

No. 711,094.

Patented Oct. 14, 1902.

J. BRADY.
ENGRAVING MACHINE.

(Application filed May 20, 1902.)

(No Model.)

6 Sheets—Sheet 1.

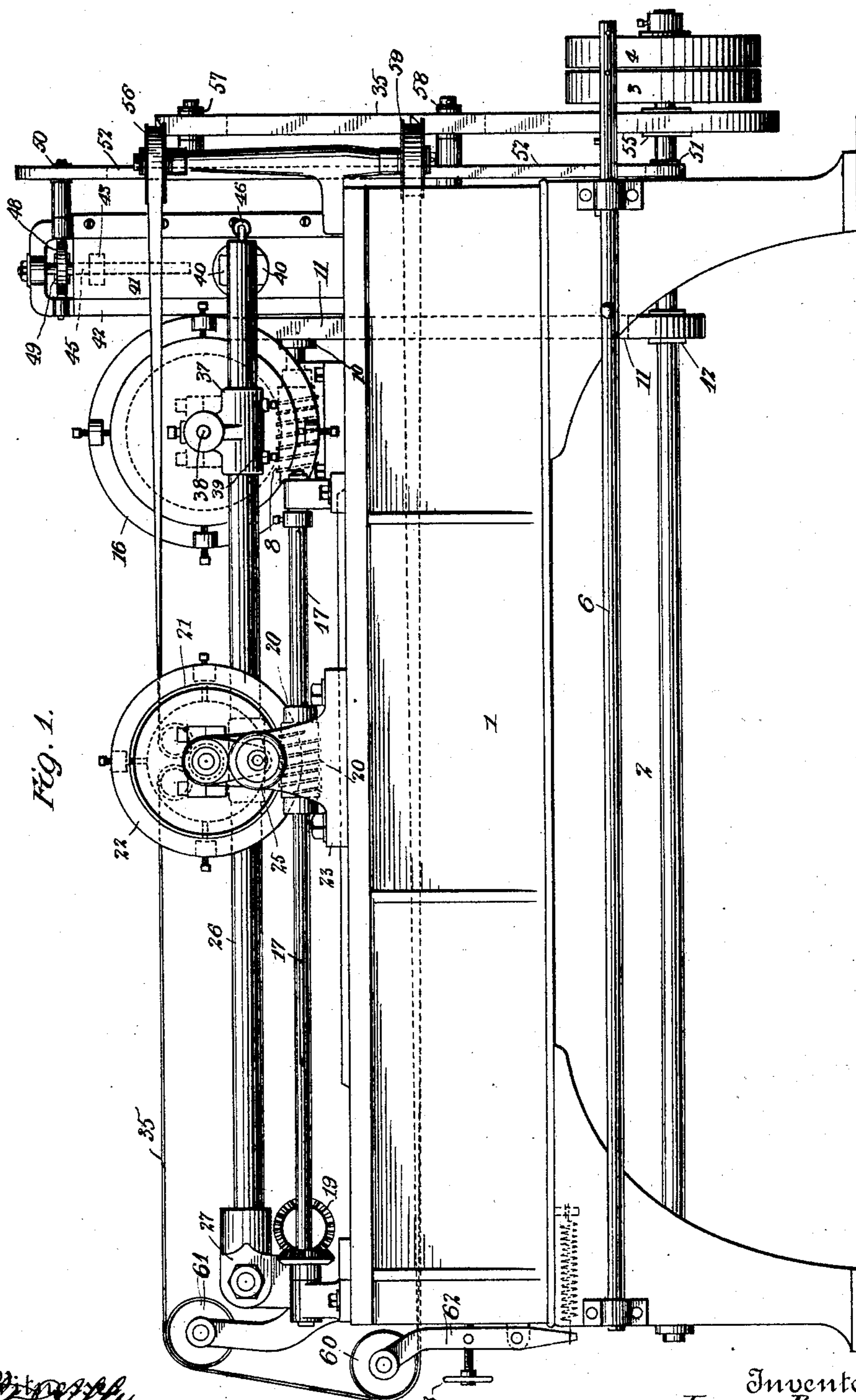


Fig. 1.

