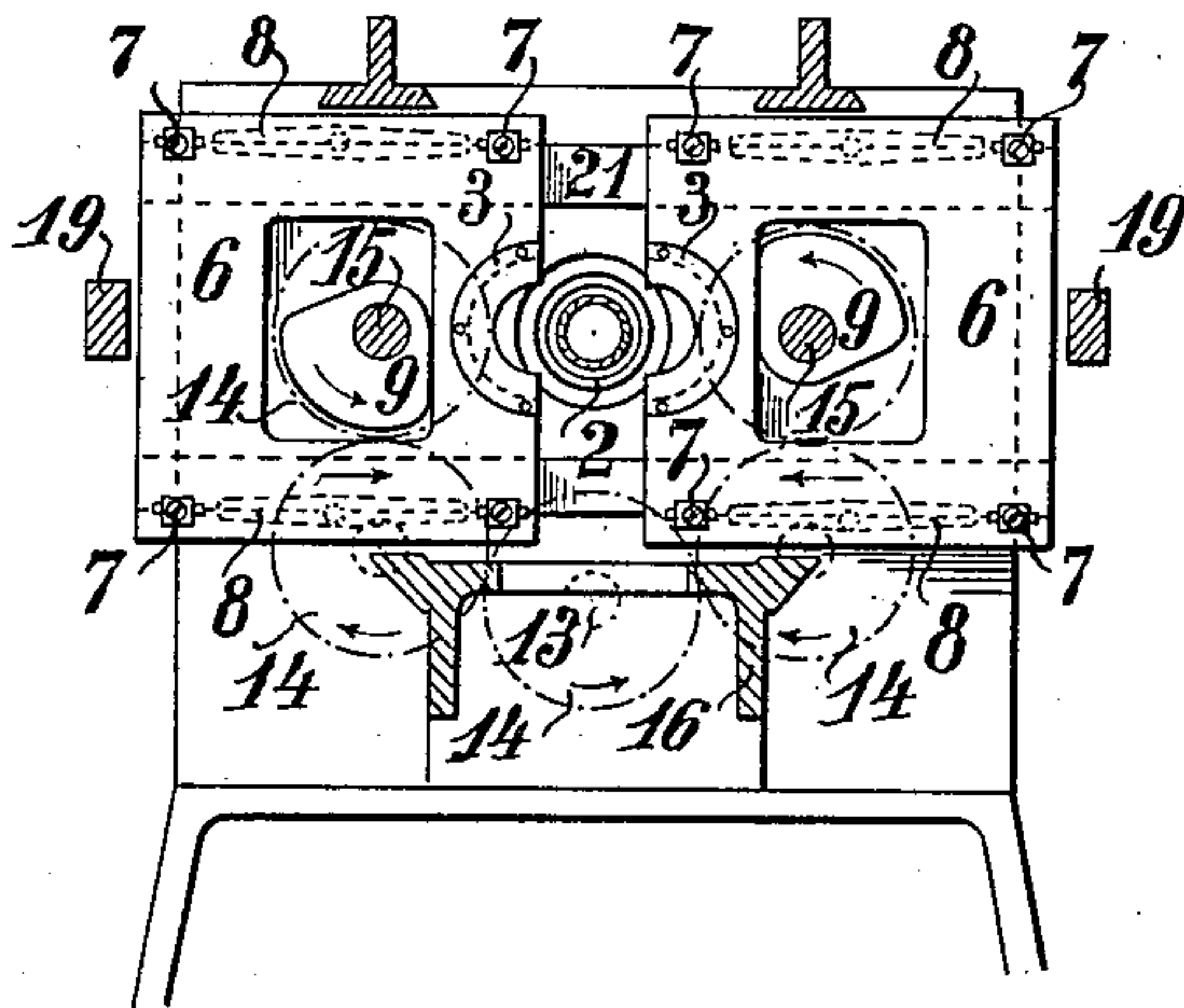


Fig. 4.

