

No. 886,298.

PATENTED APR. 28, 1908.

P. A. JOHNS.  
TUBE CUTTER.

APPLICATION FILED DEC. 17, 1906.

3 SHEETS—SHEET 1.

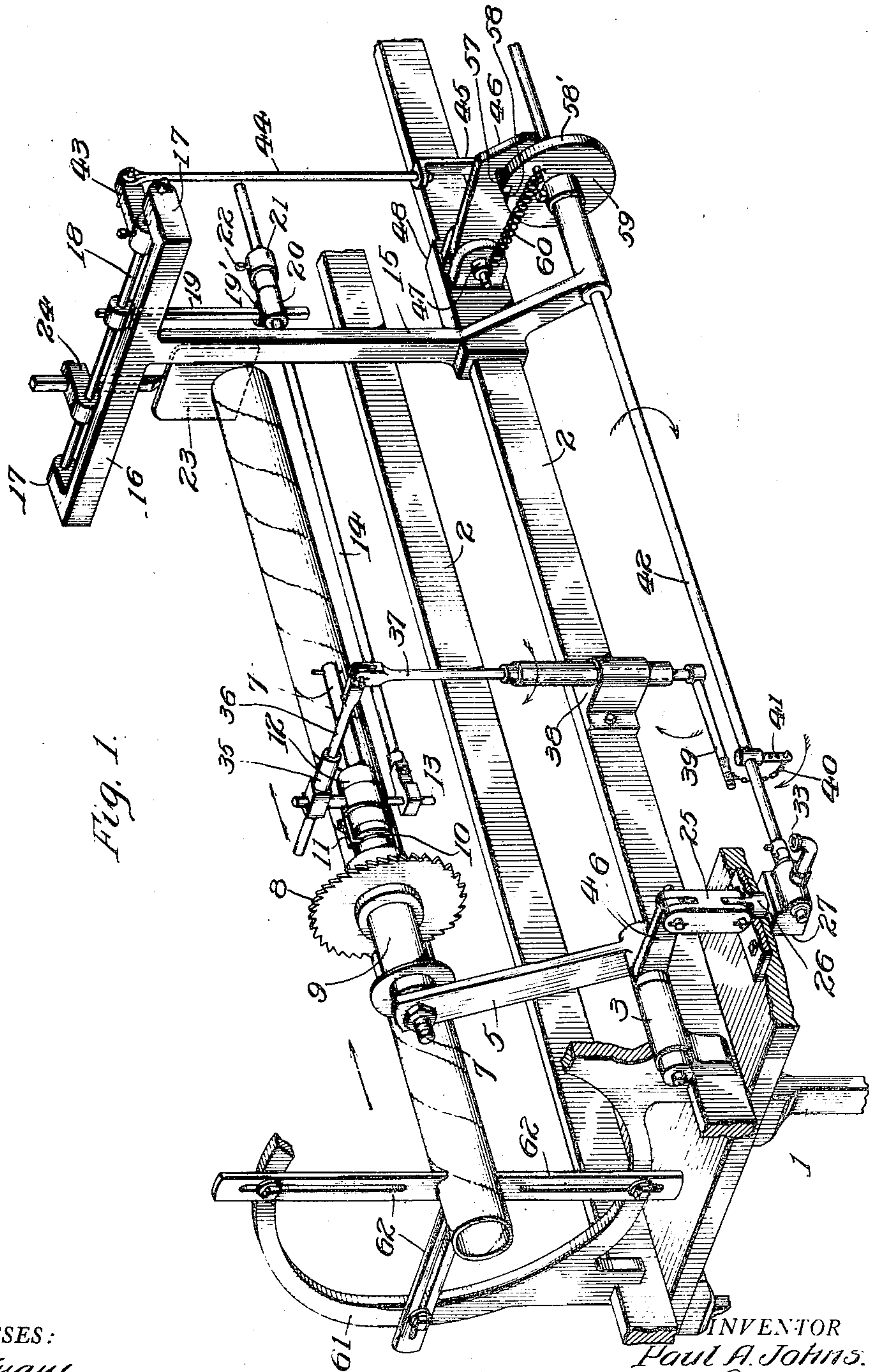


Fig. 1.