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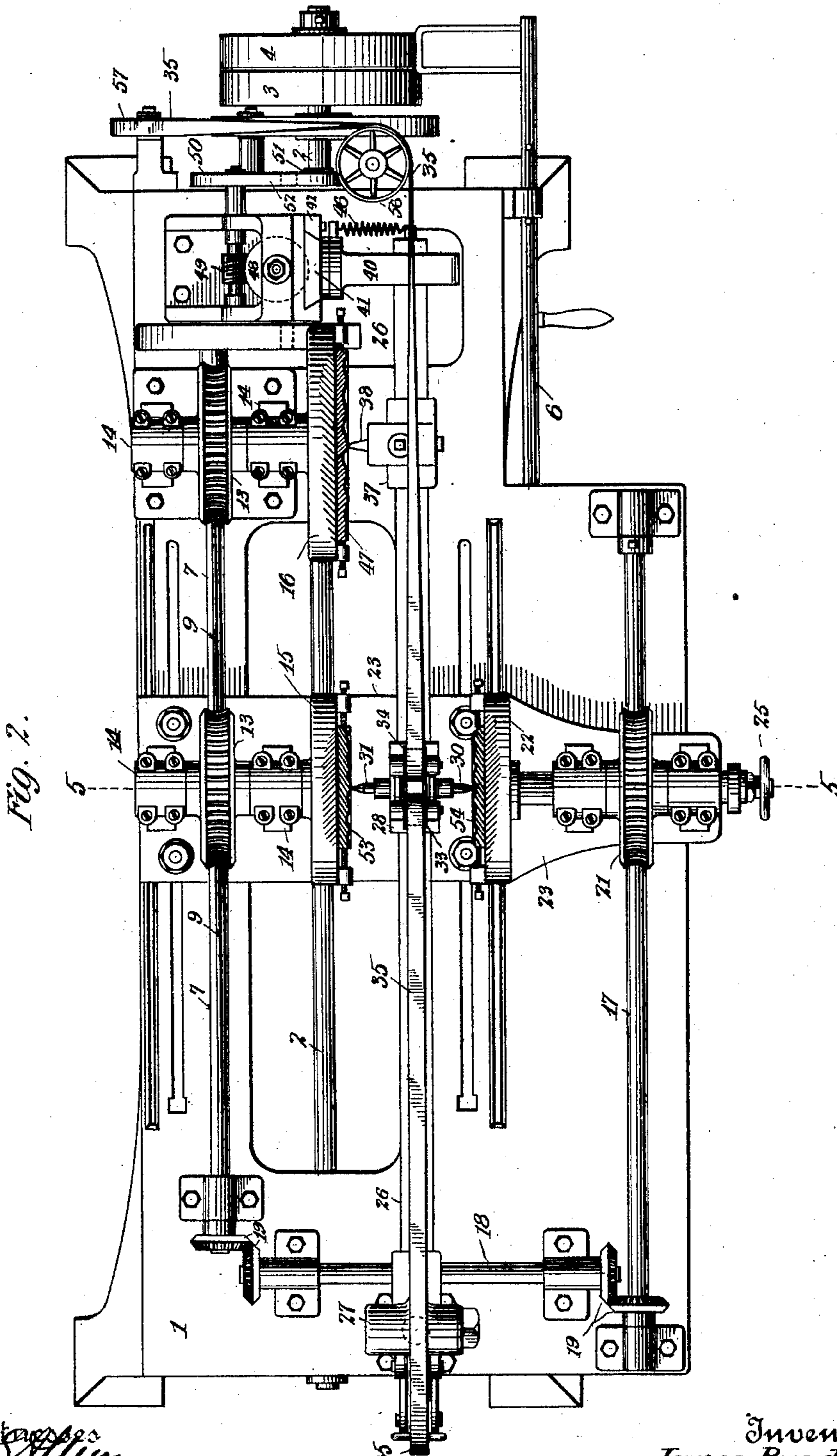
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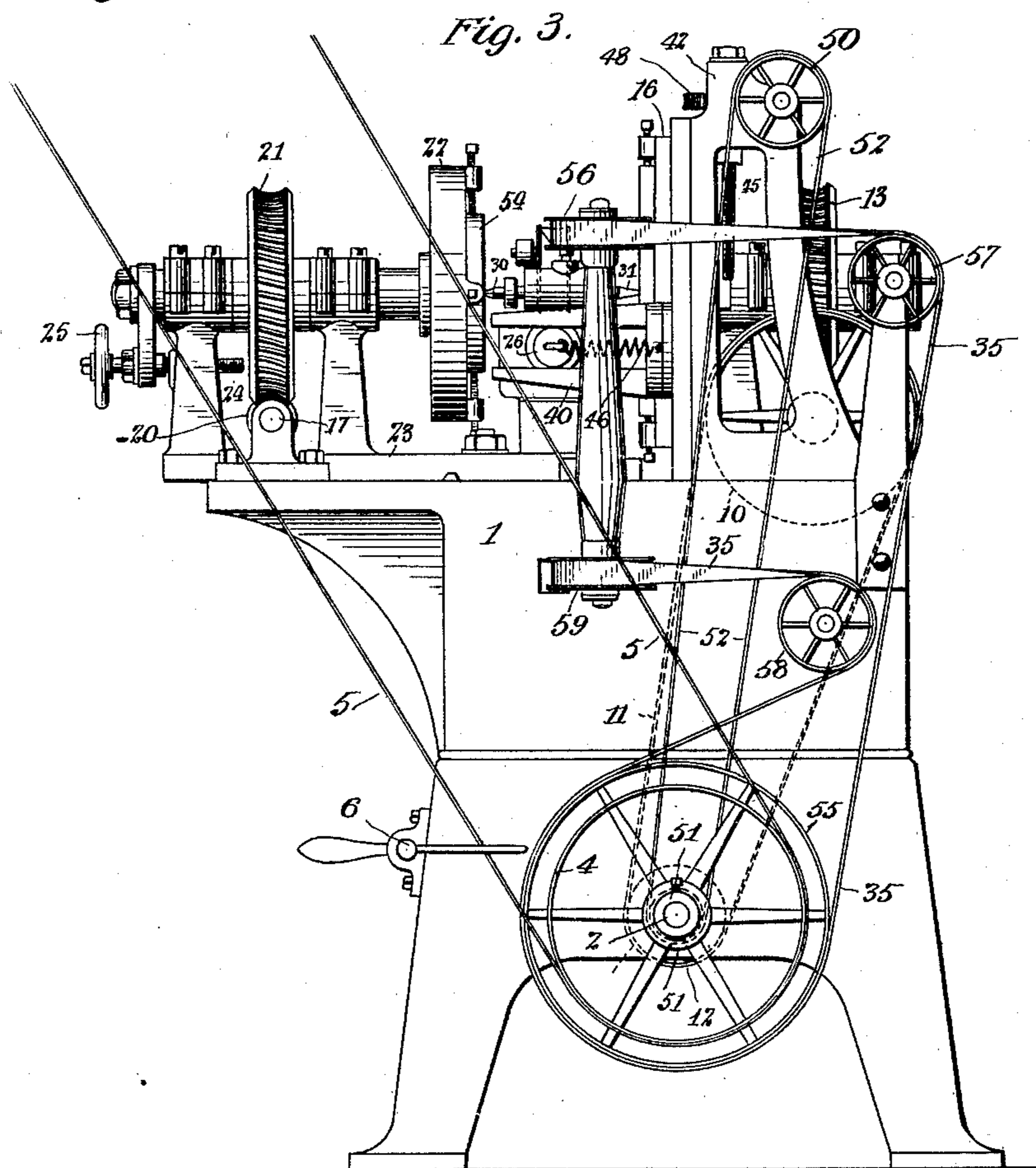