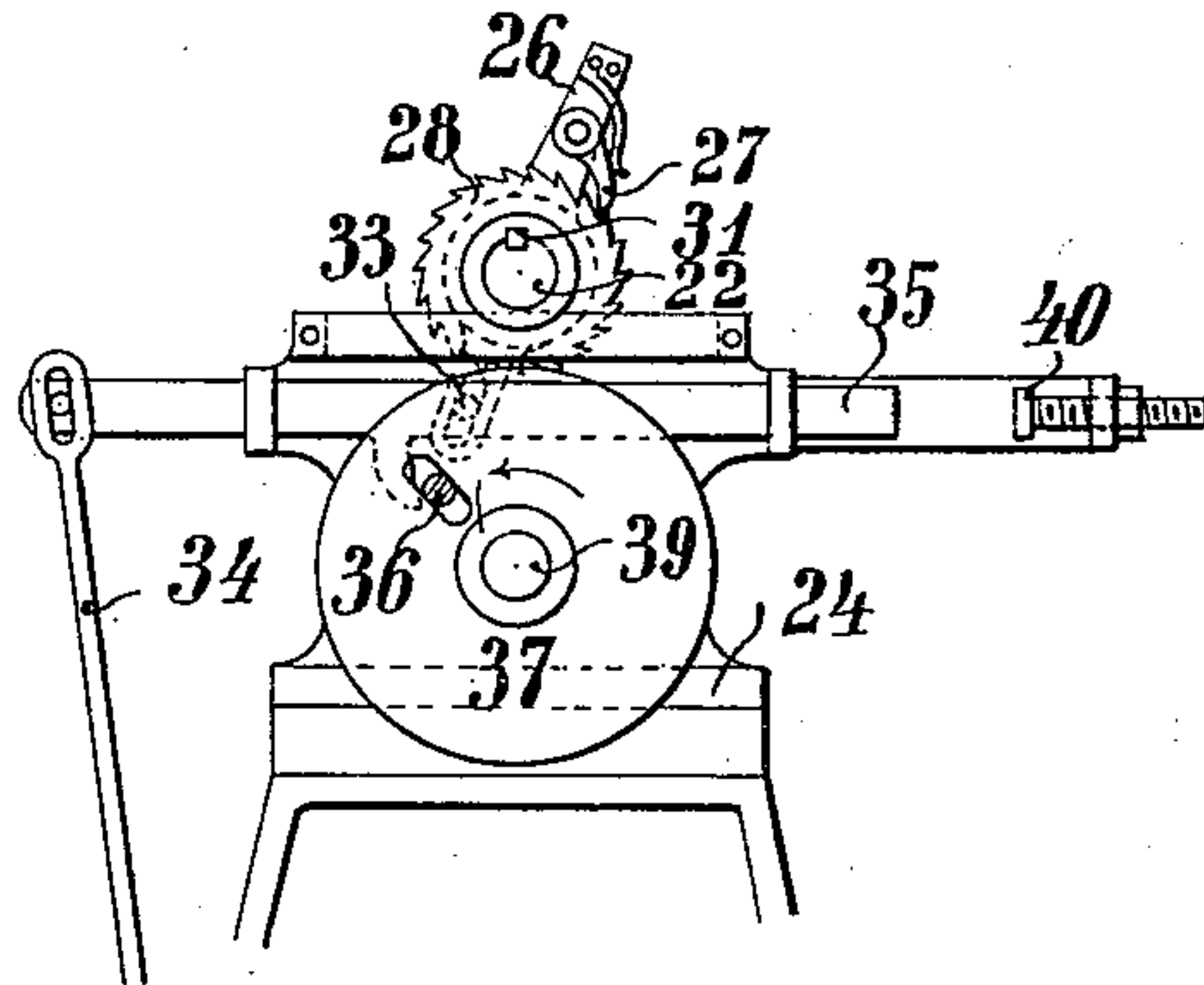


Fig. 5.