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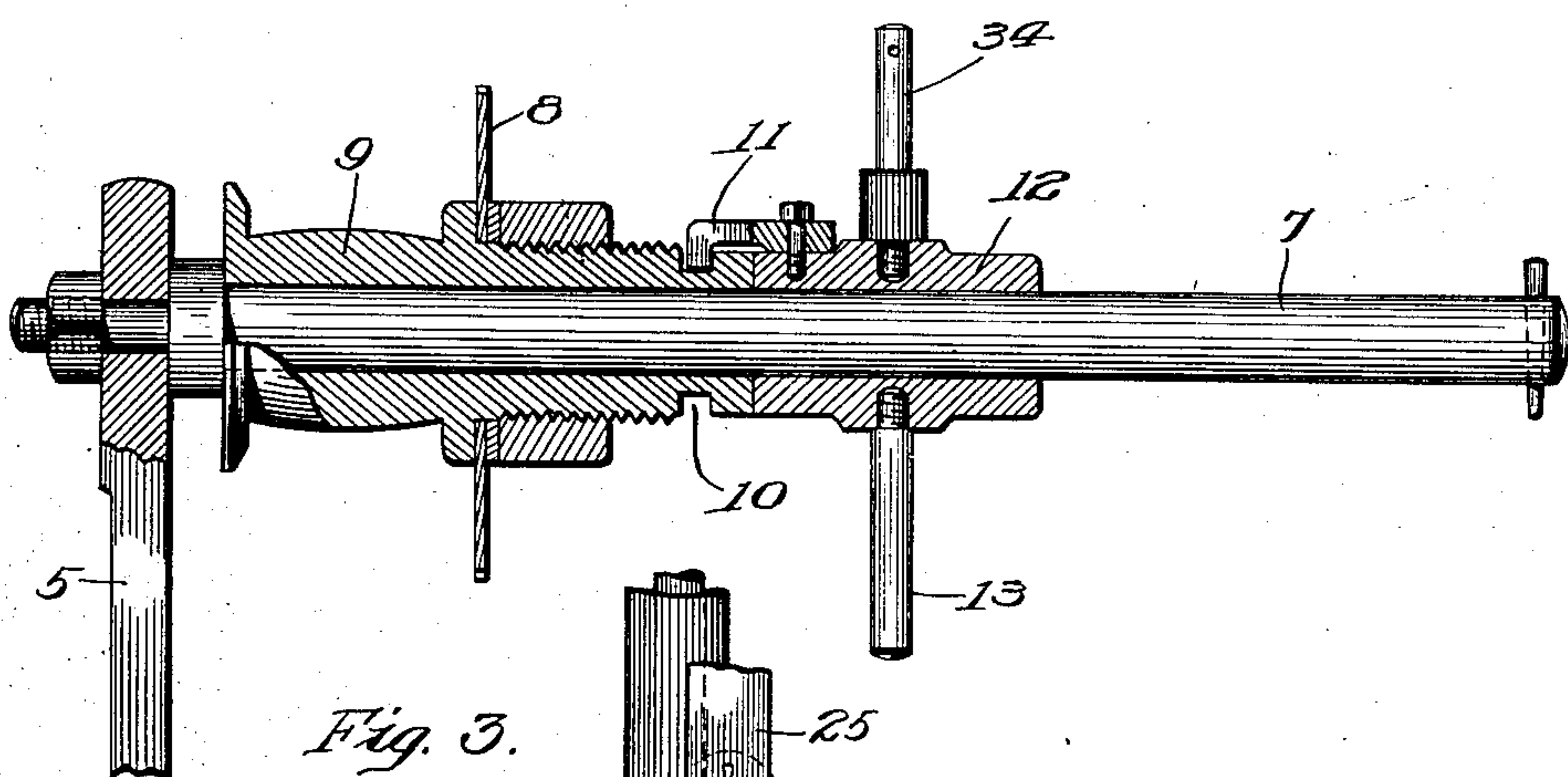
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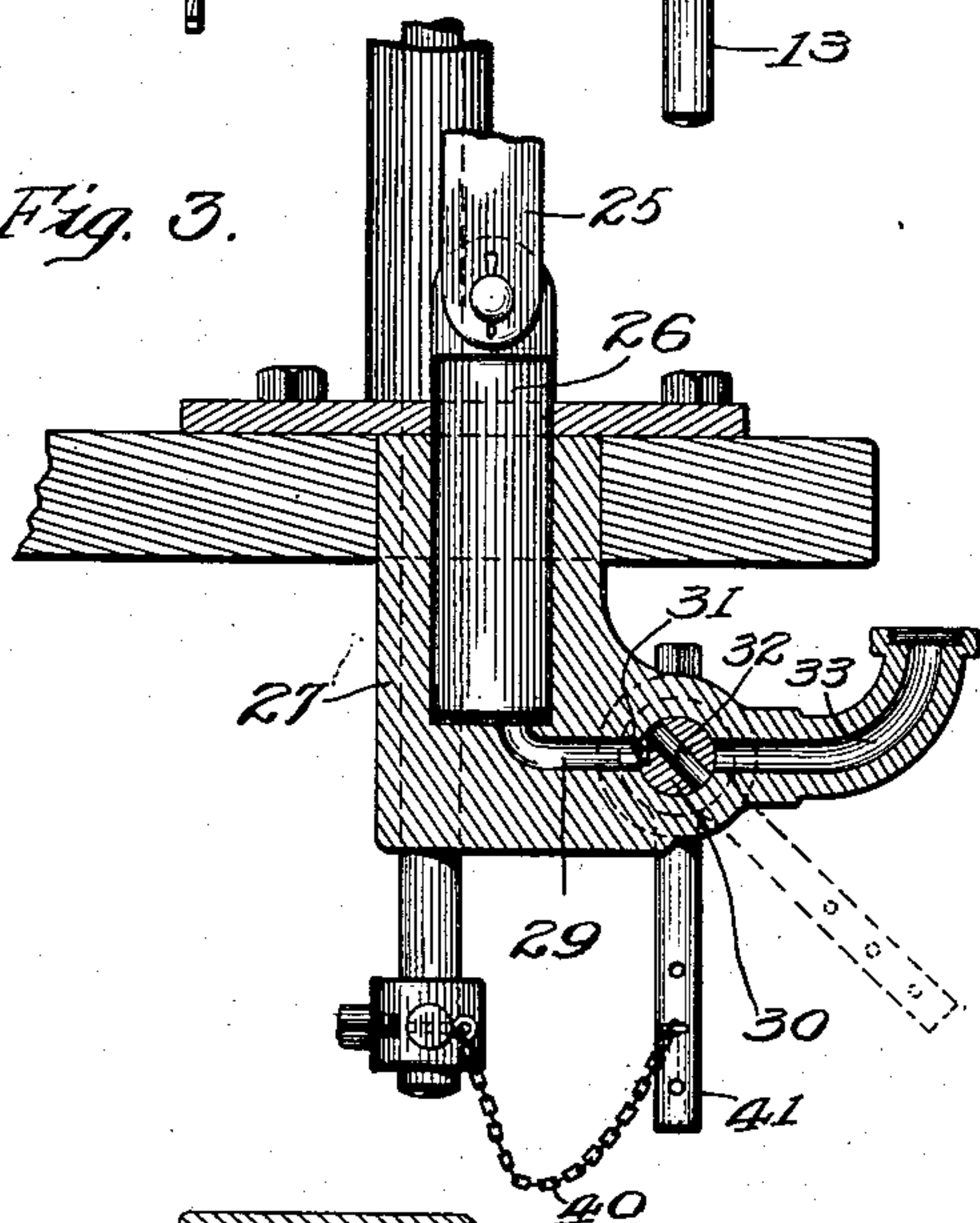
