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H. E. MORTON, ADMINISTRATOR OF M. MORTON, DEC'D.

DRAW OUT FOUNDRY SHAPER.

APPLICATION FILED AUG. 26, 1908.

983,748.

Patented Feb. 7, 1911.

6 SHEETS—SHEET 1.

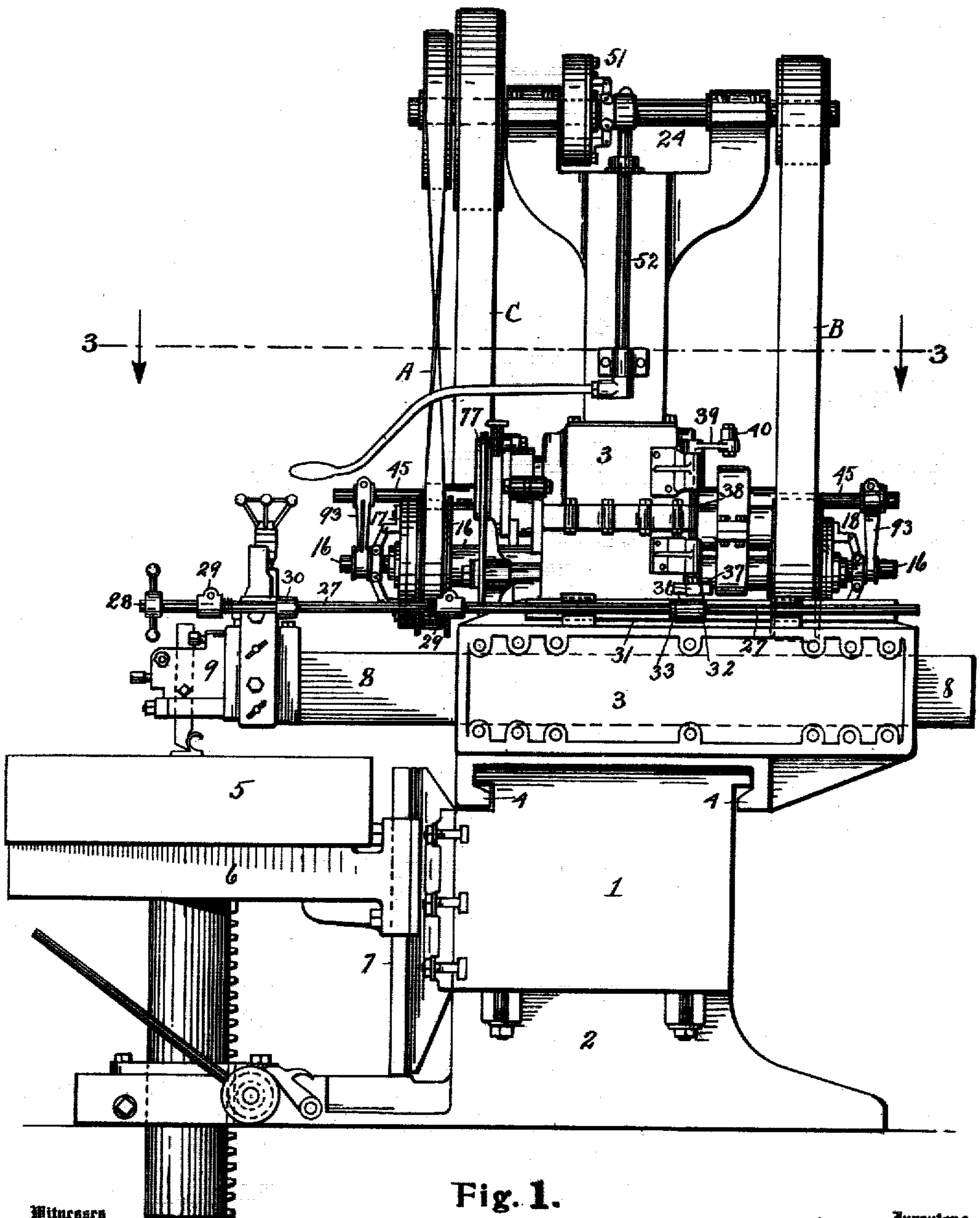


Fig. 1.

Witnesses  
O. B. Raenziger.  
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6 SHEETS—SHEET 2.

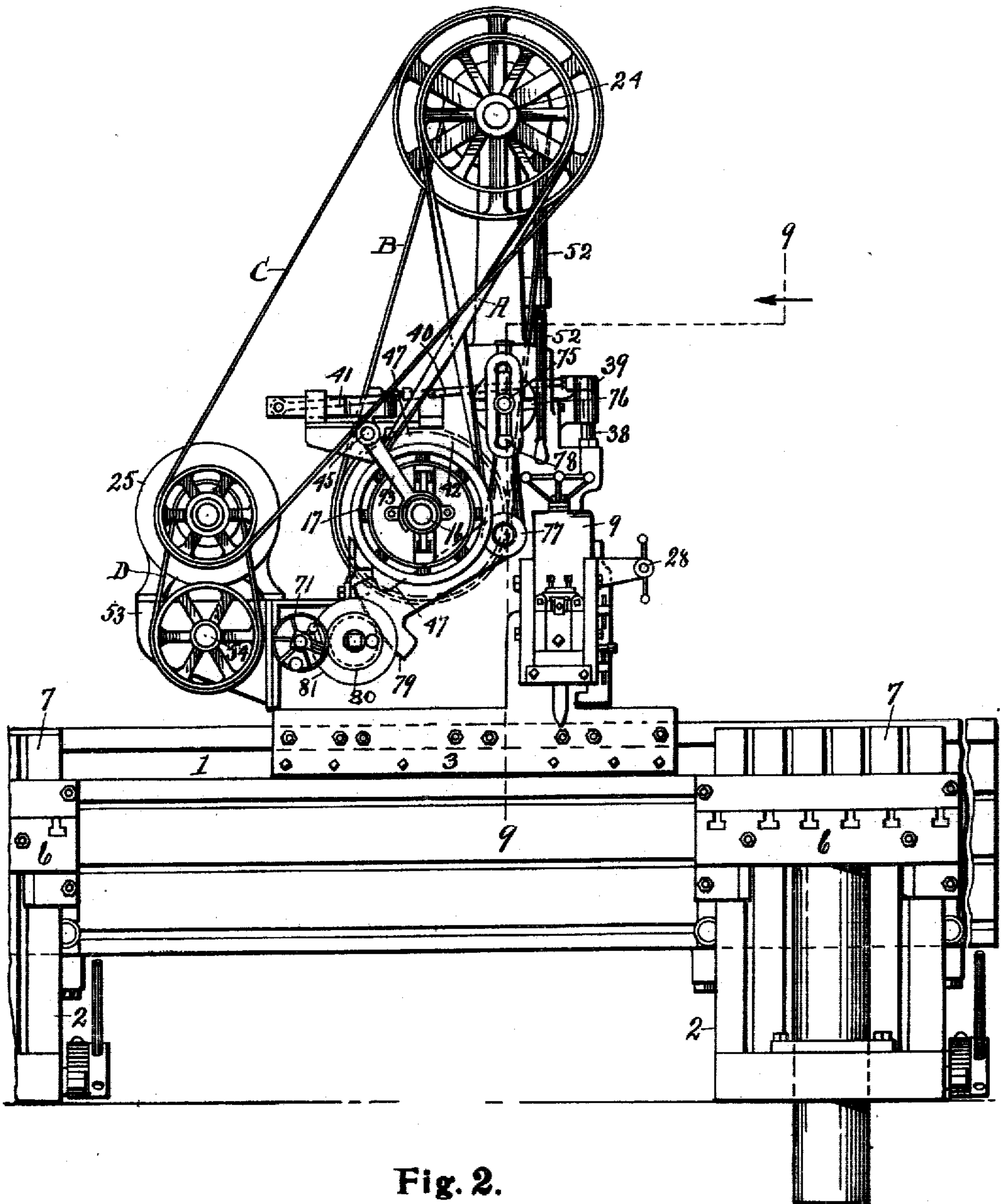


Fig. 2.