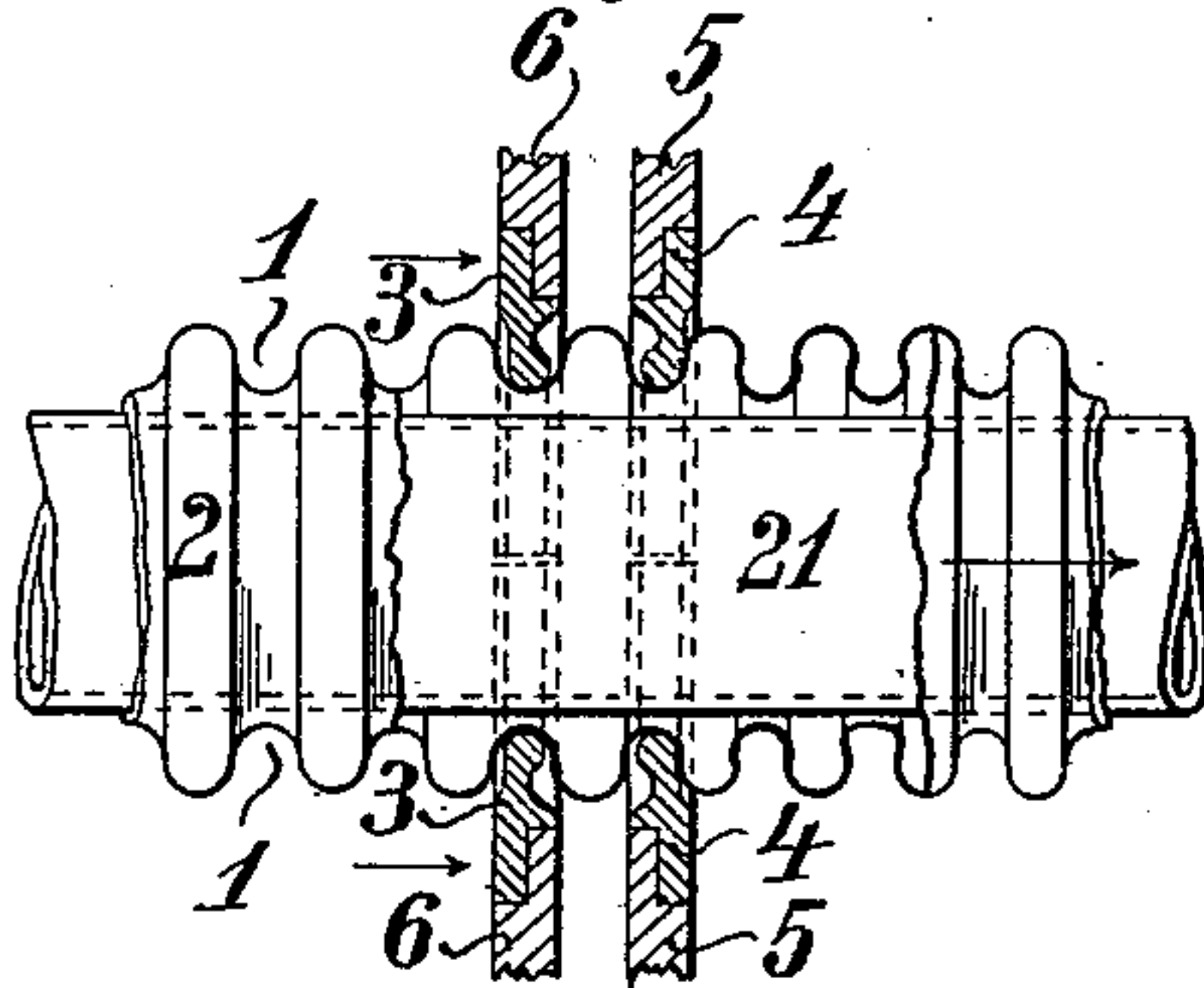