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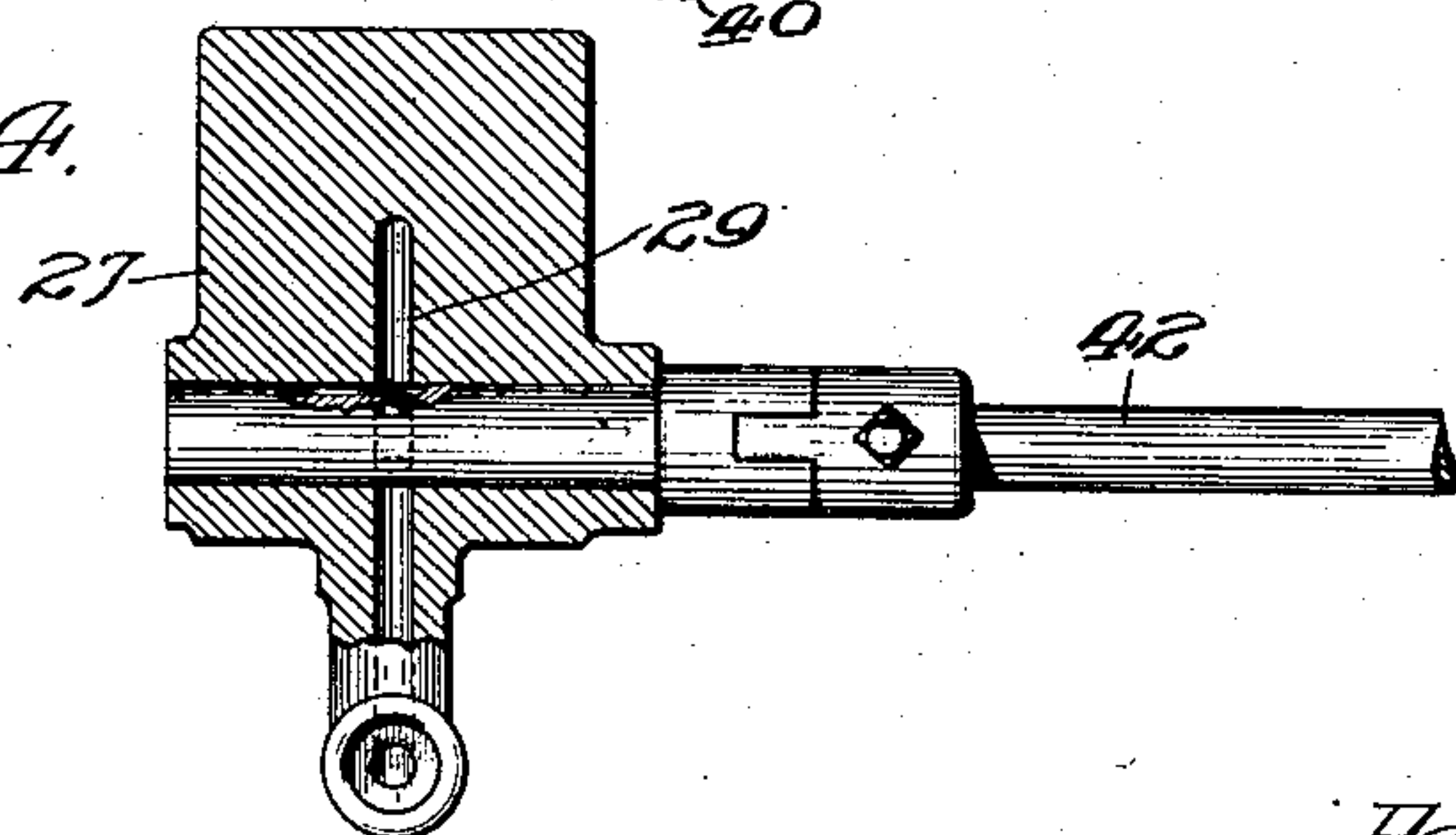
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



