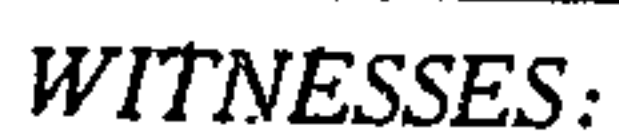


APPLICATION FILED MAY 26, 1908.

Patented Mar. 8, 1910.

5 SHEETS—SHEET 1.



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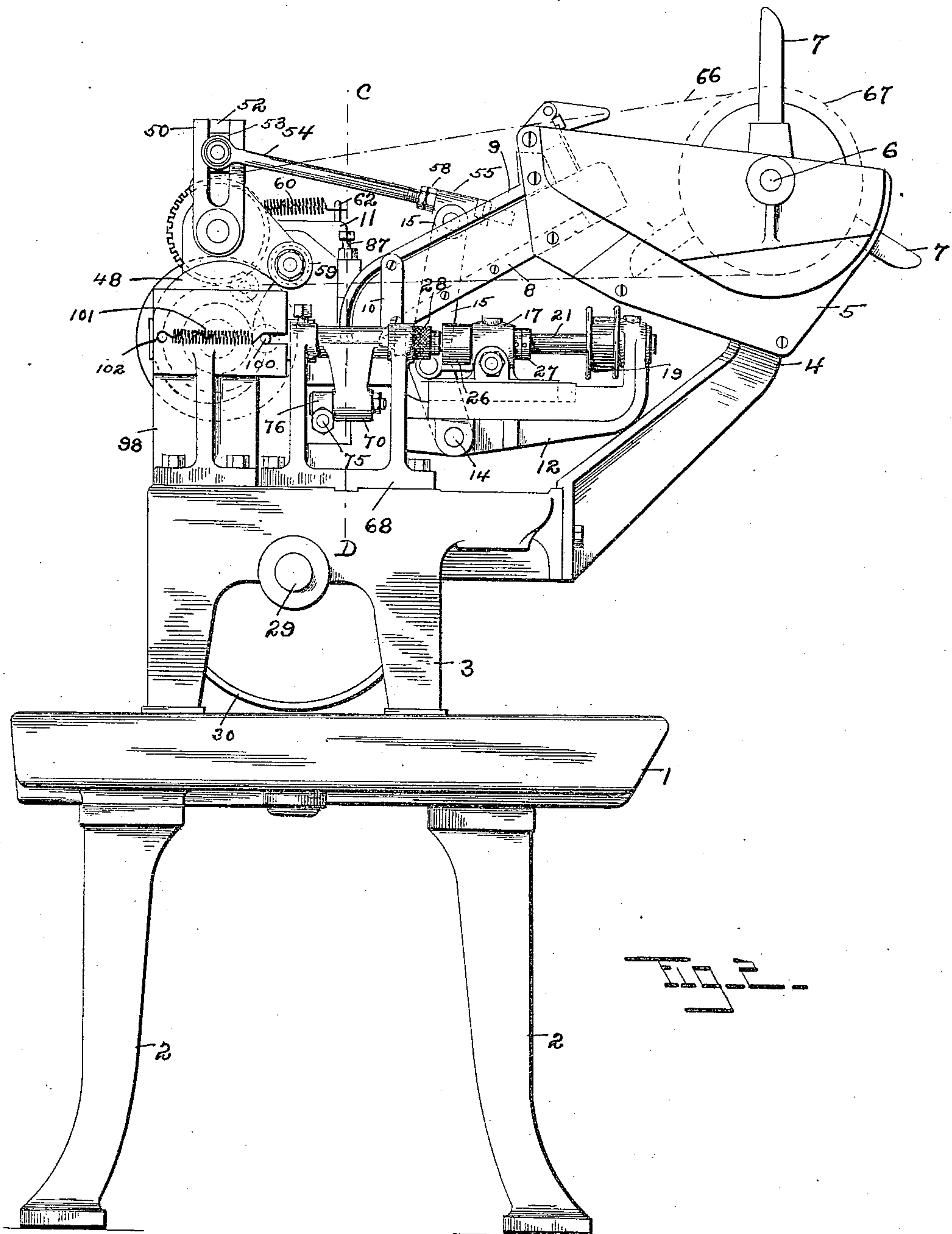
R. L. WILCOX.  
DRILLING MACHINE.