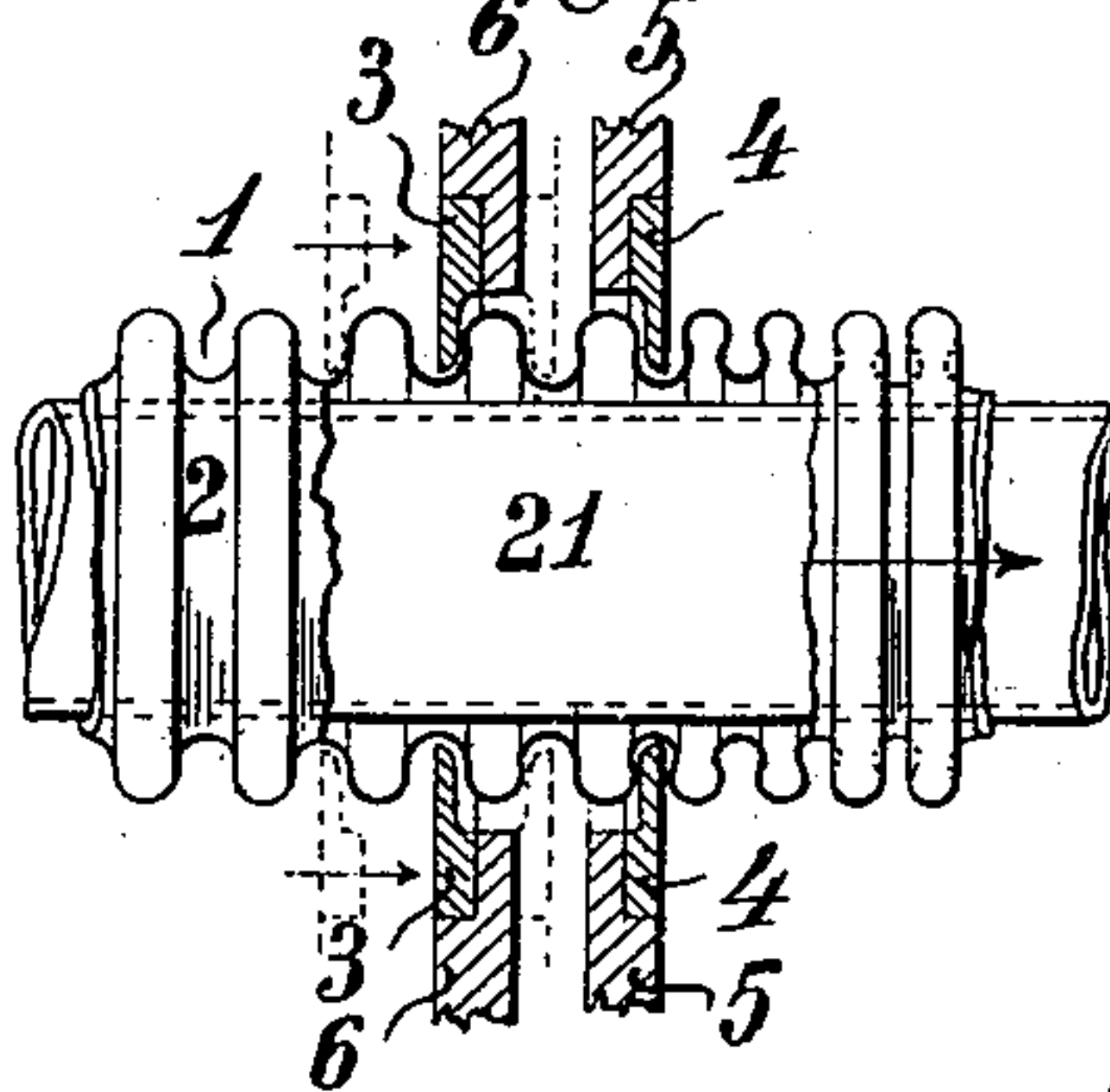