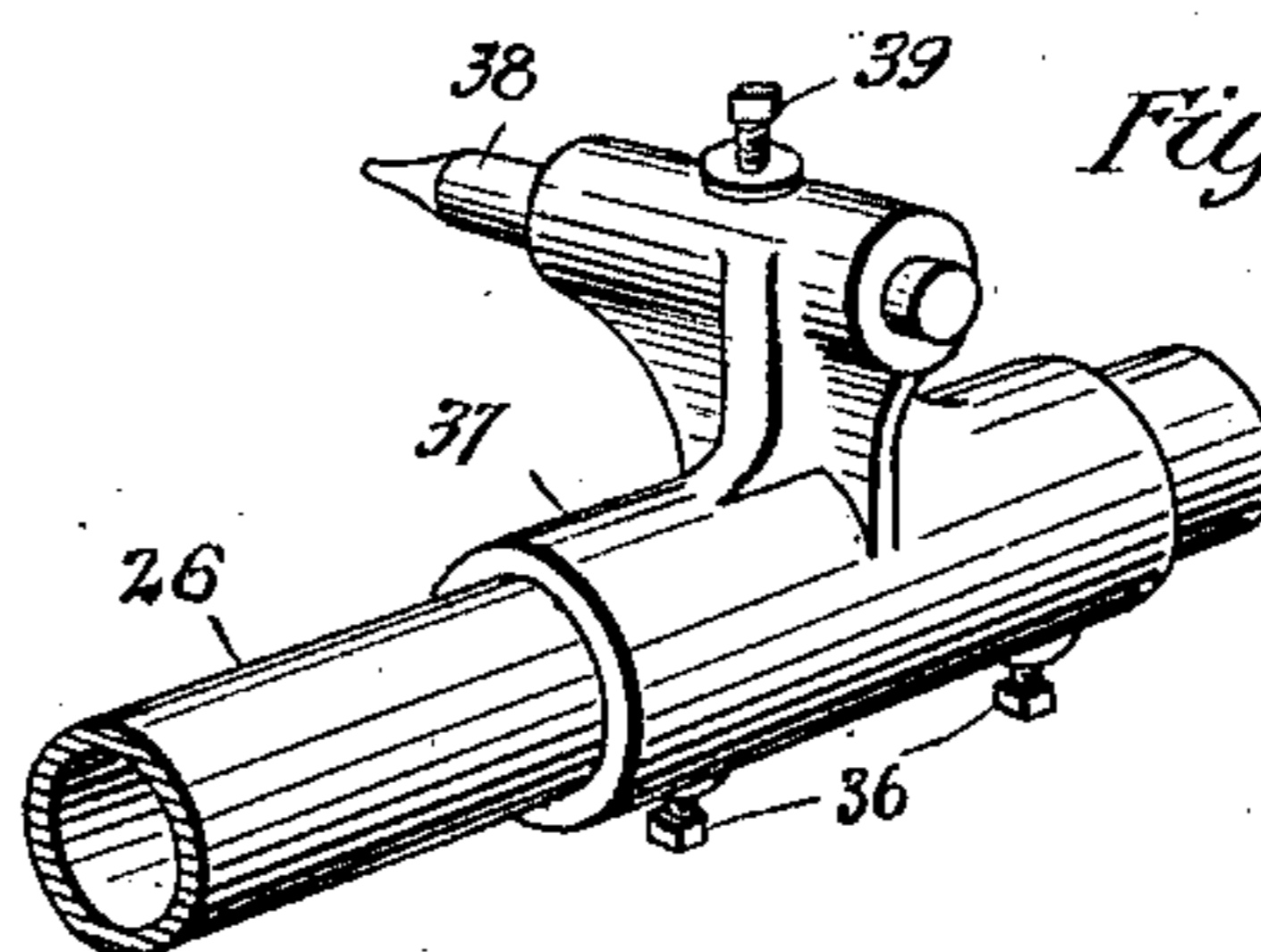
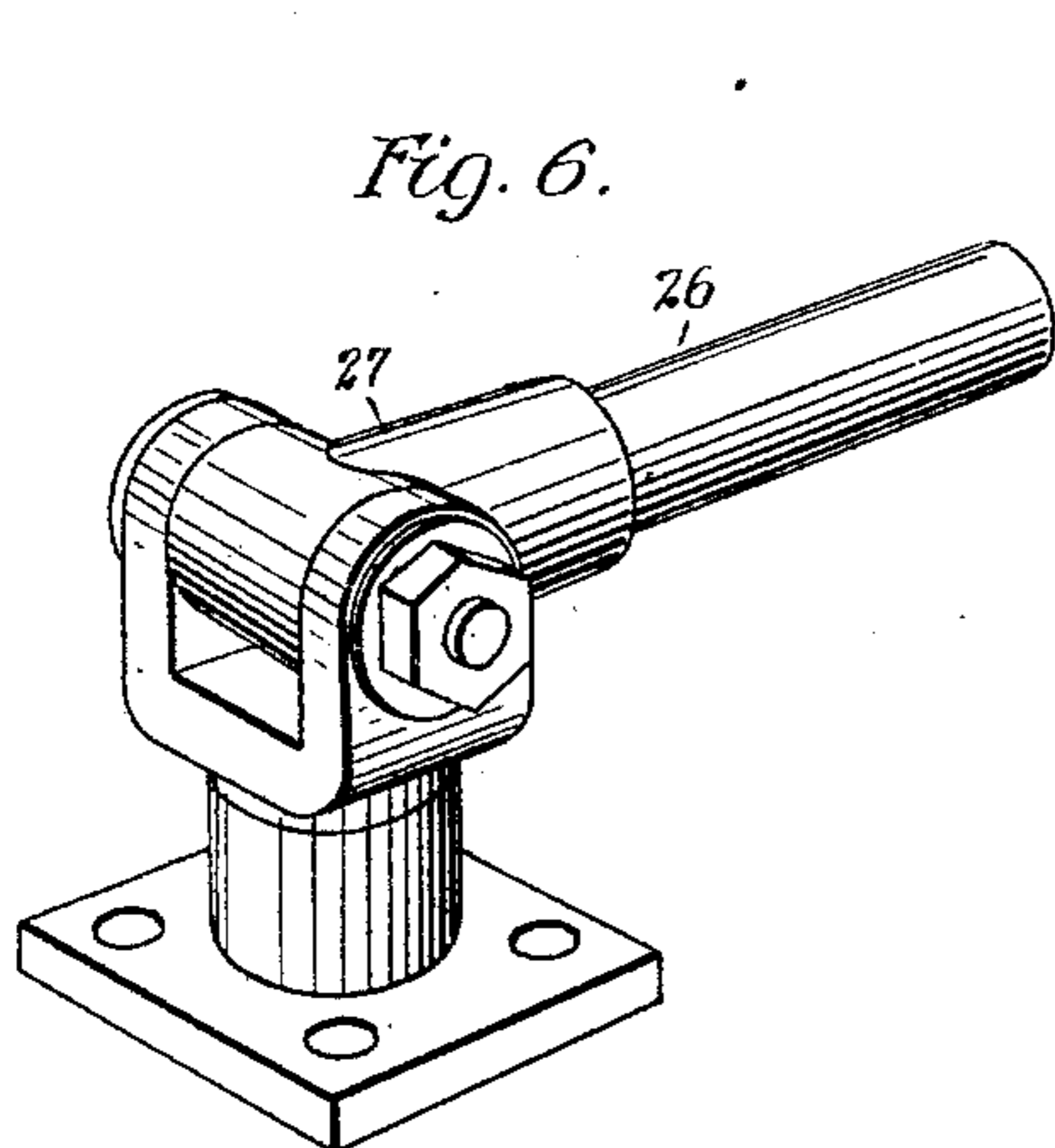
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Fig. 8.