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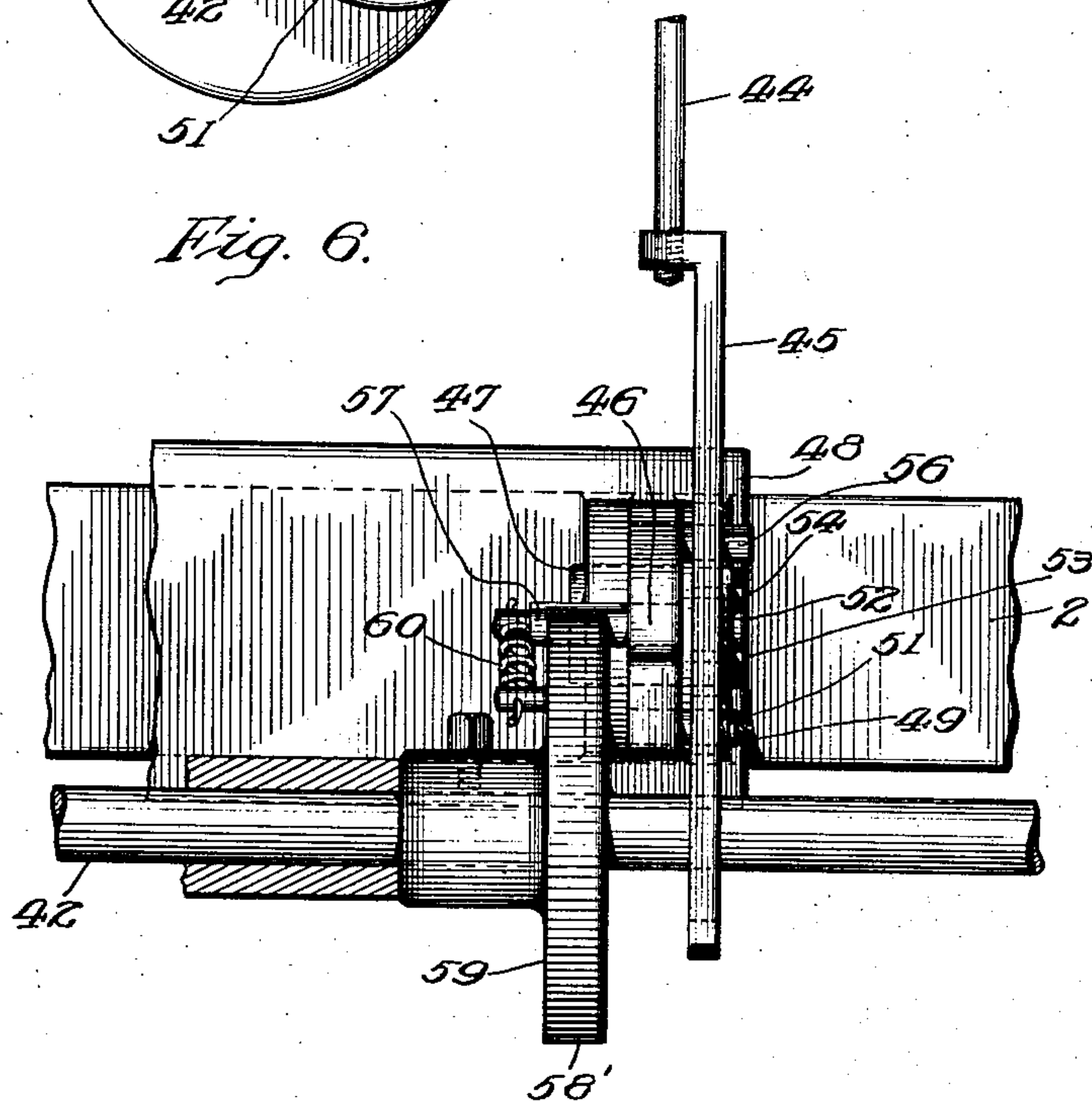
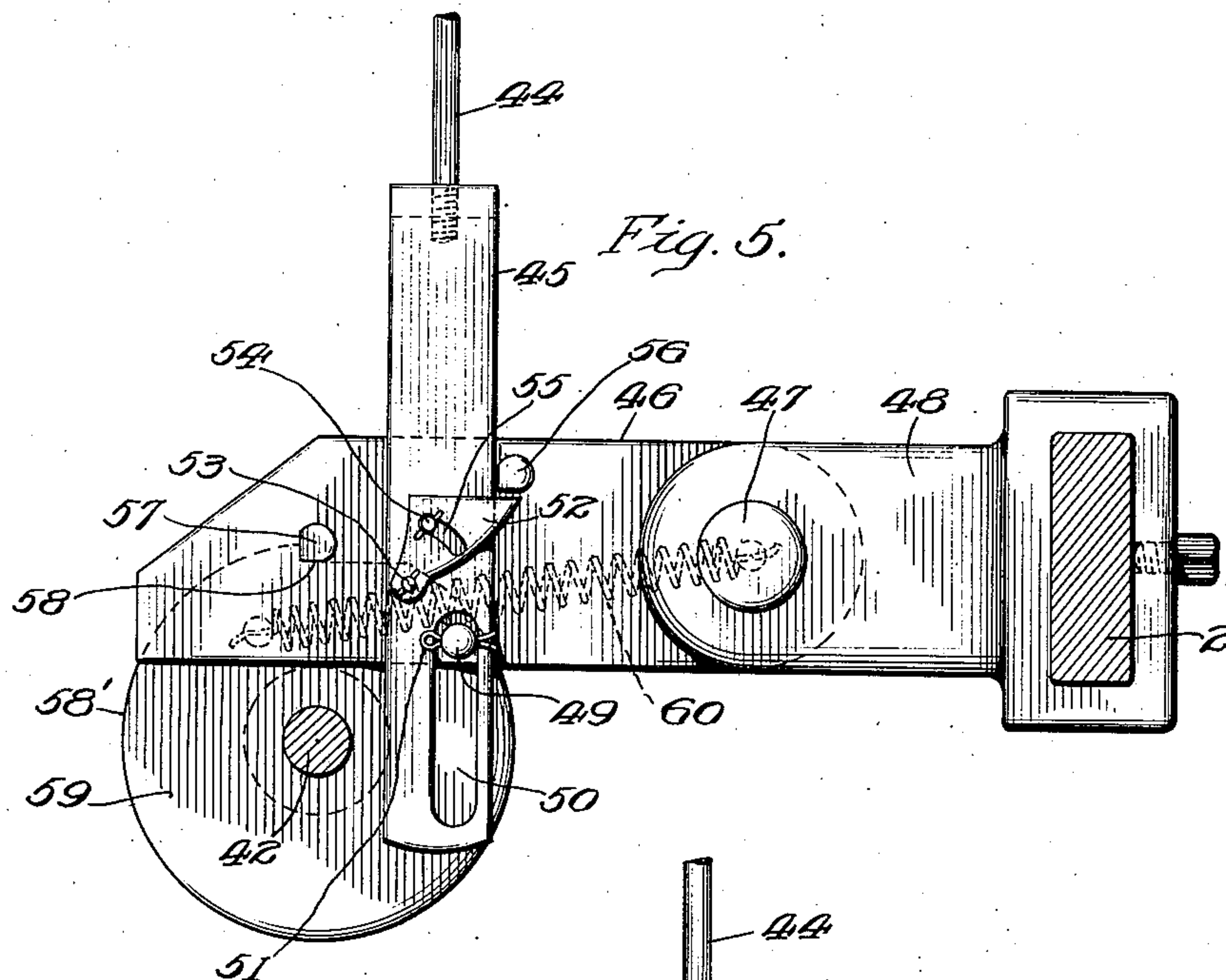
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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