Witnesses

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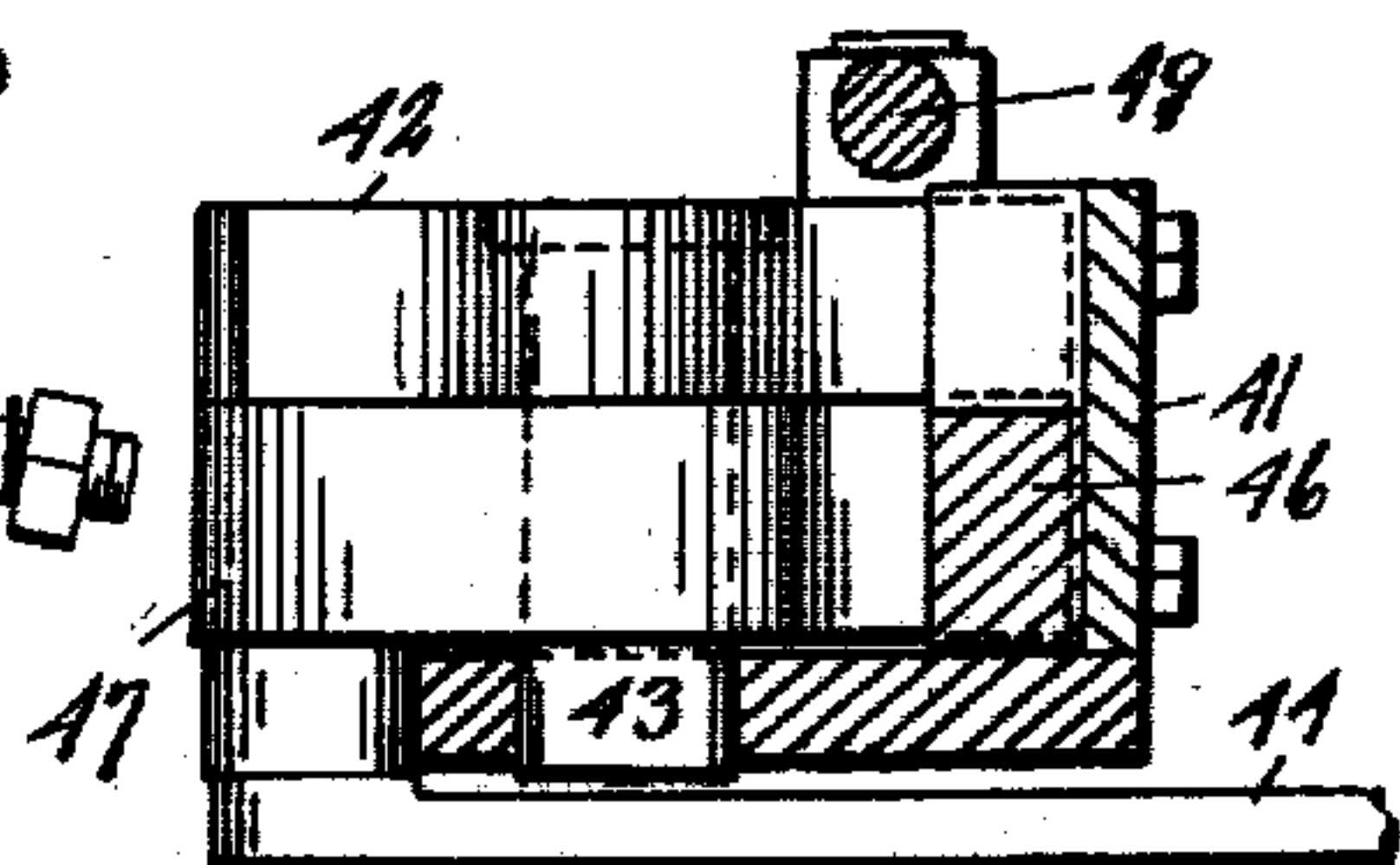
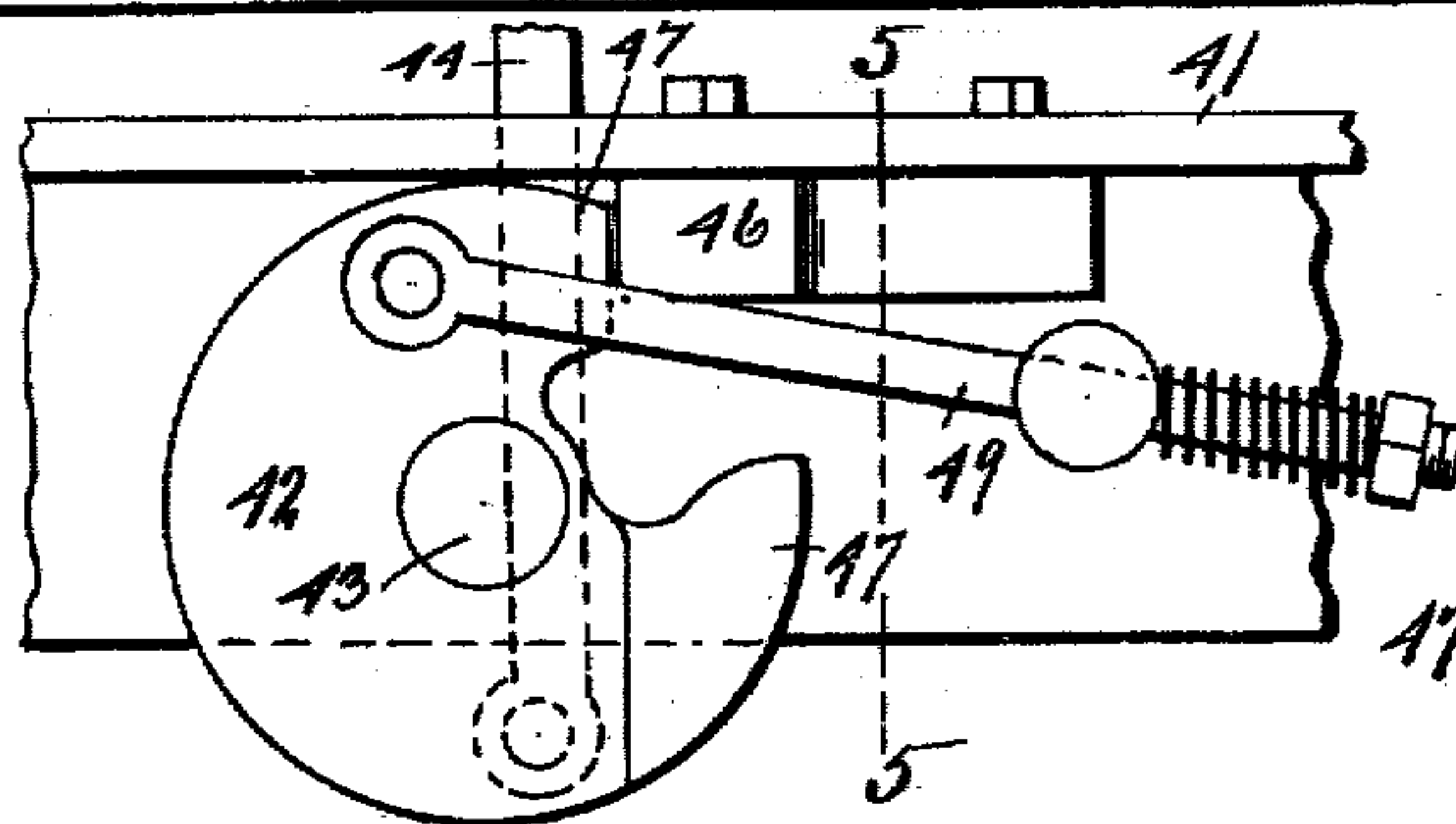
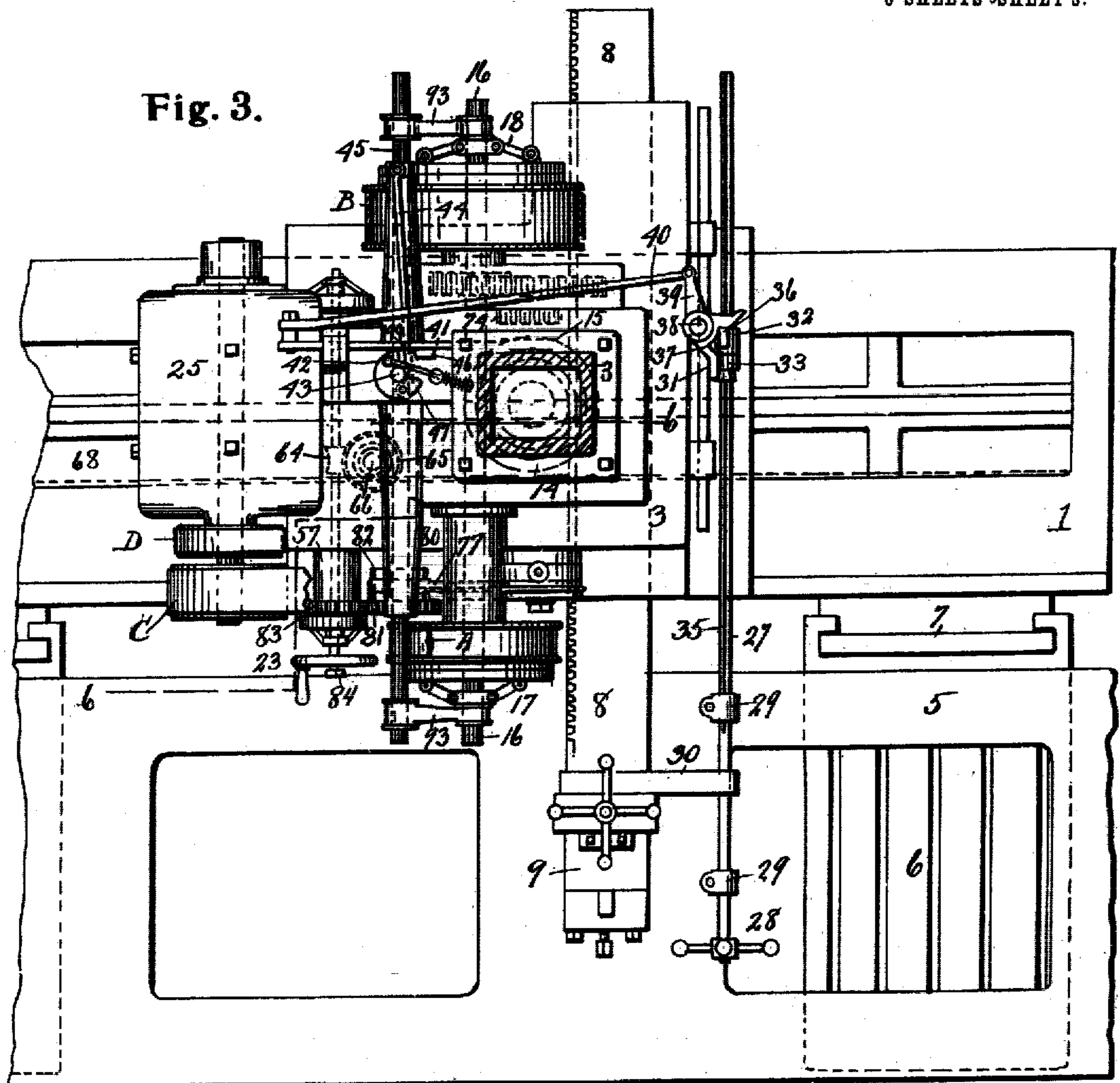