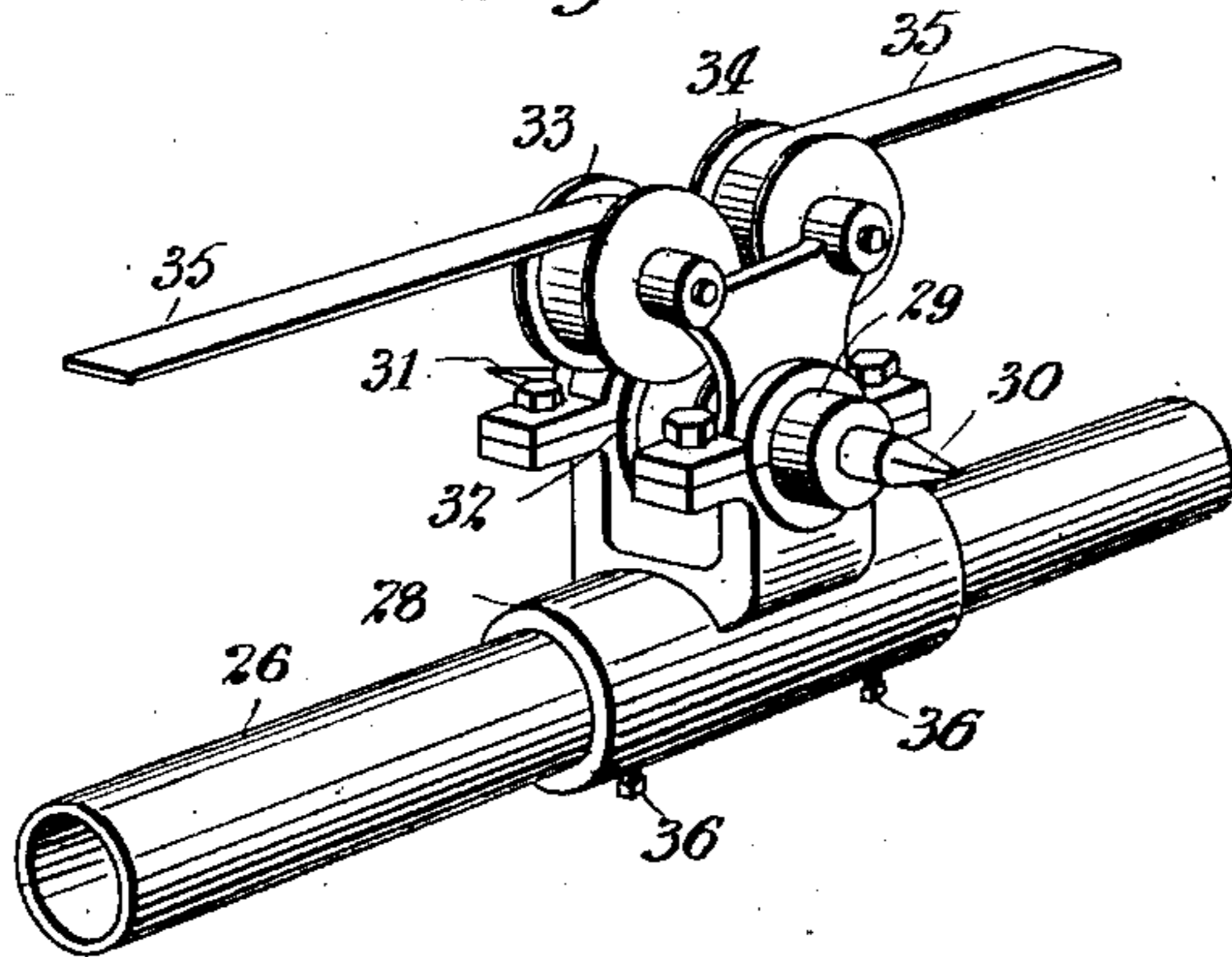
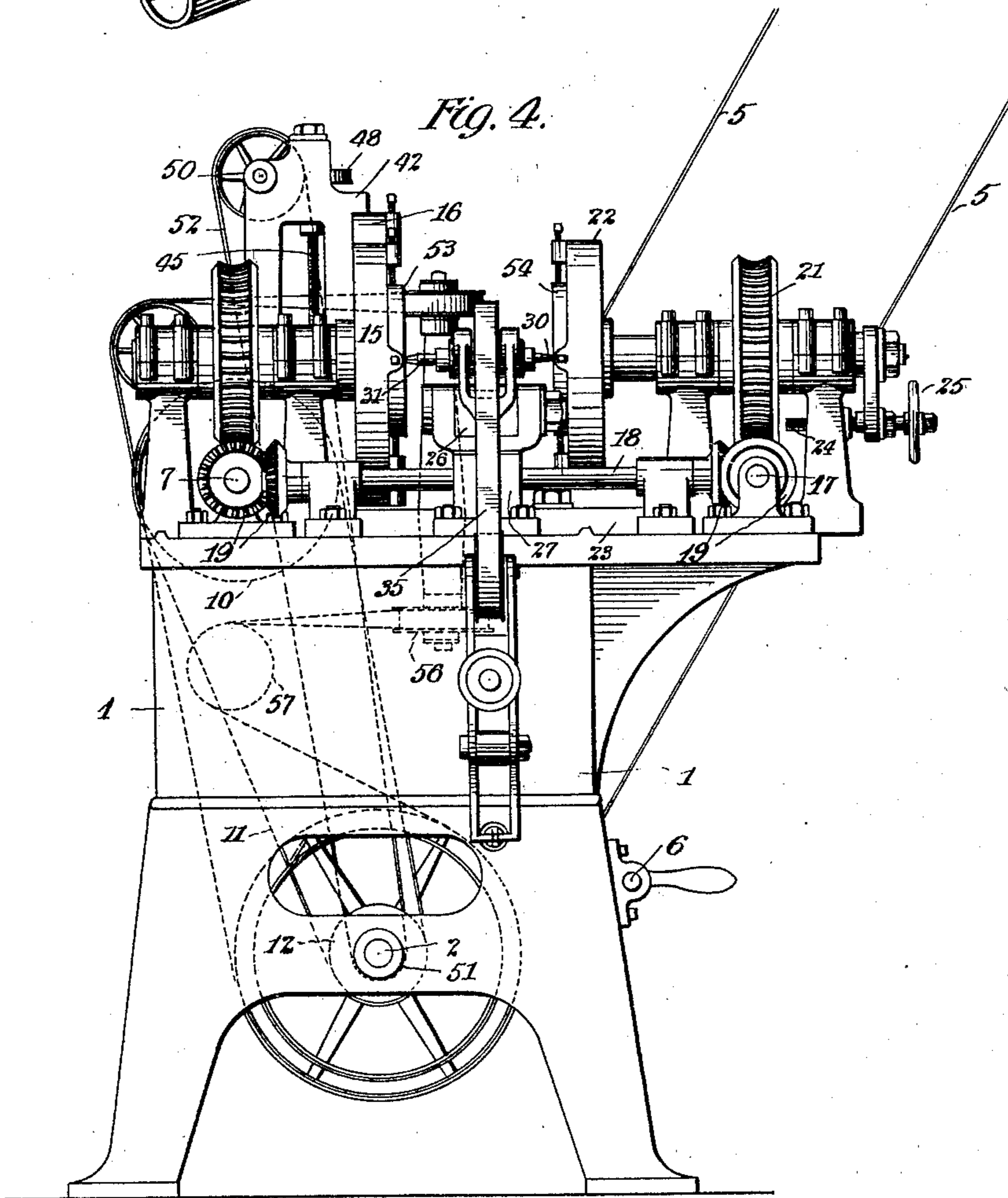