PAUL A. JOHNS, OF PHILADELPHIA, PENNSYLVANIA.

## TUBE-CUTTER.

No. 886,298.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed December 17, 1906. Serial No. 348,338.

*To all whom it may concern:*

Be it known that I, PAUL A. JOHNS, a citizen of the United States, and a resident of the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Tube-Cutters, of which the following is a full, clear, and complete disclosure.

My invention relates to machines for automatically cutting bars, pipes and the like, into lengths and more particularly for cutting tubes.

The object of my invention is to provide a machine, wherein a tube advancing at variable speed, will be cut transversely and into uniform predetermined lengths, the cutter of the machine being automatically operated and so combined with the advancing tube, that both tube and cutter will travel together, thus enabling the tube to be severed into lengths while the same is traveling.

A further object of my invention is to provide mechanism operated by the advancing tube itself, wherein the engagement of the cutter with the tube is automatically timed.

Another object of my invention is to provide mechanism to throw the cutter in and out of engagement with its traveling mechanism, all of which are so combined in such a manner, that they will be set in operation by the advancing tube.

For a full, clear and complete disclosure of my invention, reference may be had to the following description and accompanying drawings, in which like reference characters refer to corresponding parts.

In the drawings, Figure 1 is a perspective of my invention; Fig. 2, an enlarged detail view of the traveling mechanism carrying the cutter shown partly in longitudinal section; Fig. 3 an enlarged detail view of the means for throwing the cutter in and out of its working position, shown partly in transverse section; Fig. 4, a fragmentary elevation of Fig. 3, shown partly in longitudinal section, Fig. 5, an enlarged detail view of the mechanism for throwing the cutter in and out of its working position and Fig. 6, an elevation of Fig. 5.

1 indicates the frame work of the machine upon which is mounted a longitudinal extending bed, composed of substantially rectangular bars 2, 2, upon which the various parts of the machine are mounted.

3 indicates a bracket or lug upon which is pivoted an angle lever 4 having an upwardly

extending arm 5 and a horizontally extending arm 6. To the upper end of the upwardly extending arm 5, is suitably journaled on a stationary shaft 7 a saw 8, rigidly secured to a belt pulley 9. The hub of the pulley 9 is extended on the opposite side of the saw 8 and is provided with a groove 10 adapted to be engaged by a dog 11, carried on a slider 12, loosely mounted on the shaft 7. Thus if the slider 12 be given a longitudinal movement by reason of the engagement of the dog 11 with the groove 10, the pulley 9 will be longitudinally moved along the shaft 7. At the lower end of the slider 12 is a pin 13, to which is pivotally secured a rod 14 extending outwardly in the direction away from the saw.

15 indicates a bracket adjustably mounted on the bed bar 2, the upper end of the bracket being provided with a cross bar 16 extending transversely of the machine and having its opposite ends provided with lugs 17, 17 in which is rotatably journaled a shaft 18.

Rigidly secured to the shaft 18 and extending outwardly therefrom, is a lever 19 carrying at its lower end a lug 19' pivoted to a sleeve 20 sliding along the rod 14 and supporting the same. The rod 14 passes through the sleeve and slides freely therethrough.

21 is a collar which may be rigidly secured on the rod 14 by a set screw 22 and arranged adjacent the end of the sleeve 20 to act as an abutment. Also depending from the rock shaft 18 is a target plate 23, vertically adjustable on a rocker arm 24, which in turn is rigidly secured to the rocker shaft 18.

The horizontally extending arm 6 of the crank lever 4 is connected by a link 25 with a piston 26 rigidly mounted on the frame work of the machine. This piston slides in a cylinder 27 from the lower end of which extends a passage 29 communicating with a valve 30. The valve 30 is a two way valve that is to say, when the valve is turned to the position shown in Fig. 3, it contains a transverse passage 32 and a longitudinal slot 31 and the air from the piston escapes to the atmosphere through the groove 31. When, however, the valve is thrown to the position indicated in dotted lines in Fig. 3, the passage 32 is in alinement with the passage 29 and with the passage 33 which is connected with a suitable crusher chamber and the air from said chamber is conducted directly into the cylinder 27 to force the piston 26 upwardly. Upon the slider 12 is also mounted a transversely extending sleeve 35, in which loosely slides a