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8 SHEETS-SHEET 3.



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6 SHEETS—SHEET 4.

Fig. 6.

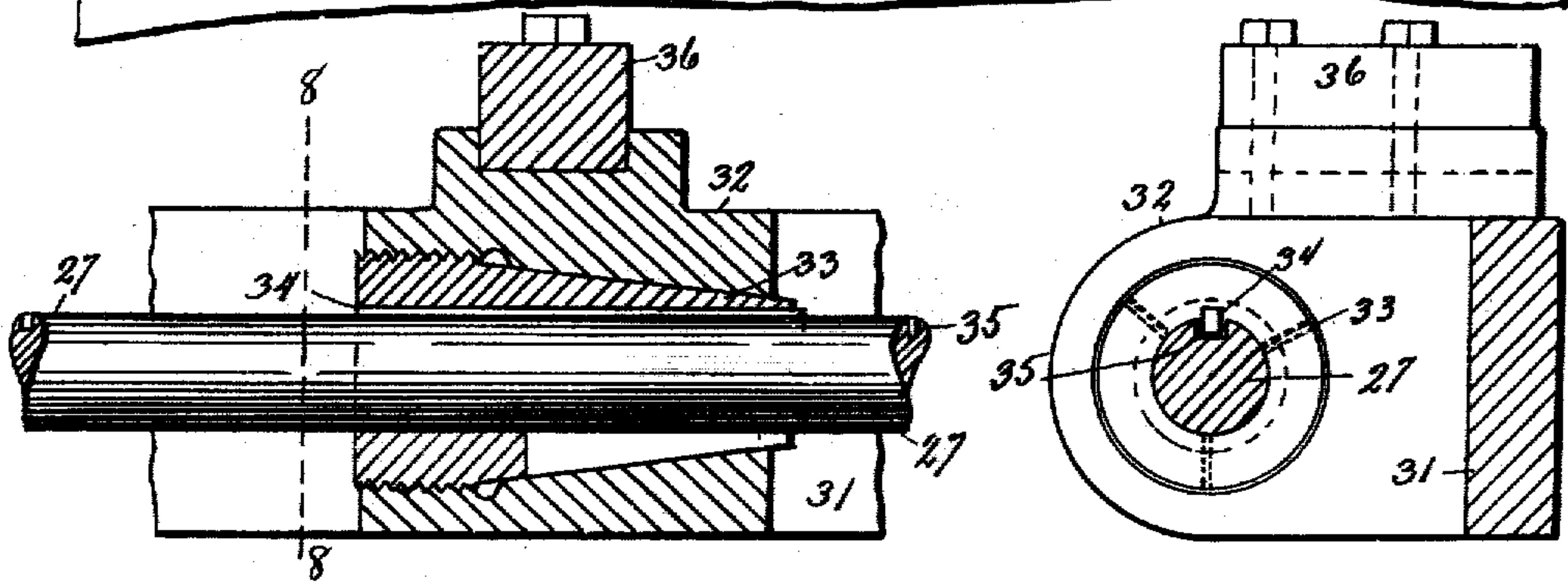
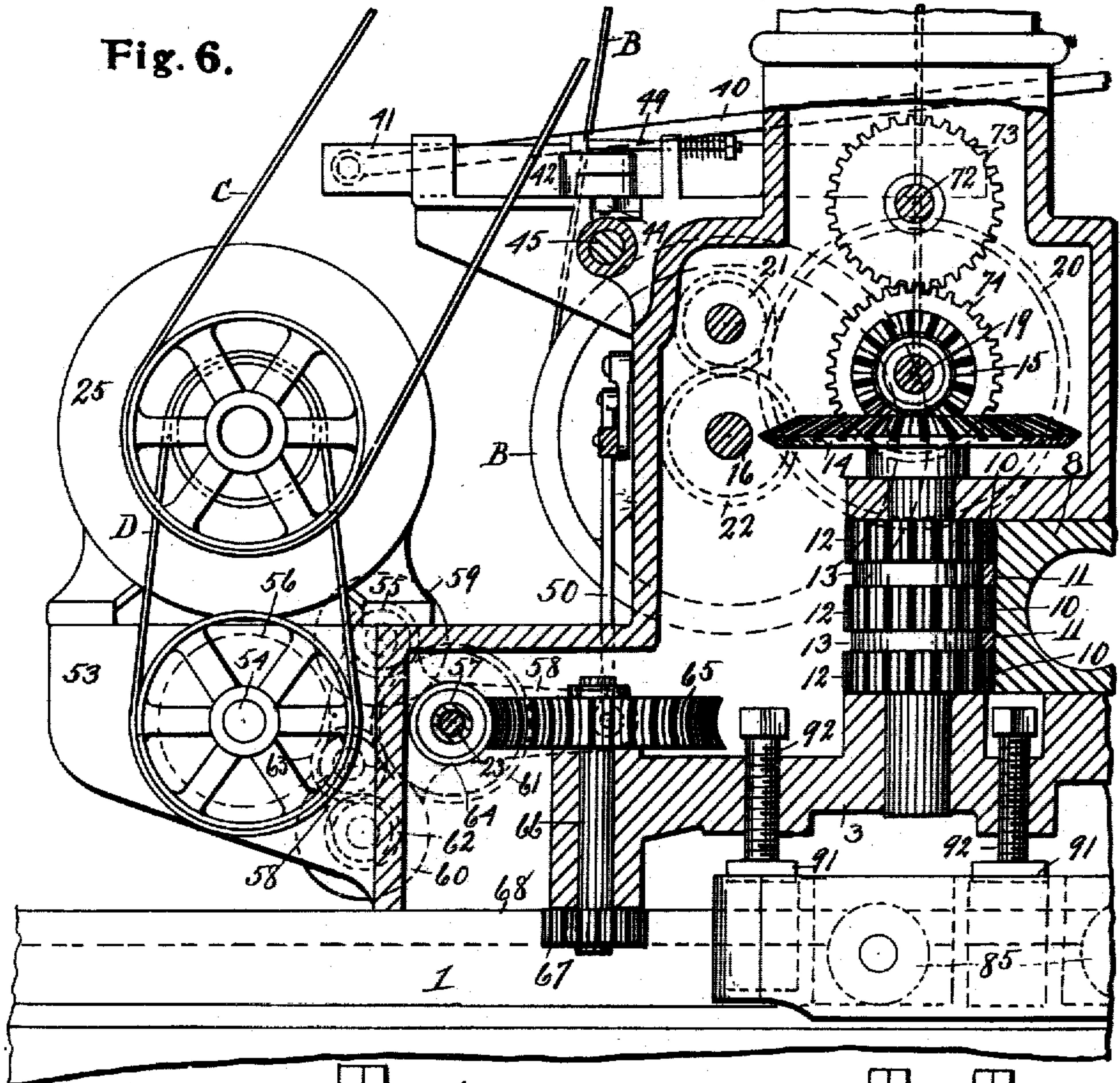