Fig. 4.



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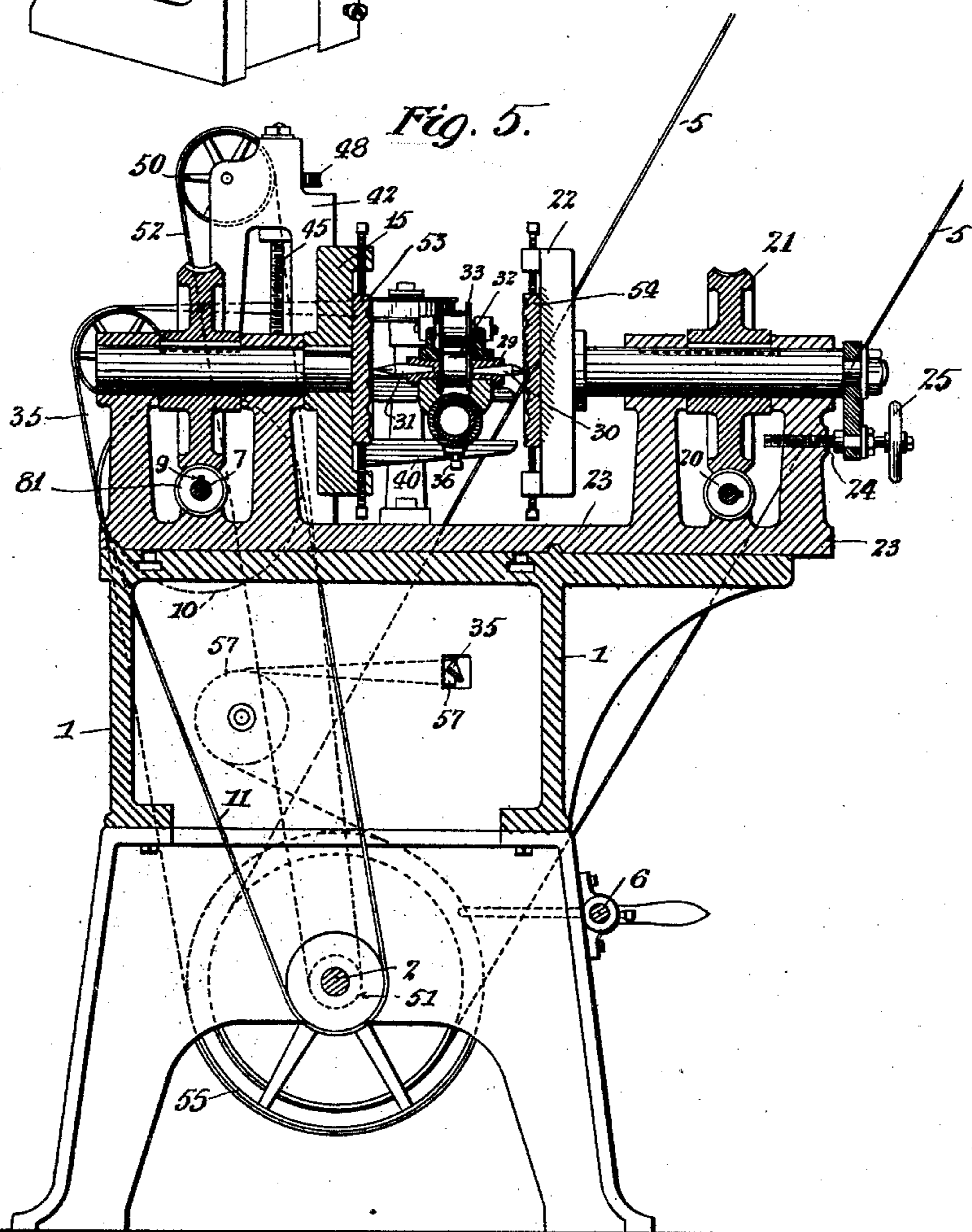
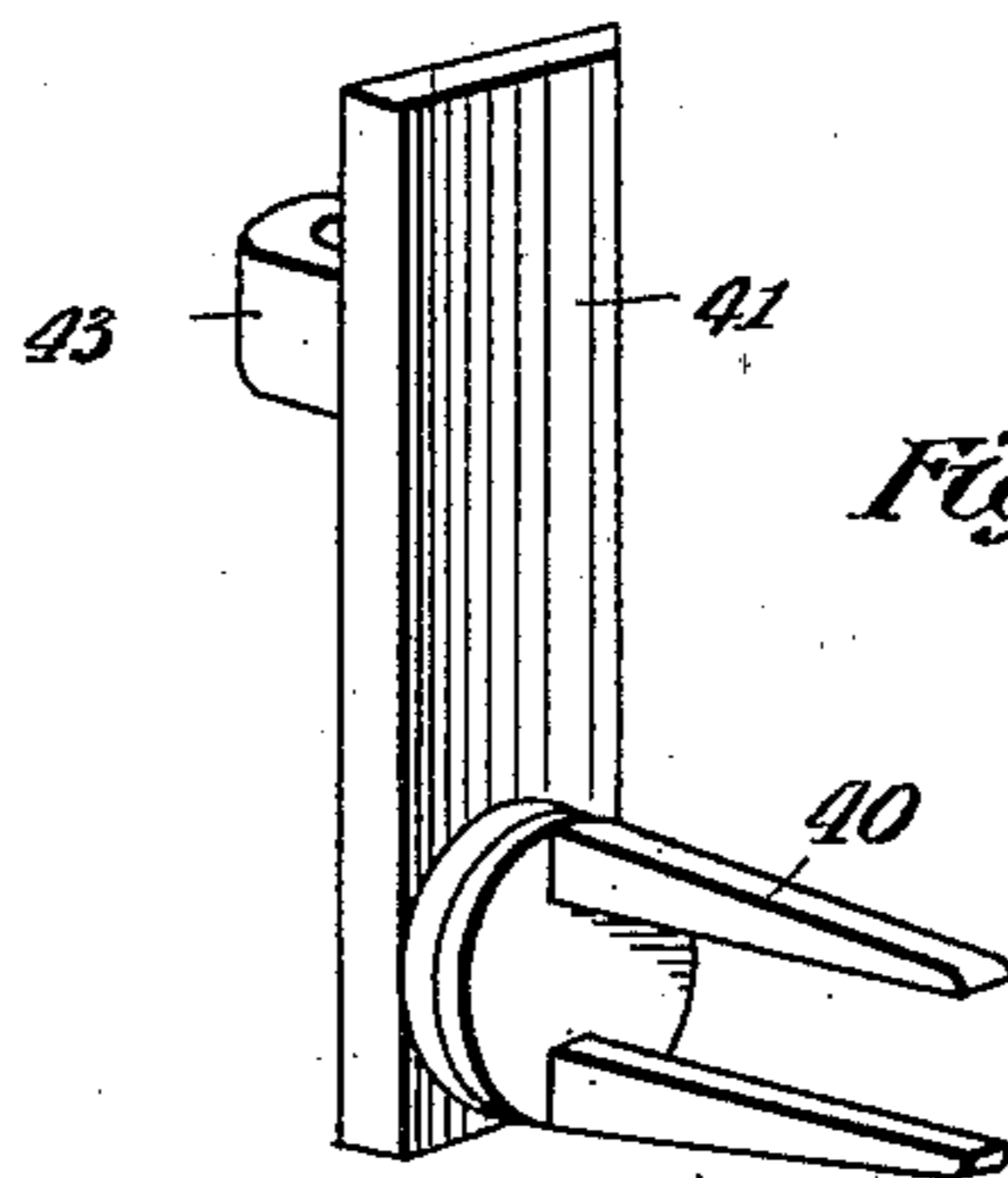
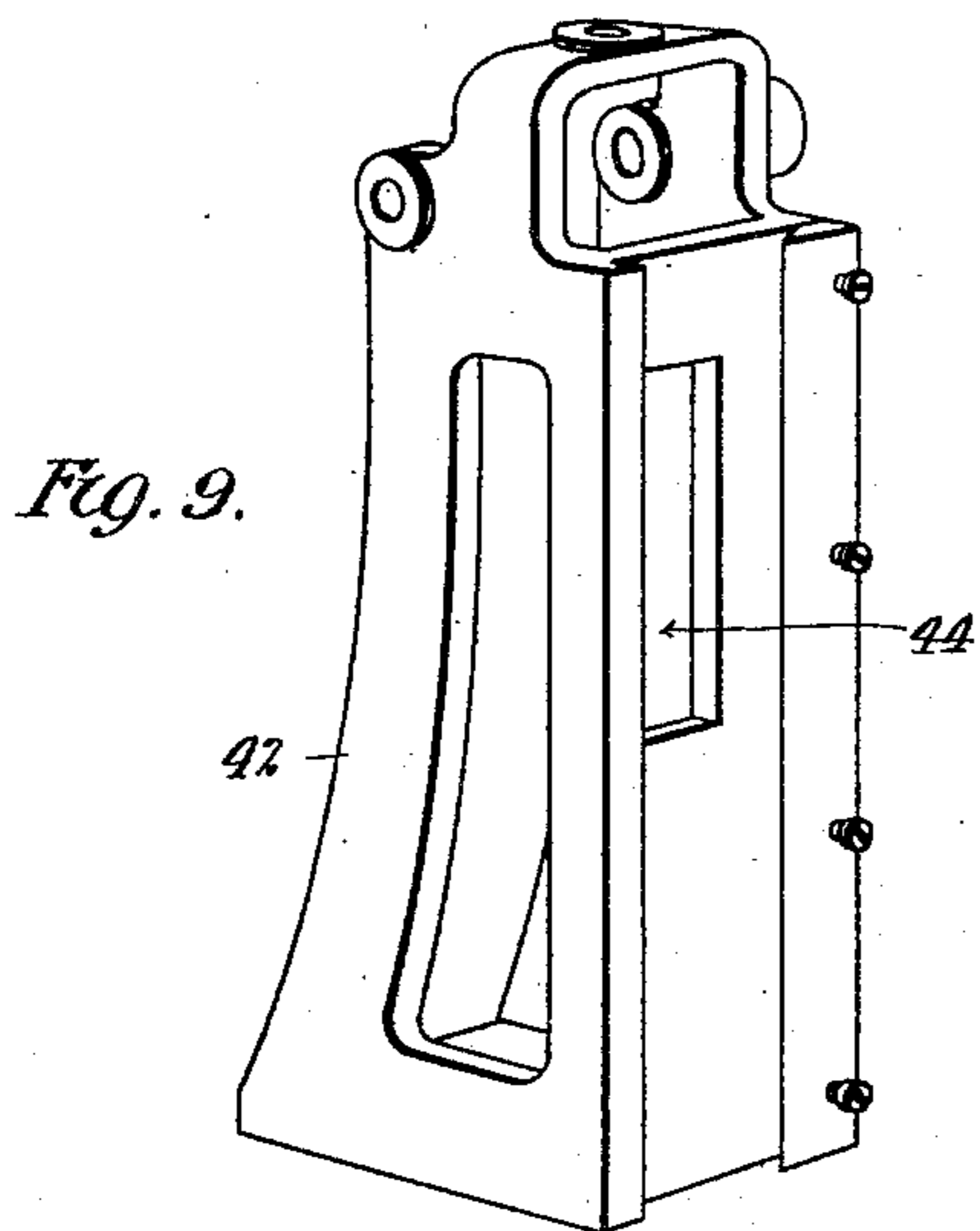