rod 36, horizontally pivoted to the upper end of a rod 37 mounted in a bracket 38 on one of the bars 2 of the machine, the lower end of the rod 37 is provided with an additional lever 39 connected by a chain 40 with a lever 41, rigidly secured to the shaft 42 which is connected to the valve stem 32 in any suitable manner so that the rock of the shaft 42 rocks the valve stem 32 into one or the other of the two positions shown in Fig. 32. Also secured to the rock shaft 18 is a horizontally extending lever 43 connected by a link 44 to a slide 45 held against a lever 46, pivoted at 47 to a bracket 48 secured to the bed 2 of the machine. The slide 45 is held in position adjacent the pivoted lever 46 by a pin 49 extending through a slot 50 in the slide. The pin 49 being provided with a cotter pin 51 or any other suitable means whereby the slide 45 is prevented from moving away from the pivoted lever 46. The slide 45 is also provided with a dog 52, pivoted at 53 and prevented from swinging more than a predetermined distance by means of a pin 54 passing through a slot 55 therein. This dog 52 is adapted to fall below a pin 56 of the lever 44 when the slide is in its lowermost position. To the outer end of the lever 46 is another pin 57 adapted to engage within a notch 58 in a cam 59 rigidly secured to the shaft 42. Thus an upward movement of the rod 44 will carry with it, the slider 45 and the upper side of the dog 52 will engage the pin 56 on the lever 46, until the said lever has been raised sufficiently to lift the pin 57 out of the notch 58 in the cam 59 and the lever 46 will continue its upward movement until the pin 56 clears the top edge of the dog 52, by virtue of traveling on an arc of which the pivot 47 is a center. The disengagement of the pin 57 from the notch 58 will cause the said pin to travel a short distance on the surface 58' of the cam 59, which latter has been drawn inwardly by the tension of the spring 60. A center rest is mounted upon the under side of the bed for guiding the tube from the pipe molding machine. This rest consists of the circle 61, from which extend inwardly the adjustable radial bars 62, the inner ends of said bars being curved to conform to the exterior surface of the pipe or tube.

Having now described the essential parts of my machine I will proceed to explain the operation thereof. The parts being shown in the position in Fig. 1 and the tube moving in the direction of the arrow at a variable speed dependent upon the pipe forming machine, the engagement of the tube with the target plate 23 will rock the shaft 18 and with it the arm 19, in the direction of the arrow. This movement brings the sleeve 20 against the fixed collar 21 and consequently will move the rod 14, which is parallel to the tube, forwardly and at the same rate of speed as the speed of the feed of the tube. When,

however, the target plate 23 has swung sufficiently to cause the arm 43 to lift the slide 45 and with it the pivoted lever 46 so that the pin 57 is withdrawn from its engagement with the notch 58 in the cam 59, the shaft 42 will be revolved by a spring 60 or any other suitable means so as to bring the passage 32 of the valve 30 into an alinement with the passage 29 and with the passage 33 and compressed air being admitted by the movement of this valve, the piston 26 is forced upwardly, turning the bell crank lever 4 on its axis sufficiently to throw the saw 8 into cutting engagement with the tube. The target will continue to be pushed by the advancing tube and the saw consequently drawn along at the same speed as the tube for a time sufficient for the saw to cut a groove substantially through the tube, after which, the tube itself will push the saw forward on the shaft 7 until the tube length has been entirely severed, it being understood, of course, that the tube is given at all times a rotary as well as a longitudinal movement. This forward movement of the rod 14 is communicated through the pin 13 with the slider 12 and by the engagement of the dog 11 with the hub of the pulley 9, the pulley and saw 8 will be given a motion in the direction of the tube at just the same rate of speed as the tube moves. This longitudinal movement of the slider 12 turns the shaft 37 in its bearing 38 through the arm 36 and this turning of the shaft 37 causes the arm 39 to draw taut the chain 40. The mechanism is so timed that when the chain 40 becomes taut, the tube has become severed and any further movement of the saw, caused by the advancing tube in the rear thereof, will cause the shaft 37 to rotate the shaft 42 until the compressed air or other fluid has been cut off from the cylinder 27 and the slide 31 is brought into alinement with the passage 29. At the same time that the tube is severed, the target plate 23 swings back to its vertical position, thus causing the lowering of the slide 45 until the pin 57 of the lever 46 comes into the path of the notch 58 and is engaged thereby since the cam 59 has been revolved, outwardly by the turning of the shaft 42 after the chain 40 has become slack by virtue of the return movement of the slider 12, when the target plate 23 swings back to its original position.

From the above described construction, it will appear that the tube is being severed without retarding its advancing movement and that the parts are brought back to their original position by the weight of the target plate 23 swinging downwardly to its vertical position. The saw which may be replaced by any other form of cutter, has two movements, the one caused by the admission of compressed air, steam or other fluid into the pipe 33, which throws the cutter into and



out of its engagement with the tube, and the other, which is caused by the swinging upwardly of the plate 23, which causes the same to travel in the same direction with the tube.

- 5 The mechanism is so adjusted as to be relatively timed to perform the function described and both are combined to operate together by being connected through the crank shaft 18. Of course, it is obvious that  
10 other forms of targets may be utilized besides the plate 23, and further the specific construction of the center rest and bed is not essential to the operation of my device.

Having now described my invention, what  
15 I desire to protect and secure by Letters Patent of the United States is:—

1. In a tube cutting machine, the combination with a cutter, of means for causing said cutter to travel longitudinally with the  
20 tube, comprising a rock shaft, having a target plate swinging therefrom within the path of the advancing tube.