Fig. 7.

Fig. 8.

Witnesses  
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6 SHEETS—SHEET 5.

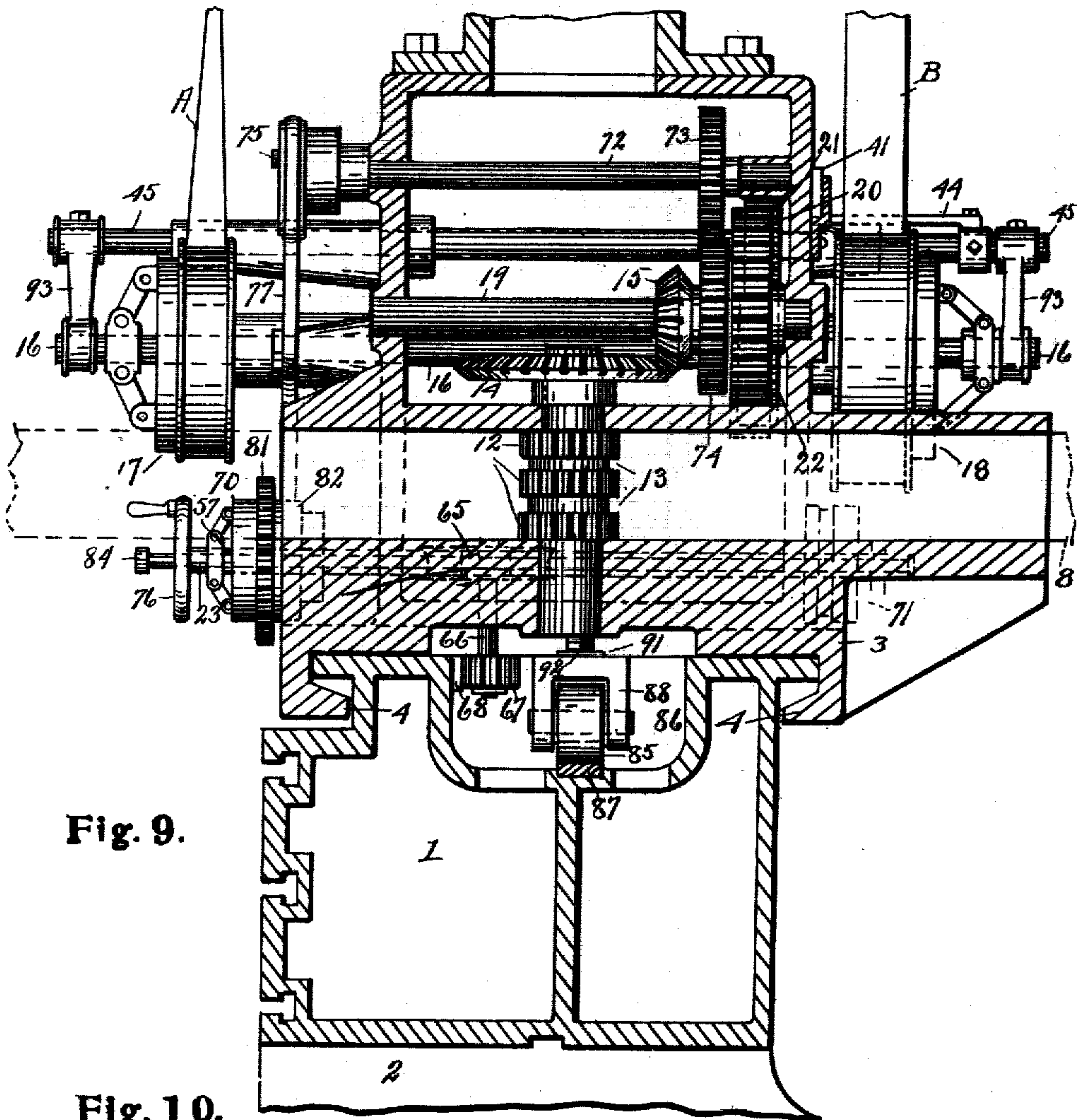


Fig. 9.

Fig. 10.