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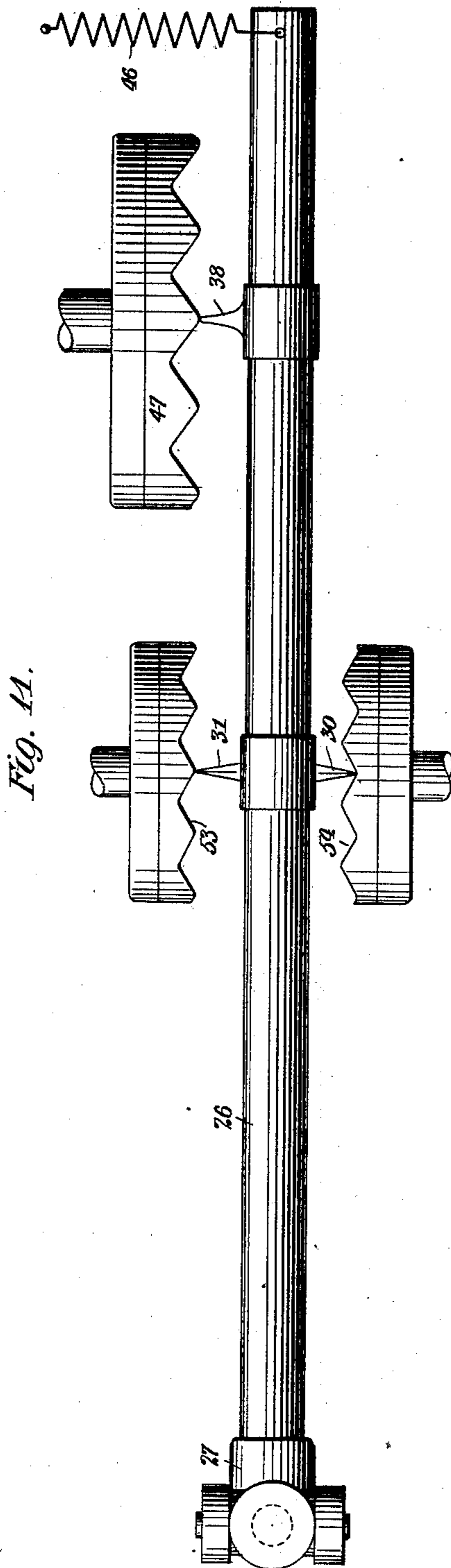
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6 Sheets—Sheet 6.