2. In a tube cutting machine, the combination with a cutter, of means for causing said  
25 cutter to travel longitudinally with the tube, comprising a rock shaft, having a target plate swinging therefrom within the path of the advancing tube and a draw rod operated by said rock shaft.

3. In a tube cutting machine, the combination with a cutter, of means for causing said  
30 cutter to travel longitudinally with the tube, comprising a rock shaft, having a target plate swinging therefrom, a draw rod and  
35 a crank arm, connecting said rock shaft with said draw rod.

4. In a tube cutting machine, the combination with a cutter, of a swinging target  
40 within the path of the tube and mechanism, operated by the movement of said target, for causing said cutter to travel longitudinally with the tube during its cutting operation, the said means comprising an adjustable  
45 crank.

5. In a tube cutting machine, the combination with a cutter, of a swinging target  
50 within the path of the tube and mechanism, operated by the movement of said target, for causing said cutter to travel longitudinally with the tube during its operation, the said means comprising a crank and draw rod.

6. In a tube cutting machine, the combination with a cutter, of a swinging target  
55 within the path of the tube and mechanism, operated by the movement of said target, for causing said cutter to travel longitudinally with the tube during its operation, the said means comprising an adjustable crank and  
60 draw rod.

7. In a tube cutting machine, the combination with a cutter and means for causing  
65 said cutter to travel longitudinally with the tube, comprising a rock shaft, having a target swinging therefrom, in the path of the advancing tube and fluid pressure means for

throwing said cutter into and out of engagement with said tube, comprising a piston and a two-way valve, an oscillatory valve rod, a notched cam rigidly connected therewith, a spring connected to said cam and a swinging  
70 ratchet lever connected to the said rock shaft to operate on the notched portion of said cam.

8. In a tube cutting machine, the combination with a cutter, movable toward and  
75 away from the tube and longitudinally therewith, of means for giving the cutter a longitudinal movement by the tube before said cutter has engaged said tube, and means for moving said cutter toward said tube at the  
80 same time that it is being carried forward longitudinally by the tube and before it has engaged said tube.

9. In a tube cutting machine, a saw fixed  
85 to a rotatably mounted, slidable hub, movable toward and away from the tube and longitudinally therewith, a rock shaft having a target swinging therefrom in the path of the tube, a crank connected to said rock  
90 shaft, a rod connected to said crank, a dog actuated by said rod and slidably engaging in an annular groove in said hub for causing the saw to travel in the same direction as the tube before and after the saw has engaged  
95 said tube.

10. In a tube cutting machine, a saw fixed  
100 to a rotatably mounted, slidable hub, movable toward and away from the tube and longitudinally therewith, a rock shaft having a target swinging therefrom in the path of the tube, a crank connected to said rock  
105 shaft, a rod connected to said crank, a dog actuated by said rod and slidably engaging in an annular groove in said hub for causing the saw to travel in the same direction as the tube before and after the saw has engaged  
110 said tube, and means actuated by said target for throwing the said saw into and out of engagement with the tube.

11. In a tube cutting machine, the combination with a rotatable saw, movable  
115 toward and away from the tube, of fluid pressure means for throwing said saw into and out of engagement with said tube, comprising a piston and a two-way valve, an oscillatory valve rod and notched cam rigidly connected therewith, a spring connected at one end to said cam and at its other end to a fixed point, and a swinging ratchet lever to  
120 operate on the notched portion of the said cam.

12. In a tube cutting machine, the combination with a saw fixed to a rotatable and  
125 slidable hub, movable toward and away from the tube and longitudinal therewith, of a rock shaft having a target swinging therefrom in the path of the tube, a crank connected to said rock shaft, a rod connected to said crank, a dog actuated by said rod and slidably engaging in an annular groove in  
130



said hub for longitudinally moving the same, fluid pressure means for throwing said saw into and out of engagement with said tube, comprising a piston and a two-way valve, an oscillatory valve rod, a notched cam connected rigidly therewith, a spring connected to said cam, and a swinging ratchet lever connected to the said rock shaft to operate on the notched portion of the same cam.

13. In a tube cutting machine, the combination with a saw carried by a rotatably and slidably mounted hub, movable toward and away from the tube and longitudinally therewith, of a target mounted to swing in the longitudinal path of the tube, means actuated by said target for moving said saw longitudinally with said tube, fluid pressure means actuated by said target for throwing said saw into engagement with said tube, comprising a piston, a valve and an oscillatory valve rod, and means between said hub and said valve rod to reverse said valve rod to retract said saw from engagement with the tube.

14. In a tube cutting machine, the combination with a saw carried by a rotatably and slidably mounted hub, movable toward and away from the tube and longitudinal therewith, of a target mounted to swing in the longitudinal path of the tube, means actuated by said target for moving said saw longitudinally with said tube, means actuated by said target for throwing said saw into engagement with said tube, comprising an oscillatory rod, and means between said hub and said oscillatory rod to reverse said rod to retract said saw from engagement with the tube, said means for reversing said rod comprising a lever rigidly connected to said rod, a rock shaft, an arm rigidly mounted upon said rock shaft, a flexible connection between said lever and said arm, a second arm connected to said rock shaft and a sleeve slidably mounted upon said second arm and pivotally connected to said hub whereby when said hub is moved longitudinally said rock shaft is rotated to reverse said oscillatory rod when said flexible connection has been drawn taut.

15. In a tube cutting machine, the combination with a cutter, of a swinging target plate depending in the path of the tube, a rock shaft supporting said target plate, a crank arm carried by said rock shaft, means actuated by said crank arm for giving said saw a longitudinal motion, a second crank arm secured to said rock shaft, and means actuated by said second crank arm to move said cutter into engagement with the tube.