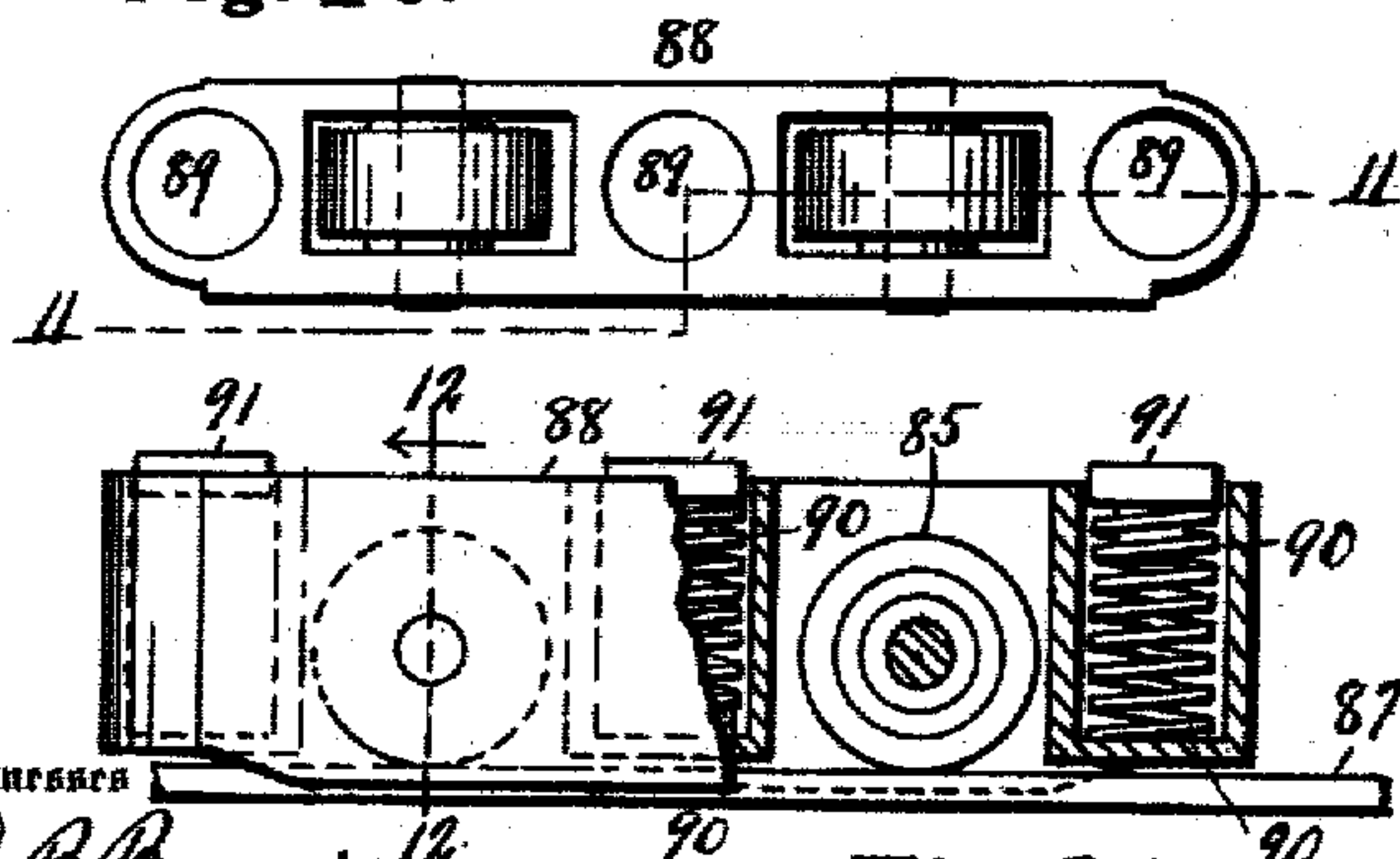


Fig. 11.

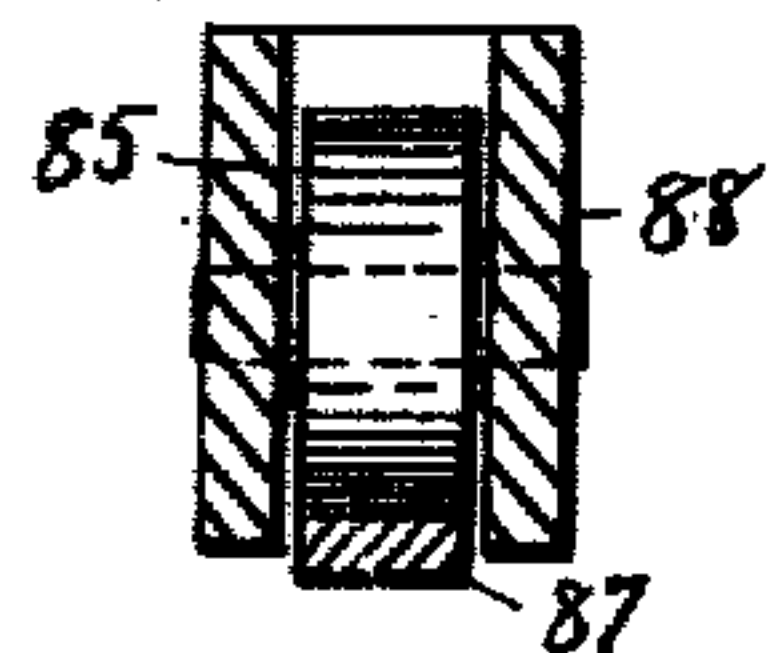


Fig. 12.

Witnesses  
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Patented Feb. 7, 1911.