Fig. 6.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR UPSETTING TUBES WITH ANNULAR CORRUGATIONS FOR RENDERING THEM FLEXIBLE.

SPECIFICATION forming part of Letters Patent No. 700,662, dated May 20, 1902.

Application filed October 31, 1901. Serial No. 80,667. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH WILHELM KOFFLER, a subject of the Emperor of Austria-Hungary, residing at Vienna, in the Province of Lower Austria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Machines for Upsetting Tubes with Annular Corrugations for Rendering them Flexible; and I do hereby
5 declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

The machine which forms the subject of this invention has for its object to upset the annular corrugations of corrugated tubes, so
20 as in bringing the corrugations nearer together and altering the form thereof to impart to the tube a high degree of flexibility.

The machine consists, mainly, of two sets of opening and closing checks or die-plates
25 which are situated between two platens, one of which is fixed and serves as abutment, while the other travels to and fro, constituting a press-head for pressing the two sets of die-plates together. Both sets of die-plates
30 have semicircular openings constituting dies which on the moving together or closing up of the die-plates enter one of the furrows of the circular corrugations of the tube and effect the pressing together or narrowing of the
35 intermediate ridge as soon as the movable platen exercises a pressure thereon. The die-plates then recede or open, and the corrugated tube is fed forward one corrugation preparatory to the next pressing operation.
40 The said upsetting-machine is shown on the accompanying drawings, in which—

Figure 1 shows a longitudinal section. Fig. 2 is a sectional plan. Fig. 3 is a section on line A B, Fig. 1, showing the open die-plates.
45 Fig. 4 shows a front view of the feed-motion of the corrugated tube. Figs. 5 and 6 show, to an enlarged scale, the action of two differently-formed sets of die-plates operating consecutively upon the tube.

50 As shown at Figs. 1, 2, and 3, the upsetting of the furrows 1 of the tube 2 is effected by

means of the semicircular dies 3 and 4, which are fixed to the plates 5 and 6.

The plates 5, which during the upsetting operation constitute a stationary abutment,
55 are formed as rigid bearers and slide transversely on guide-ledges on the fixed platen of the machine. The die-plates 6 are mounted on movable guides 7 and are movable toward the plates 5.
60

Springs 8, interposed between the plates 5 and 6, tend to move these and their dies a distance apart equal to the pitch of the corrugations.

The opening and closing of the die-plates
65 is effected by means of two cams 9, operating in openings in the plates. They are actuated from the shaft 10 by means of bevel-wheels 11 and 12, which transmit the motion to shaft 13 and from this through spur-wheels
70 14 to the cam-shafts 15.

The reciprocating platen 17, sliding in guides 16 and acting against the die-plates 6, receives its to-and-fro motion from driving-shaft 10 by means of spur-wheels 18, constituting crank-plates connected by connecting-
75 rods 19 to the platen 17. The corrugated tube 1 to be acted upon, which is carried in a gutter-shaped guide 20, Fig. 1, passes freely through the pressing-platen between the die-
80 plates 5 and 6 and through the fixed platen 17^a. In operating when the tube has been advanced one corrugation the die-plates 5 and 6 close up, so as to enter the respective furrows opposite them, whereupon the platen
85 17 advances and forces the plates 6 toward the plates 5, thereby upsetting or narrowing the ridge situated between them. It is of advantage to effect the complete upsetting in
90 two separate operations. At the first operation the upsetting is effected by means of dies having beaded edges, as at Fig. 5, in order not only to narrow the ridge between them to a certain extent, but also to form the sides thereof with an S-shaped curvature.
95

In the second operation thin dies without beads are employed, as shown at Fig. 6, in order to enable the shaped ridges to be brought closer together. Fig. 5 shows the left-hand
100 part of the tube before and the right-hand part after the preliminary upsetting operation, and Fig. 6 shows in like manner the left-

hand side of the tube after the first upsetting and the right-hand side after the final upsetting. In the arrangement shown at Fig. 6 the die-plates 5 and 6 are shown at a greater distance apart than at Fig. 5, so as to leave space for one valley and two ridges between them. By this means the final upsetting operation is accelerated and the ridges can be brought closer together. At the following forward motion of the tube the dies 4 will enter the furrow, which is now between the plates.

The forward feed of the corrugated tube can be effected by any suitable means. In the arrangement shown it is effected as follows: The corrugated tube 2 is mounted upon a core 21, which for facilitating the removal of the finished tube from the machine is connected to the screw-spindle 22 (to which the tube 2 is attached by a transverse pin) by means of a bayonet-joint at 23.

The screw-spindle 22 passes loosely through a socket 25, rotatable in the frame 24, on which socket is mounted loose an actuating ratchet-lever 26, the pawls 27 of which are engaged with a ratchet-wheel 28, fixed on the socket.