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ENGRAVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 711,094, dated October 14, 1902.

Application filed May 20, 1902. Serial No. 108,178. (No model.)

To all whom it may concern:

Be it known that I, JAMES BRADY, a citizen of the United States, residing at Brooklyn, Kings county, New York, have invented certain new and useful Improvements in Engraving-Machines, of which the following is a full, clear, and exact description.

My invention relates to engraving-machines, the object being to provide improved mechanism for engraving or sinking dies and forming forces to be used therewith, the leading feature of the invention being to provide mechanism whereby a force and a die may be simultaneously produced.

In the machine two cutting-tools are employed and both are caused to move simultaneously and in an opposite relation to each other, so as to work out a cameo on one side and an intaglio on the other side. The design is determined by a pattern which is moved in front of a tool which I shall term a "stylus." The stylus may be mounted in such a manner relatively to both cutting-tools as to impart thereto similar movement in a greater or lesser degree.

To facilitate an understanding of the preferred form of my invention, reference is made to the accompanying drawings, in which—

Figure 1 is a side elevation of an engraving-machine embodying my invention. Fig. 2 is a plan view thereof. Fig. 3 is a view of the right-hand end of the machine shown in Figs. 1 and 2. Fig. 4 is a view of the left-hand end of the machine shown in Figs. 1 and 2. Fig. 5 is a vertical section on the plane of the line 5 5, Fig. 2. Fig. 6 is a perspective view of the end of the cutter-supporting boom, showing a universally-jointed support. Fig. 7 is a perspective view of another part of the boom, showing a connection for the stylus. Fig. 8 is another part of said boom, showing a mounting for the cutting-tools and manner of driving them. Fig. 9 is a perspective view of a portion of the frame. Fig. 10 is a perspective view of a detail coacting with the part shown in Fig. 9. Fig. 11 is a diagrammatic view graphically illustrating the main principle of my invention.

1 is the main frame.

2 is a driving-shaft suitably mounted in the frame.

3 is a pulley fixed on the shaft 2.

4 is a pulley loose on shaft 2.

5 is a driving-belt leading from a suitable source of power (not shown) to either of the pulleys 3 or 4.

6 is a belt-shifter whereby the belt 5 may be shifted from the pulley 3 to pulley 4, or vice versa, to start or stop the machine.

7 is a shaft bearing thereon worms 8 81. Either or both of the worms may be connected to the shaft 7 by means of a feather-spline 9, so that the said worms may be shifted longitudinally on said shaft.

10 is a pulley on shaft 7.

11 is a belt leading from a pulley 12 on shaft 2 to the pulley 10.

From the foregoing it will be seen that the rotation of shaft 2 rotates shaft 7 and worms 8 81.

13 13 are worm-gears mounted in suitable bearings 14 14, said gears being in mesh with the worms 8 81. Upon the same shaft with each of the worm-gears 13 13 suitable face-plates or carriers are mounted and each is provided with clamping devices for the purposes hereinafter described. These face-plates or carriers are numbered 15 16.

17 is a shaft supported in suitable bearings and arranged parallel to the shaft 7.

18 is a shaft connecting the gears 7 and 17 by means of suitable bevel-gears 19 19, the arrangement being such that the motion of shaft 7 is transmitted to shaft 17, the speed and direction of rotation of shaft 17 being the same as shaft 7.

20 is a worm on shaft 17, which worm may be shifted thereon in the same manner as worm 81. 21 is a worm-gear in mesh therewith. The shaft of worm-gear 21 carries at its end a face-plate or carrier 22, provided with suitable clamping devices for the purposes hereinafter described. The face-plates or carriers 15 22 may be termed "work-carriers," while the plate 16 may be termed the "pattern-carrier." The worms and the worm-gears are such that the plates 15 and 22,

which face each other, revolve simultaneously and in the same direction and at the same speed.

In the preferable construction the worms 5 81 20, the worm-gears meshing therewith, and the face-plates carried thereby are mounted upon the carriage 23, having an adjustable movement longitudinally upon the bed-plate of frame 1. The shaft of worm-gear 21 is 10 splined thereto and has a sliding movement in its bearings, as best seen in Fig. 5, said sliding movement being controllable by an adjusting-screw 24 and an operating-handle 25. By this means the face-plate 22 may be moved 15 forward or backward and adjusted to any desired position.

26 is a boom, the same being universally mounted at 27, (see Fig. 6,) so as to have a free swinging movement at its opposite end. 20 Mounted upon the boom 26 is a carriage 28. (See view Fig. 8.) This carriage 28 supports a revoluble shaft 29, which carries in turn two cutting-tools 30 31, said cutting-tools being arranged one at each end of said shaft 29.

25 32 is a pulley on shaft 29.

33 34 are pulleys mounted upon the carriage 28 and over and between which the belt 35 may pass. The said belt 35 also passes under pulley 32, so that the motion of the belt 30 35 will cause the rapid rotation of the shaft 29 and the cutting-tools 30 31. The carriage 28 is preferably adjustable upon the boom 26, and suitable devices being provided—for example, set-screws 36—to clamp said carriage in any desired position. The shape and the method of connection of the parts may be modified in many ways. The boom 26 supports another carriage 37, which may be adjustable upon said boom in the same manner 40 as the carriage 28. The carriage 37 supports what I shall term a "stylus" 38, the alignment of which corresponds with either one of the tools 30 31, but arranged to one side thereof. The stylus 38 may be adjustable in 45 the carriage 37, any suitable means—for example, a set-nut 39—being provided to clamp the stylus in the desired position. The carriage 37 and the associated parts are best seen in Fig. 7.

50 The free end of the boom 26 receives its support in a fork 40, carried by a slide 41, in turn vertically movable in a guideway in the upright standard 42. These parts 40 to 42 are best seen in Figs. 9 and 10. Upon the 55 rear of the guide 41 is a projection 43, having a screw-threaded passage therein.

44 is a slot in the upright standard 42 permitting the passage of the projection 43.

45 is a vertical threaded shaft passing 60 through the threaded opening in projection 43.

The rotary movement of shaft 45 will impart to the slide 41 a vertical movement. Consequently as said shaft 45 is rotated the fork 40 will be elevated or depressed, according to the direction of rotation of said shaft. 65 By this means the free end of the boom 26 may be raised or lowered, and consequently

the stylus 38 and cutting-tools 31 31 are similarly moved. It will be observed that the fork 40 will not prevent the lateral movement 70 of the boom 26.

46 is a spring normally tending to draw the free end of the boom into the fork.

47 is a pattern carried by the face-plate 16. The stylus 38 bears against the face of the 75 pattern 47. The pattern 47 is revoluble with the face-plate 16. Consequently and because the boom 26 is at its free end laterally movable any irregularities in the face of the pattern will be followed by the stylus-point, the 80 boom moving back and forth to permit said stylus to traverse the irregular surface of the pattern. The spring 46 tends to cause the stylus to bear yieldingly and with any desired degree of pressure against the face of 85 the pattern.

48 is a worm-wheel fixed on the revoluble shaft 45. 49 is a worm meshing therewith and driven by pulley 50 from pulley 51, said pulleys 50 and 51 being connected by a belt 90 52. The pulley 51 is mounted on the driving-shaft 2.

From the foregoing it will be seen that assuming that the boom is mounted so that the stylus 38 is located in the center of the pattern 47 and the machine is started the pattern 95 will be slowly revolved, and simultaneously the free end of the boom will be slowly elevated or depressed, so that the path of travel of the stylus over the face of the pattern is 100 in a very fine convolute curve working out toward the edge of the pattern, the said boom being moved back and forth as the said stylus-point follows the irregularities of the pattern. This movement of the boom imparts a corresponding movement to the cutter-tools 30 31, 105 which may bear against suitable blanks of metal. These blanks are shown in the drawings and numbered 53 54. Either one may represent a blank in which a die is to be 110 formed and the other a blank in which a force is to be formed, which force must necessarily fit the die, because during the operation of the machine the cutters work to 115 produce the same design—one an intaglio, the other a cameo. The blanks 53 54 revolve simultaneously and at the same speed as the pattern 47, and the cutters remove the metal from the face of the said blank as desired 120 by means of a rapid rotary motion imparted by the belt 35, which may be driven as follows: The belt 35 is endless and may pass over any desired arrangement of pulleys which will lead said belt 35 to the pulley 55, fixed upon the driving-shaft 2. The particular arrangement of pulleys shown possesses desirable advantages, because it permits of the 125 adjustment of the cutter-carriage 28 on the boom without disturbing the belt. In this arrangement and starting with the plan view shown in Fig. 2 the belt leaves the cutter-carriage and passes to the right over an idler 130 56, thence to idler 57, thence to a driving-pulley 55, Fig. 3, thence to idler 58, thence

to a horizontal idler 59, thence through the machine to the opposite end thereof, to and around the idler 60, Fig. 1, thence to idler 61, directly to the rear of and close to the universal support for the boom 26, and thence to the pulleys on the cutter-carriage.