6 SHEETS-SHEET 6.

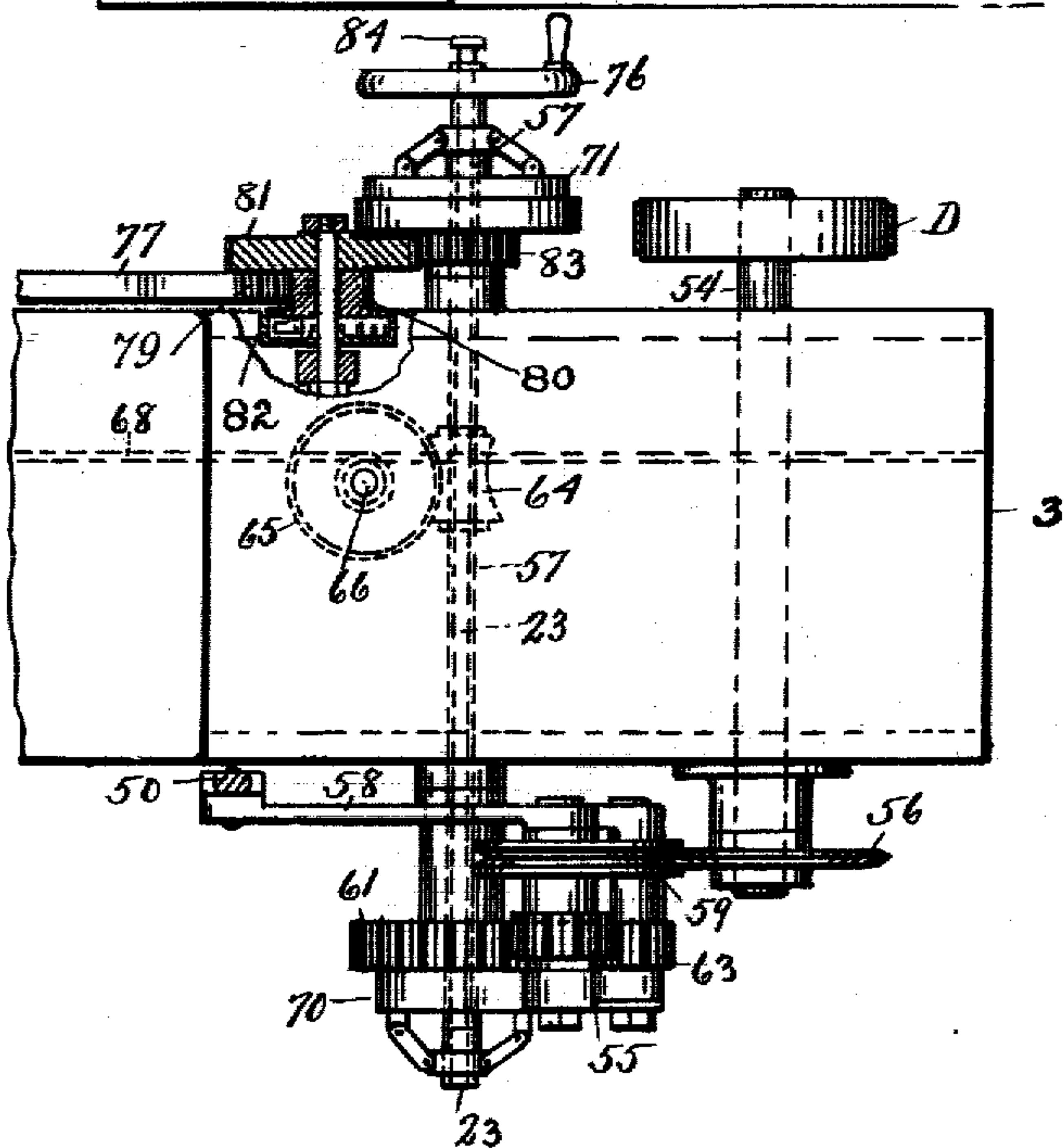
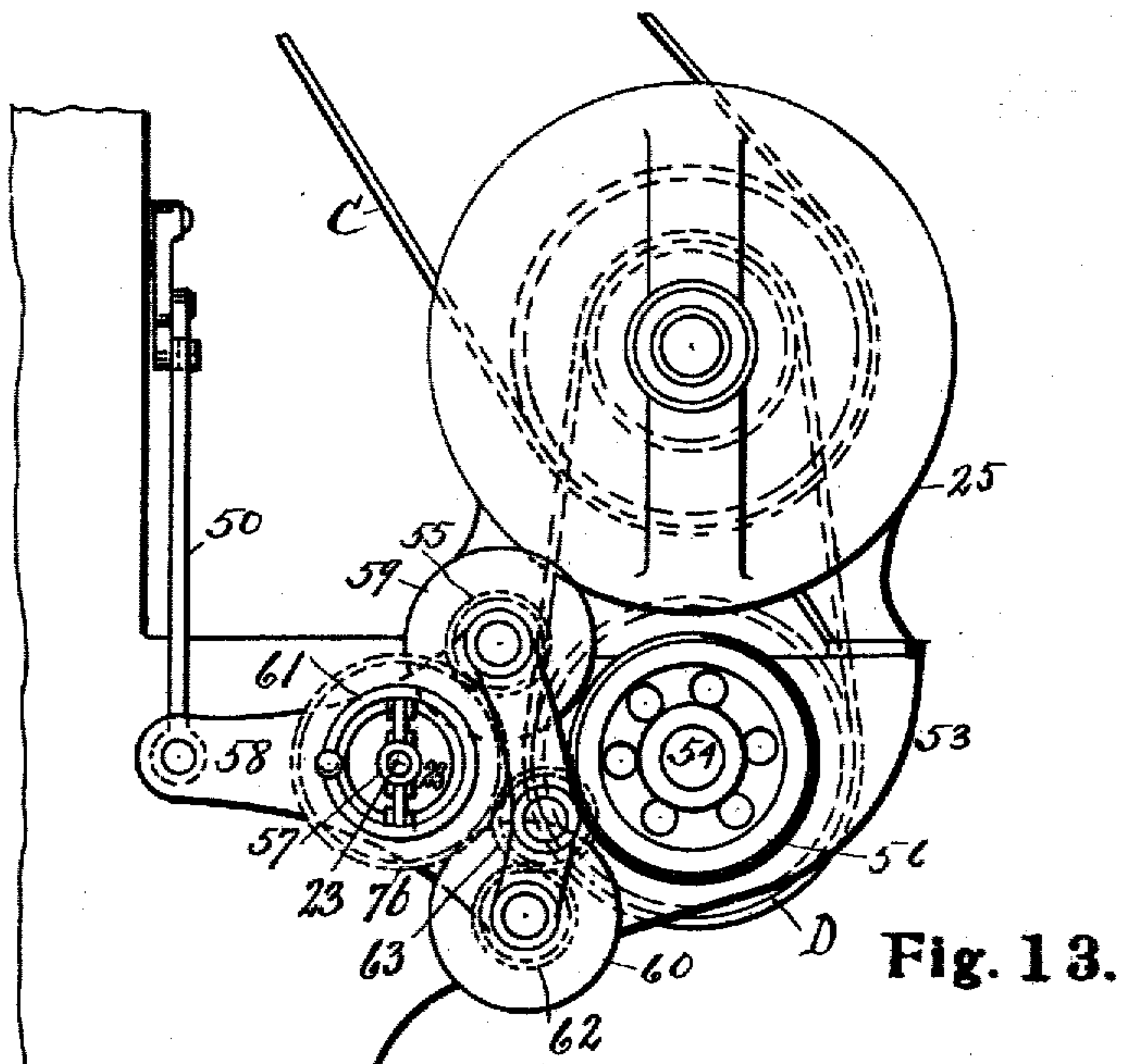
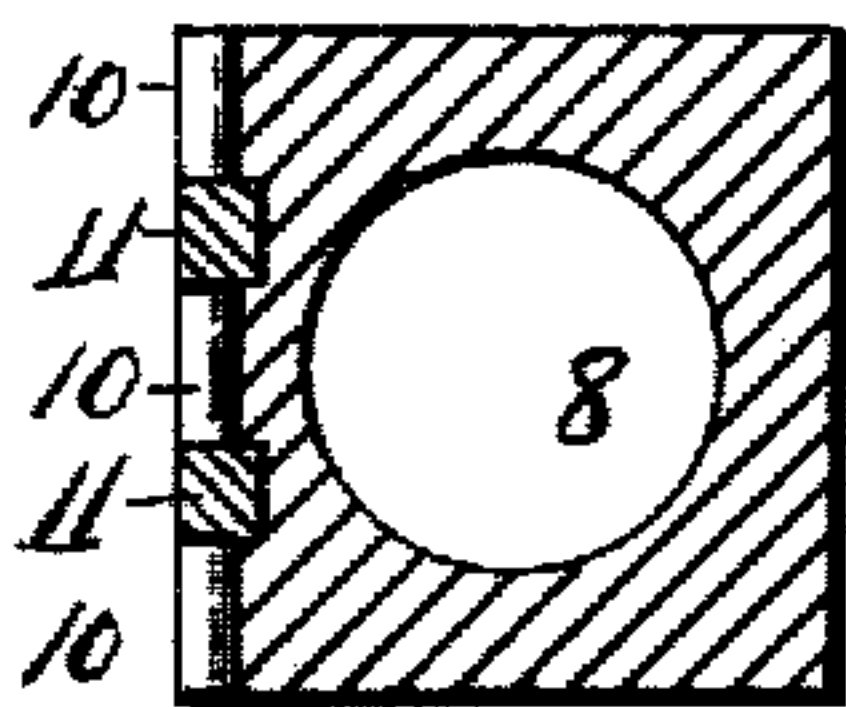


Fig. 14. *Matthew Morton*  
*Henry E. Morton*  
*Newell S. Wright*

Witnesses  
O. B. Brenziger.  
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# UNITED STATES PATENT OFFICE.

MATTHEW MORTON AND HENRY E. MORTON, OF MUSKEGON HEIGHTS, MICHIGAN;  
SAID HENRY E. MORTON ADMINISTRATOR OF SAID MATTHEW MORTON, DECEASED.

## DRAW-CUT FOUNDRY-SHAPER.

983,748.

Specification of Letters Patent.

Patented Feb. 7, 1911.

Application filed August 26, 1908. Serial No. 450,283.

*To all whom it may concern:*

Be it known that we, MATTHEW MORTON and HENRY E. MORTON, citizens of the United States, residing at Muskegon Heights, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Draw-Cut Foundry-Shapers, of which the following is a specification.

Our invention has for its purpose and design an improved draw cut foundry shaper adapted for various uses, as for example, to remove shrink heads or surplus stock from steel castings or other work for which it is adapted, and it consists of the construction, combination, and arrangement of devices hereinafter described, and claimed and illustrated in the accompanying drawing, in which,

Figure 1 is a view in side elevation. Fig. 2 is a view in front elevation. Fig. 3 is a view in horizontal section on the line 3—3 Fig. 1. Fig. 4 is a detail view of the tripping mechanism for reversing the ram. Fig. 5 is a view in section on the line 5—5 Fig. 4. Fig. 6 is a view in vertical section on the line 6—6 Fig. 3 showing the internal gearing for driving the ram, and other gearing. Fig. 7 is a detail view of the mechanism for locking the tappet bar to the tripping mechanism for reversing the ram. Fig. 8 is a view in section on the line 8—8 Fig. 7. Fig. 9 is a view in vertical section on the line 9—9 Fig. 2. Fig. 10 is a plan view of the truck that carries the traveling frame or head. Fig. 11 is a side elevation partly in section, of said truck. Fig. 12 is a view in section on the line 12—12 Fig. 11. Fig. 13 is a side elevation on the side opposite that shown in Fig. 1 and showing the mechanism for rapidly moving the traveling frame or head across the bed in either direction. Fig. 14 is a plan view of Fig. 13. Fig. 15 is a sectional view of the ram.