The inner end of the socket 25 has a divided nut 29 movably mounted thereon, which nut can be put into or out of engagement with the screw-spindle. The rotation of the screw-spindle is prevented by a feather 31, engaging with a longitudinal groove 30 of the screw-spindle and situated in a socket 32, which is prevented from rotating. With the slotted tail of the ratchet-lever 26 is engaged a stud 33 of a slide 35, subject to the action of a spring 34, and which can be shifted by the adjustable pin 36 of a disk 37, rotated by the bevel-wheel 11 of the driving-shaft and the wheel 38 of the shaft 39. On the slide 35 being shifted to the left hand the ratchet-lever is turned on its pivot and the socket, with the nut 29, is turned, and if the latter be closed upon the spindle 22 the latter will be advanced.

As soon as pin 36 of disk 37 is out of engagement with the slide 35 the latter will be pushed back by the spring 34 and the lever 36 will be brought back to its original position, the extent of its motion being regulated by an adjustable stop 40 acting upon the slide, so as to accurately regulate the forward feed of the tube 2.

When the upsetting of a furrow of the tube 2 is completed, the platen 17 recedes and the die-plates move apart, whereupon the above-described feed mechanism is actuated, and the screw-spindle, together with the corrugated tube, is fed forward the distance of the pitch of the corrugations, and the operation is repeated. When the tube 2 has thus been upset along its entire length, it is removed, the nut 29 is opened, and the screw-spindle is pushed back into the position for having another corrugated tube attached to it.

I claim—

1. In a machine of the class described, dies adapted to take into the corrugations of the

tube and means to move the dies toward one another to upset the corrugations, substantially as set forth.

2. In a machine of the class described, two sets of dies adapted to take into the corrugations of the tube and means to move one set toward the other in the direction of the tube length to upset the corrugations, substantially as set forth.

3. In a machine of the class described, two pairs of dies adapted to be moved between the corrugations of the tubes and means to move one pair of dies toward the other in the direction of the tube length, substantially as set forth.

4. In a machine of the class described, two pairs of dies, cams to move the dies into and out of engagement with the tube, and a reciprocable platen to move one pair of dies toward the other to upset the corrugations between them, substantially as set forth.

5. In a machine of the class described, two pairs of dies, one die of each pair located at one side of the tube, two cams each simultaneously moving two dies, means to yieldingly hold one pair of dies distanced from the other, and a reciprocable platen to move one pair of dies toward the other in the direction of the length of the tube, substantially as set forth.

6. In a machine of the class described, two pairs of dies, means to move them into and out of engagement with the tube, a platen to move one pair of dies in the direction of the length of the tube and means to intermittently feed the tube forward, substantially as set forth.

7. In a machine of the class described, a driving-shaft, a platen reciprocated therefrom, dies to engage the tube, cams to move the dies into and out of engagement with the tube and gear-driven from the driving-shaft, and means also gear-driven from the driving-shaft to intermittently position the tube with respect to the dies, substantially as and for the purpose set forth.

8. In a machine of the class described, the combination with dies and a platen acting thereon to upset the corrugations of a tube; of means to intermittently feed the tube to the dies comprising a screw-spindle, longitudinally movable, a nut thereon, a ratchet-wheel to move the nut and a pawl to intermittently move the ratchet-wheel, substantially as set forth.

9. In a machine of the class described, the combination with dies and a platen acting thereon to upset the corrugations of a tube; of an intermittently-operated feed device comprising a screw-spindle longitudinally movable, a sleeve, a two-part nut engaging the screw and carried by the spindle, a ratchet-wheel on the sleeve and means to intermittently move said ratchet-wheel, substantially as set forth.

10. In a machine of the class described, a driving-shaft, dies to engage the tube, cams, gear-driven from the driving-shaft to move

the dies into and out of engagement with the
tube, a platen to force the dies together length-
wise of the tube, a longitudinally-movable
screw-spindle, a sleeve, a two-part nut car-
ried thereby, and a ratchet-wheel thereon, a
5 lever, a pawl thereon engaging the ratchet-
wheel, a disk rotatable from the driving-shaft
and a pin on said disk adapted to periodically
move said lever and pawl to actuate the
ratchet-wheel and nut to move the screw, sub- 10
stantially as set forth.

In testimony that I claim the foregoing as
my invention I have signed my name in pres-
ence of two subscribing witnesses.

FRIEDRICH WILHELM KOFFLER.

Witnesses:

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