16. In a tube cutting machine, the combination with a cutter, of a swinging target plate depending in the path of the tube, a rock shaft supporting said target plate, a crank arm carried by said rock shaft, means

actuated by said crank arm for giving said saw a longitudinal motion, a second crank arm secured to said rock shaft, means actuated by said second crank arm to move said cutter into engagement with the tube, and means actuated by the longitudinal movement of the tube for retracting said saw from engagement therewith.

17. In a tube cutting machine, the combination with a bed, of a rotatable saw mounted upon said bed, a bracket adjustable longitudinally upon said bed, a rock shaft journaled in said bracket, a target swinging from said rock shaft into the path of the tube, a crank arm connected to said crank arm to give longitudinal motion to said saw, a valve rod adjustably supported by said bracket, means between said rock shaft and said valve rod for actuating said valve rod to throw the saw into engagement with the tube, and fluid pressure means controlled by said valve rod to throw said saw into engagement with the tube.

18. In a tube cutting machine, the combination with a bed of a rotatable saw mounted upon said bed, a bracket adjustable longitudinally upon said bed, a rock shaft journaled in said bracket, a target swinging from said rock shaft into the path of the tube, a crank arm connected to said crank arm to give longitudinal motion to said saw, a valve rod adjustably supported by said bracket, means between said rock shaft and said valve rod for actuating said valve rod to throw the saw into engagement with the tube, fluid pressure means controlled by said valve rod to throw said saw into engagement with the tube, and means actuated by the longitudinal motion of the saw to actuate said valve rod to retract said saw from engagement with the tube.

19. In a tube cutting machine, the combination with a rotating saw movable toward and away from the tube and longitudinally therewith, of a rotatable valve stem, fluid pressure means controlled by said valve stem for throwing said saw into and out of engagement with said tube, a draw rod for moving said saw longitudinally, and means actuated by the forward movement of the tube to automatically operate said valve rod and said draw rod.

20. In a tube cutting machine, the combination with a rotating saw movable toward and away from the tube and longitudinally therewith, of a rotatable valve stem, fluid pressure means controlled by said valve stem for throwing said saw into and out of engagement with said tube, a draw rod for moving said saw longitudinally, and a target depending in the path of the tube and actuated by the tube.

21. In a tube cutting machine, the combination with a bed, a lever pivotally mounted thereon, a shaft rigidly secured to one end



of said lever, a saw rotatably mounted upon said shaft and longitudinally slidable thereon, a cylinder rigidly secured to said bed, a piston in said cylinder, fluid pressure means for actuating said piston, a link between said piston and said lever for moving said saw into and out of engagement with the tube, and means actuated by the forward movement of the tube to automatically control said fluid pressure means to move said saw into and out of engagement with said tube and longitudinally therewith.

22. In a tube cutting machine, the combination with a cutter movable toward and away from the tube, of fluid pressure means for throwing said cutter into and out of engagement with said tube comprising a piston, a valve, an oscillatory valve rod, a cam rigidly connected thereto, and a swinging ratchet lever to operate on the said cam.

23. In a tube cutting machine, the combination with a cutter movable toward and away from the tube, of means for throwing said cutter into and out of engagement with said tube comprising an oscillatory rod and notched cam rigidly connected to said rod, a spring connected at one end to said cam and at its other end to a fixed point, and a swinging ratchet lever to operate on the notched portion of the said cam.

24. In a tube cutting machine, the combination with a cutter movable toward and away from the tube, of means for throwing said saw into and out of engagement comprising an oscillatory rod and notched cam rigidly connected to said rod, a spring connected at one end to said cam and at its other end to a fixed point, a ratchet rigid with said lever, and means actuated by the forward movement of the tube to oscillate said lever to operate on the notched portion of the said cam.

25. In a tube cutting machine, the combination with a cutter movable toward and away from the tube, of means for throwing said saw into and out of engagement comprising an oscillatory rod and notched cam rigidly connected to said rod, a spring connected at one end to said cam and at its other end to a fixed point, a ratchet rigid

with said lever, a slide having a slot and pin carried by said lever and engaging in said slot, and means to actuate said slide to cause said ratchet to operate on the notched portion of the said cam.

26. In a tube cutting machine, the combination with a cutter movable toward and away from the tube, of means for throwing said cutter into and out of engagement with the tube comprising an oscillatory rod, a notched cam rigidly connected to said rod, a spring connected at one end to the said cam and at its other end to a fixed point, a swinging ratchet lever to operate on the notched portion of the said cam, a bar slidably mounted upon said lever, a pivoted dog having a limited movement carried by said bar, a projection on said lever engaging said dog, and means to slide said bar to cause the swinging ratchet lever to operate on the notched portion of the said cam.

27. In a tube cutting machine, the combination with a saw carried by a rotatably and slidably mounted hub movable toward and away from the tube and longitudinally therewith, of an oscillatory rod to move said saw into and out of engagement with the tube, means to oscillate said rod in one direction to move said saw into engagement with said tube, means to move said rod in the opposite direction to retract said saw from engagement with the tube, said means for reversing said rod comprising a lever rigidly connected to said rod, a rock shaft an arm rigidly mounted upon said rock shaft, a flexible connection between said lever and said arm, a second arm connected to said rock shaft, and a slidable connection between said second arm and said hub whereby when said hub is moved longitudinally said rock shaft will be rotated to reverse said oscillatory rod.

In witness whereof, I have hereunto set my hand this 14th day of December, A. D., 1906.

PAUL A. JOHNS.

Witnesses:

WALTER A. HOLDEN,  
ALEXANDER PARK.