The object of our invention is to provide a machine of this nature of superior efficiency and utility and we carry out our invention as follows: In the drawings, upon a suitable support or bed 1, shown mounted upon a base 2, is a traveling frame or head 3 which carries all the actuating mechanisms, the traveling frame or head being fitted to the

top of the support 1, and is preferably provided with V-shaped gibs 4 for compensating wear. The work is indicated at 5 supported upon a table 6 vertically adjustable upon vertically slotted plates 7. The supporting mechanism for the traveling frame or head 3 is, however, the subject of a separate application filed July 30th, 1908, the supporting mechanism for the said traveling frame or head forming therefore no feature of our present invention. A ram 8 is employed, the same being preferably constructed square in cross section and hollow, said ram being provided with a tool or cutter head 9 and with teeth 10 on the back side thereof, the teeth being preferably spaced by longitudinally extended plates or bars 11, the teeth forming a rack bar divided by said plates 11, which plates project slightly beyond the points of the teeth and form a bearing surface at that side of the ram to engage the bearing in which it reciprocates. A gear 12 engages the rack teeth of the ram, said gear being vertically arranged and provided with grooves 13 to receive the plates 11 of the ram. The shaft of the gear 12 is provided at its upper end with a beveled gear 14 engaged by a pinion 15, said pinion being engaged through a train of spur gearing with a clutch shaft 16 provided with any suitable clutch 17 for driving the ram in one direction, and with a clutch 18 for driving the ram in the opposite direction. To this end the shaft 19 of the pinion 15 is provided with a gear 20 meshing with a pinion 21 meshing with a pinion 22 upon the clutch shaft. The friction clutches are employed, as above observed, to actuate the ram in opposite directions, the one being operated by a crossed belt A, and the other by a straight belt B, the crossed belt returning the ram, the straight belt advancing it. These belts are driven from a counter shaft 24, which may be driven from any suitable source of power as by a motor 25 belted with the counter shaft as by a belt C. By this arrangement when one clutch is engaged, the other being disengaged, the ram travels in one direction, and vice versa.

The reversing mechanism for operating the clutches comprises a splined tappet rod 27 provided with a handle 28 at the outer



end thereof and with adjustable tappets 29 which may be adjusted for a given stroke desired. A suitable journal 30 is provided on the cutter head to support the outer end of the tappet bar.

A sliding cam bar 31 is provided with a conically bored block 32 which is securely fastened thereto, said block being threaded internally so as to receive a conical bushing 33 which is threaded on its outer periphery as shown. A feather key 34 is also fitted into the conical bushing, said key engaging a spline 35 in the tappet bar. The bushing is split so that when the handle on the end of the tappet bar is turned a part of a revolution, the bushing is forced into the block gripping the tappet bar firmly in connection therewith. When the parts that are to be machined off from the work are small and located in several different positions, an operation may be made running on a 10" stroke with the ram in its innermost position. After turning the tappet rod a part of a revolution the cutter head of the ram may be run out, the tappet bar slipping through the conical bushing, and when the tappet bar is turned back to its locking position the reciprocatory stroke still remains the same as for length, but the position of the cutting tool is changed to the outer extremity instead of the inner. This is of particular advantage as it renders a very quick adjustment of the stroke possible to meet the varying conditions in work of this class. The handle on the tappet bar is extended and constructed so that when the cutting tool is working on the inner side of a large piece of work, a hook or other suitable implement to be provided for the purpose (not shown) may be used to engage the handle so that the machine may be reversed by hand. When the tool is working on the outside of a piece of work the handle of the tappet is within convenient reach of the operator so that the machine may also be readily reversed by hand. Located on the block 32 is a shoulder 36 engaged by a shifting dog 37 upon the vertical shaft 38 provided with a crank arm 39 having engaged therewith a connecting rod 40 actuating the sliding rod 41 which in turn actuates a cam 42 upon the upper end of a vertical shaft 43, with which cam is eccentrically connected a rod 44 engaged with the clutch actuating shaft 45 whereby the movement of the clutches 17 and 18 are controlled. To this end the rod 41 is provided with a stop or shoulder 46 to engage the shoulders 47 of the cam 42, a spring actuated rod 49 serving to quickly restore the cam to normal position when free to move.

As the cutter head passes out it strikes the adjacent tappet on the tappet bar which transmits power to the shifting dog 37 and

vertical shaft 38 and thence to the clutch shaft as above explained, causing the pulling clutch 18 to be engaged, the cut being taken on the ingoing stroke. As the bearing 30 on the cutter head strikes the inner adjustable tappet 29 it makes its inward stroke causing the reversing mechanism to operate in the opposite direction thereby throwing out the pulling clutch and engaging the backing up clutch causing the ram to make its reciprocatory stroke.

The counter shaft 24 carries a friction clutch 51 engaging and disengaging in such a manner that it may be stopped or started independently of the motor 25. This clutch is controlled by a hand lever 52 so that the machine may be stopped or started and placed under control of the operator. The motor if used may be supported upon a motor bracket 53 secured to the rear side of the sliding frame or head 3, said bracket carrying a horizontal shaft 54 to which power may be conducted from the motor by a short belt D. On the opposite end of the shaft 54 is a V'd friction disk 56. Running parallel with the shaft 54 is a hollow friction clutch shaft 57, passing through the head or frame 3 and provided with friction feed clutches 70 and 71. Through said shaft 57 passes a clutch actuating rod 23, provided with a hand wheel 76. A swinging bracket arm 58 carries two V'd rollers 59 and 60, one gearing direct with the shaft 57 as by gears 55 and 61, and the other gearing with said shaft through an intermediate gear, geared with the shaft 57 by gears 62 and 63. In this manner power may be transmitted onto the gear 61 on the hollow shaft 57.

It will be evident that in a certain position both of the V'd rollers 59 and 60 are freed from the disk 56. When pulled in one direction one of the V'd friction rollers is engaged with the disk 56 revolving the gear 61, and when the V'd friction rollers are thrown in the opposite direction the other V'd roller will engage the disk 56 to revolve the gear 61 and the clutch shaft 57 in the opposite direction. The rod 23 passing through the hollow shaft 57 may be provided with any suitable mechanism to actuate the clutches 70 and 71. Lever mechanism 50 is provided to actuate the swinging bracket 58.

It will be evident that by pulling the hand wheel 76 forward the adjacent feed clutch is disengaged, thereby stopping the automatic feed or operation of the shaft 57 at the same time engaging the companion clutch on the other side of the machine for power movement.

Working in conjunction with the friction feed clutch mechanism, we employ a feed shaft 72 rotated by means of a gear 73



thereupon, meshing with a gear 74 upon the shaft of the pinion 15. Upon the front extremity of the feed shaft 72 is engaged a bell crank lever 77, the end of said feed shaft being provided with an eccentric pin 75 working in an elongated slot 78 in the bell crank lever, said pin also being adjustable in a slot 76 on the end of the feed shaft in order to give the desired length of stroke. The bell crank lever is provided at its lower end with an arc shaped rack, as at 79, engaging a pinion 80, the shaft of which is provided with a gear 81 and with a pawl and ratchet ring 82 by which power is transmitted to the clutch shaft 57 through a gear 83. The rod 23 is provided with a knob 84 outside of the hand wheel 76 whereby the feeding mechanism may be engaged and disengaged, when working on a large piece of work, by a suitable hook, as hereinbefore referred to, said hook being also used if necessary for operating mechanism for stopping and starting the machine and other controlling mechanisms when desired.