From the foregoing it will be seen that the belt leads from idler 61 to idler 33 in approximately the line of the boom 26, so that as said boom moves vertically or laterally there is required but little give in the belt. This may be permitted by supporting any one of the idlers—for example, the idler 60—upon a tension-frame 62, the same affording the proper tension and yet permitting the belt to give as required. The limit of give of the frame may be stopped or checked in any well-known manner—for example, by means of the screw 63.

A diagrammatic view, Fig. 11, graphically illustrates the main feature of my invention—to wit, the simultaneous shaping of a die and a force. In this view the same letters are employed as in the other figures, and it is referred to mainly for the purpose of facilitating an understanding of how a single pattern may be employed to simultaneously shape a force and a die. This view needs no further description than already afforded.

In order to set the parts in the initial position in which one of the cutters has entered the blank to the desired depth while the other cutter remains upon the surface of the other blank, (in case no neutral point is readily available,) the face-plate 22 may be retracted by means of the adjusting-handle 25. The boom may then be adjusted to its desired starting position. The correct position of the cutter 31 is determined by the stylus-point 38 and cannot vary. The face-plate 22 may be moved forward, forcing the blank 54 into contact with the cutter 30 and against the same until the cutter will project into said blank to the desired depth. When the face-plate 22 is thus adjusted, the work may then proceed. In the form shown the cutters work from the center of each work-block outwardly; but this is immaterial.

What I claim is—

1. In an engraving-machine a pair of blank-carriers, means for rotating the same simultaneously, a pattern-carrier and means for rotating the same at the same angular speed as the blank-carriers, a boom universally mounted and carrying a stylus adapted to bear against and traverse the face of the pattern, and carrying oppositely-arranged cutting-tools located between the blank-carriers and adapted to simultaneously form a die and a force.

2. In an engraving-machine, a pair of blank-carriers, means for rotating the same simultaneously and at the same angular speed, a pattern-carrier and means for rotating the same simultaneously and at the same angular speed as both of the blank-carriers, a boom

universally mounted at one end, a stylus carried thereby and adjacent to the face of the pattern-carrier, oppositely-arranged cutting-tools carried by the boom and adjacent and between the blank-carriers, means for moving the free end of the boom horizontally and vertically to cause the stylus to follow any pattern carried by the pattern-carrier and to cause the simultaneous production of a die and a force by means of said cutting-tools.

3. In an engraving-machine, a pair of blank-carriers, means for rotating the same simultaneously and at the same angular speed, a pattern-carrier and means for rotating the same at the same angular speed as the blank-carriers, a boom universally mounted, a stylus carried thereby adapted to bear against and traverse the face of the pattern, a pair of cutting-tools mounted in a revoluble shaft in turn mounted upon said boom both of said cutting-tools being located between said blank-carriers, means for rotating the cutters, and means for moving the boom vertically and horizontally and causing the stylus to normally move toward the pattern and arranged to simultaneously produce a force and a die.

4. In an engraving-machine, a pair of blank-carriers, means for rotating the same simultaneously, a pattern-carrier and means for rotating the same simultaneously and at the same angular speed as the blank-carriers, a boom universally mounted at one end and means for elevating and moving laterally the opposite end of the boom, a stylus carried by said boom, a pair of rotary cutting-tools mounted on said boom and located between said blank-carriers, said cutters being mounted upon the same spindle and in axial alignment and arranged to simultaneously form a die and a force.

5. In an engraving-machine, a pair of blank-carriers, means for rotating the same simultaneously, a pattern-carrier and means for rotating the same at the same angular speed as the blank-carriers, a boom, a stylus, and a pair of oppositely-arranged rotary cutting-tools adjustably mounted upon said boom, said cutting-tools being arranged in axial alignment and pointing in opposite directions, and means for rotating the same and moving the boom, and arranged to simultaneously form a die and a force.

6. In an engraving-machine, a pair of blank-carriers, means for rotating the same simultaneously, a pattern-carrier and means for rotating the same at the same angular speed as the blank-carriers, a boom universally mounted at one end, a horizontally-positioned fork supporting the opposite end of the boom, means for elevating or depressing the fork, a stylus carried by the boom and projecting toward the pattern-carrier, a pair of oppositely-arranged rotary cutting-tools mounted upon the boom and facing the blank-carriers said tools being in axial alignment, and means for rotating said cutting-tools, said parts be-

ing arranged to simultaneously produce a force and a die.

7. In an engraving-machine, a pair of blank-carriers and means for rotating the same simultaneously and at the same speed and in the same direction, a pattern-carrier, means for rotating the same at the same angular speed as the blank-carriers, a boom universally mounted at one end and free to swing and move vertically at the opposite end, means for positively elevating the free end of said boom, and means for yieldingly causing the boom to move horizontally in one direction, a stylus carried by the boom and projecting toward the pattern-carrier, and a pair of cutting-tools facing in opposite directions mounted in axial alinement on the same shaft and carried by said boom and adapted to simultaneously produce a force and a die.

8. In an engraving-machine, blank-carriers, said blank-carriers facing each other, a pattern-carrier, said pattern-carrier being arranged to one side of said blank-carriers, a pair of rotary cutting-tools located between said blank-carriers, a stylus located adjacent to said pattern-carrier and a boom for supporting said cutting-tools and stylus said parts being arranged to simultaneously produce a force and a die.

9. In an engraving-machine, a pair of blank-carriers and means for rotating the same, a

pair of cutting-tools mounted upon the same support located between said blank-carriers, said cutting-tools facing in opposite directions and toward said blank-carriers, one of said blank-carriers being adjustable toward or away from said cutting-tools, means for rotating said cutting-tools and imparting to said cutting-tools a vertical and horizontal movement, said parts being arranged to simultaneously produce a force and a die.

10. In an engraving-machine, a pair of blank-carriers facing each other, a pair of cutting-tools located between said blank-carriers and facing in opposite directions toward said blank-carriers, means for rotating said cutting-tools, and means for rotating said blank-carriers, said cutting-tools and blank-carriers being mounted upon a common carriage, a frame supporting said carriage, said carriage being longitudinally adjustable on said frame, and means for controlling the position of the cutting-points of said cutting-tools relatively to the work-carriers, said parts being arranged to simultaneously produce a force and a die.

Signed at New York city, New York, this 16th day of May, 1902.

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