The clutch shaft 57 is provided with a worm 64 engaging a worm wheel 65 upon a vertical shaft 66, said shaft provided at its lower end with a pinion 67, said pinion engaging a rack 68 having its teeth set vertically, said rack extending on the inside of the bed 1. By this means the traveling frame or head may be made to traverse in either direction upon said bed by means of power direct from the motor for the purpose of adjusting said traveling frame upon the bed, although we do not limit ourselves to this particular mechanism for moving the traveling frame.

To support and enable movement of the traveling frame upon the bed we prefer to employ a series of rollers or trucks 85 located between the bed and the frame, the bed being preferably recessed upon its upper surface as shown at 86 and to provide the bed with a track indicated at 87. The frame is shown provided with a spring and roller case, indicated in Figs. 9-12 at 88, in which the rollers are journaled, said case provided also with spring pockets 89 in which are located corresponding springs 90 to help sustain the weight of the frame, the springs being engaged at their upper ends with studs 91, the frame being provided with adjusting screws 92 threaded into the frame and which may be adjusted therein as desired.

By means of the train of spur gearing above referred to, by means of which the pinion 12 is engaged with the clutch shaft 16, it is evident that the speed of the ram may be reduced. The clutch actuating shaft 45 is engaged with the clutch shaft 16 by means of arms 93. It will also be observed that the traveling frame is given a step by

step feed movement by means of the operation of the bell crank lever 77, the traveling frame being moved by the turning of the shaft 57 to which motion is imparted through the gears 80, 81 and 83 and clutch 71 to said shaft, and from said shaft by the worm 64 and its wheel to the shaft 66 carrying the pinion 67 in mesh with the fixed rack 68 on the bed.

By the mechanism related to the cam 42 a reverse movement of the ram is effected and controlled. While the traveling frame may be fed step by step by means of the lever 77, it may also be moved by hand, the operator grasping and operating the wheel 76. For short distances of movements this provision is preferable. By pulling out the knob 84, thereby changing the related clutches, and operating the lever 50, the frame may be fed quickly by means of the power mechanism controlled thereby, when it is desired to move the frame long distances.

The operation of the device will now be understood and is as follows: The traveling frame is fed by means of the mechanism shown more particularly in Figs. 13 and 11, the same being controlled by the clutch shaft 57, power being communicated thereto by the bell crank lever 77, the motion being governed in the advance or reversal of its movement by means of the mechanism carried by the swinging frame 58 controlled by the lever 50.

The feed of the ram is controlled and effected by means of the gears actuating the pinion 12, the advance and the reversal movement of the ram being controlled by the clutch mechanism of the shaft 16 actuated from the shaft 45, the reversal of the movement of the ram being automatically effected through the instrumentality of the tappet bar.

We would have it understood that we do not limit ourselves solely to the mechanism shown and described for reciprocating the ram, nor for reciprocating the traveling frame upon the support or bed.

What we claim as our invention is:

1. In combination a frame, a reciprocatory ram carried by said frame, means to reciprocate the ram, a tappet bar provided with tappets to control the reciprocation of the ram, a shifting dog actuated by the tappet bar, a crank actuated by the shifting dog, a cam actuated by said crank, a clutch shaft provided with clutches, and means actuated by the cam to shift said clutches.

2. The combination of a frame, a reciprocatory ram projecting laterally from said frame and having a cutter head on its outer end, means for controlling the actuation of said ram, a tappet bar extending outward from the frame parallel with said ram, tap-



pets on said bar, a member movable with the ram to engage said tappets and move the bar, a support on the frame for the bar within which said bar is adapted to be adjusted longitudinally, means for locking said  
5 tappet bar in its adjusted position, and means actuated by the movement of the tappet bar for operating the controlling means.

10 3. The combination of a reciprocatory ram, means for actuating said ram, means for changing the direction of movement of the ram, a movable member for actuating said means, a tappet bar adapted to be actuated by said ram, locking means for ad-  
15 justably connecting the tappet bar to said member, and means whereby the locking means is adapted to be operated by the turning of said bar.

20 4. The combination of a reciprocatory ram, means for actuating said ram comprising clutches, means for operating the clutches to change the direction of movement of the ram, a member adapted to be moved to ac-  
25 tuate said means, a tappet bar, an arm on said ram engaging and supporting said tappet bar, tappets on said bar adapted to be engaged by said arm, and a locking mem-  
30 ber on said member through which the tappet bar is longitudinally adjustable for holding said bar in its adjusted position relative to said movable member.

5. The combination of a frame, a reciprocatory ram projecting laterally from the  
35 frame and having a cutter head on its outer end, means for actuating said ram comprising clutches, means for operating the clutches, a tappet bar extending outward parallel with said ram, tappets on said bar,  
40 a member movable with said ram to engage said tappets a handle on one end of the bar adjacent to the cutter head, a member adjustably supporting the tappet bar, and means operated by the turning of said bar  
45 for locking the same in its adjusted position.

6. The combination of a reciprocatory ram, means for actuating said ram, means for changing the direction of movement of the ram, a member adapted to operate the  
50 changing means provided with a tapering bore, a tappet rod adjustable longitudinally through said bore, a split bushing for said bore having screwthreaded engagement therewith and adapted to be turned by the  
55 turning of the rod to force the bushing into the bore and clamp the rod, tappets on said tappet rod, and means on the ram to engage said tappets.

7. The combination of a reciprocatory  
60 ram, means for reciprocating said ram comprising clutches, means for operating the clutches, a member for actuating said means provided with an internally screw-threaded and tapered bore, a tappet bar adjustable

longitudinally in said bore, tappets on said  
65 bar, a member movable with said ram to engage said tappets, and a split bushing externally screw-threaded to engage the bore and adapted to be turned within the bore by turning the tappet bar.  
70

8. The combination of a reciprocatory ram, means for reciprocating said ram comprising clutches, a tappet bar actuated by the ram, a cam bar slidable longitudinally with the tappet bar and provided with means  
75 for adjustably holding said bar, a shifting dog actuated by said cam bar, and means for transmitting motion from said dog to actuate the clutches and change the direction of travel of the ram.  
80

9. The combination of a reciprocatory ram, means for reciprocating said ram, means for changing the direction of travel of said ram, a tappet bar, tappets on said  
85 bar, a member movable with said ram to engage said tappets, a cam bar, a block on the cam bar having a tapering and screw-threaded bore, a split bushing in said bore connected to said bar to be turned thereby, and a member actuated by the cam bar for  
90 actuating the means for changing the direction of travel of the ram.

10. The combination of a frame, a reciprocatory ram on said frame extending laterally therefrom, means for actuating said  
95 ram comprising clutches, a tappet bar extending parallel with said ram, an arm on the outer end of the ram engaging and supporting said bar and through which the bar is adapted to slide, tappets on said bar  
100 adapted to be engaged by said arm, a bar extending parallel with the tappet bar and slidable therewith, means on said sliding bar for engaging and adjustably holding the tappet bar, and means actuated by the  
105 sliding bar for operating the clutches.

11. The combination of a support, a traveling frame upon said support, a hollow shaft, means for transmitting motion from said  
110 shaft to move the frame upon its support, clutches on said shaft, a rod extending through said hollow shaft to simultaneously operate said clutches, means for transmitting a continuous motion to said shaft through one of said clutches, a reciprocatory  
115 ram on the frame, means for actuating said ram, and means for transmitting an intermittent motion to the other of said clutches from said ram actuating means.

12. The combination of a support, a  
120 traveling frame upon said support, a shaft, means for transmitting motion from said shaft to move the frame upon its support, clutches on said shaft, means for simultaneously operating said clutches to throw one  
125 into operative position and the other out of operative position, a driving shaft, means for transmitting a continuous motion in



either direction from said driving shaft to  
the first named shaft through one of said  
clutches, a reciprocatory ram on the frame,  
means for actuating said ram, a bell crank  
5 actuated by said means and carrying a gear  
segment, a gear engaged by said segment,  
and means for transmitting motion from  
said gear to the other of said clutches.

In testimony whereof we have signed this  
specification in presence of two witnesses. 10

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HENRY E. MORTON.

Witnesses:

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