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951,296.

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5 SHEETS—SHEET 2.



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5 SHEETS—SHEET 3.

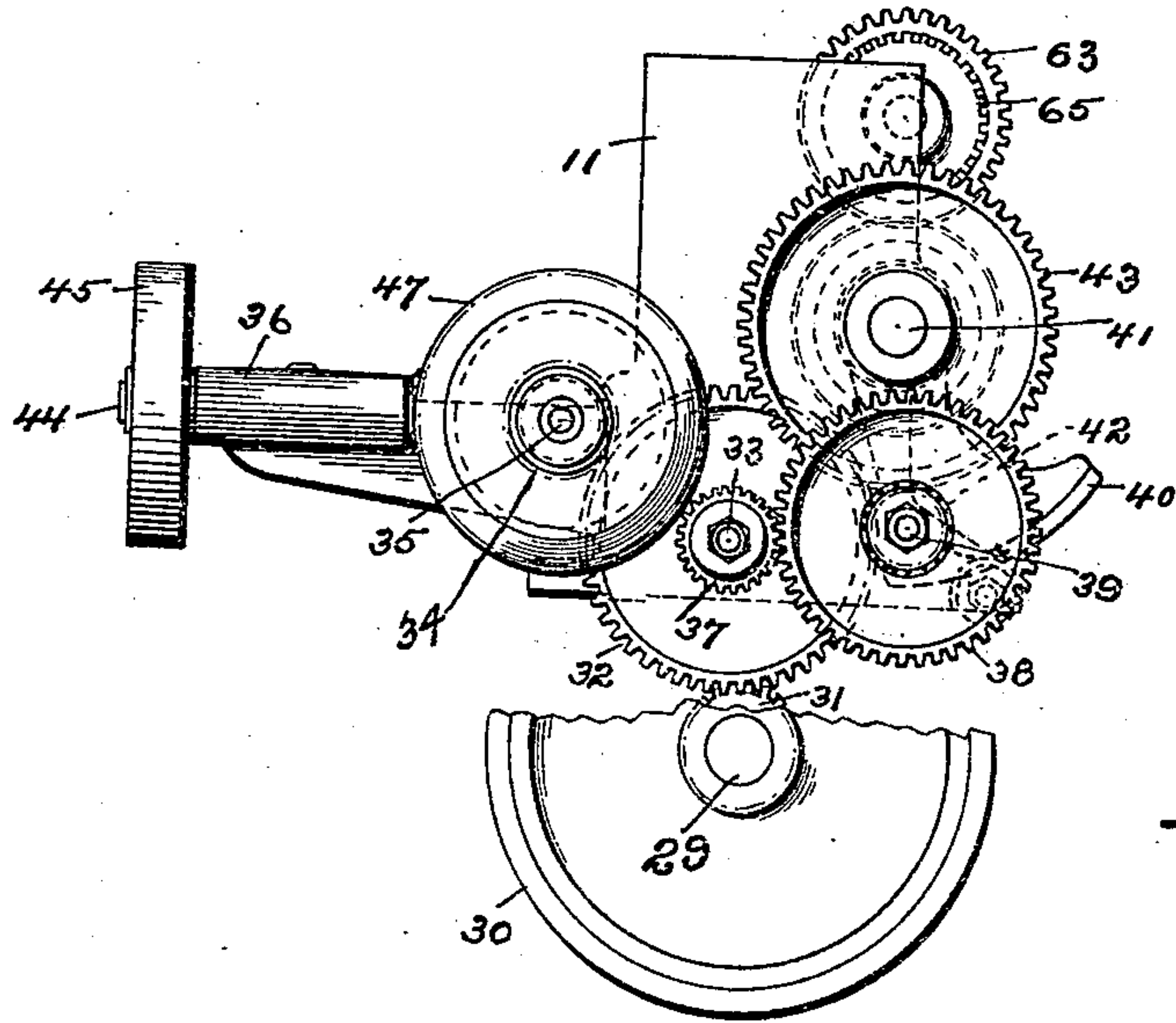


Fig. 4

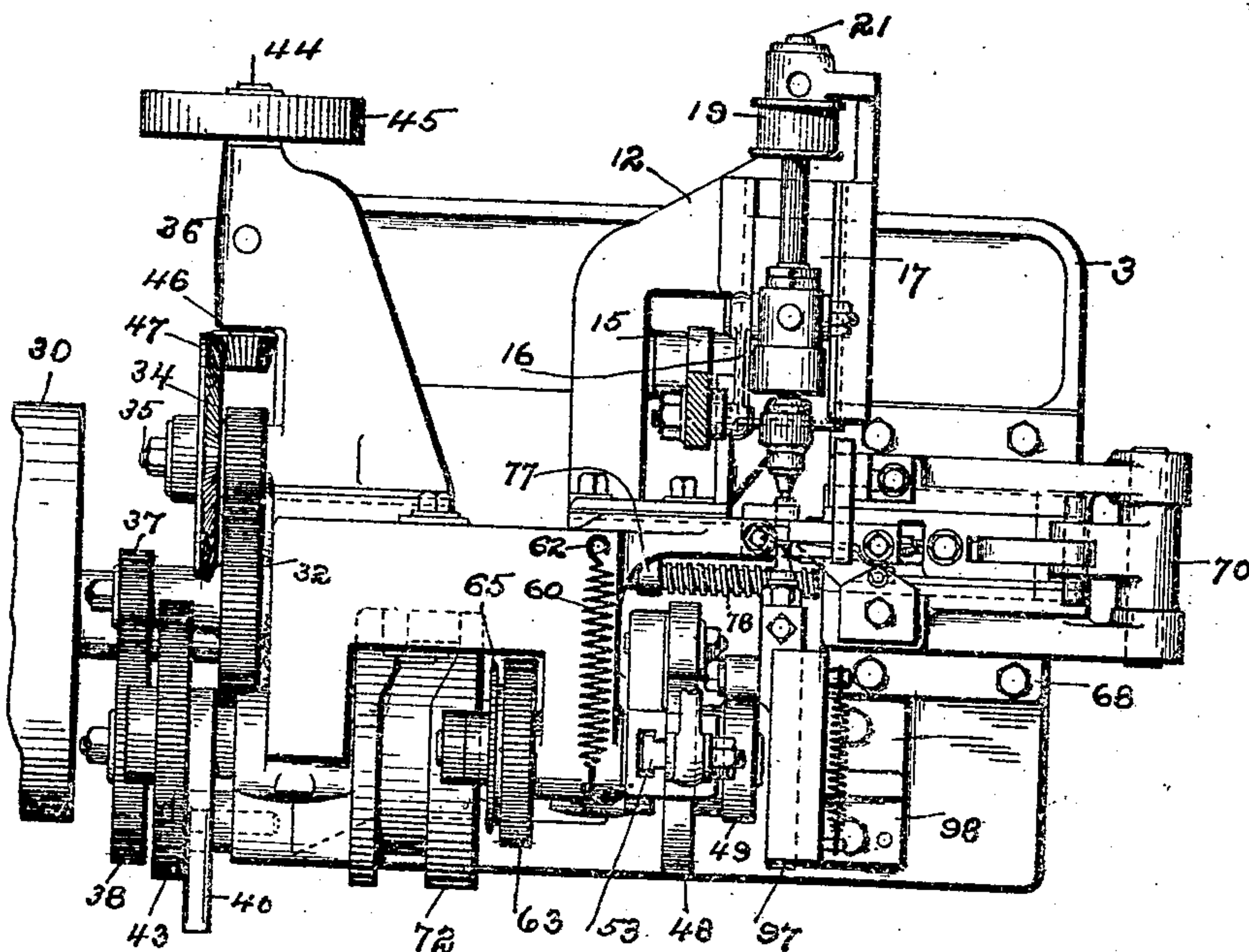


Fig. 3

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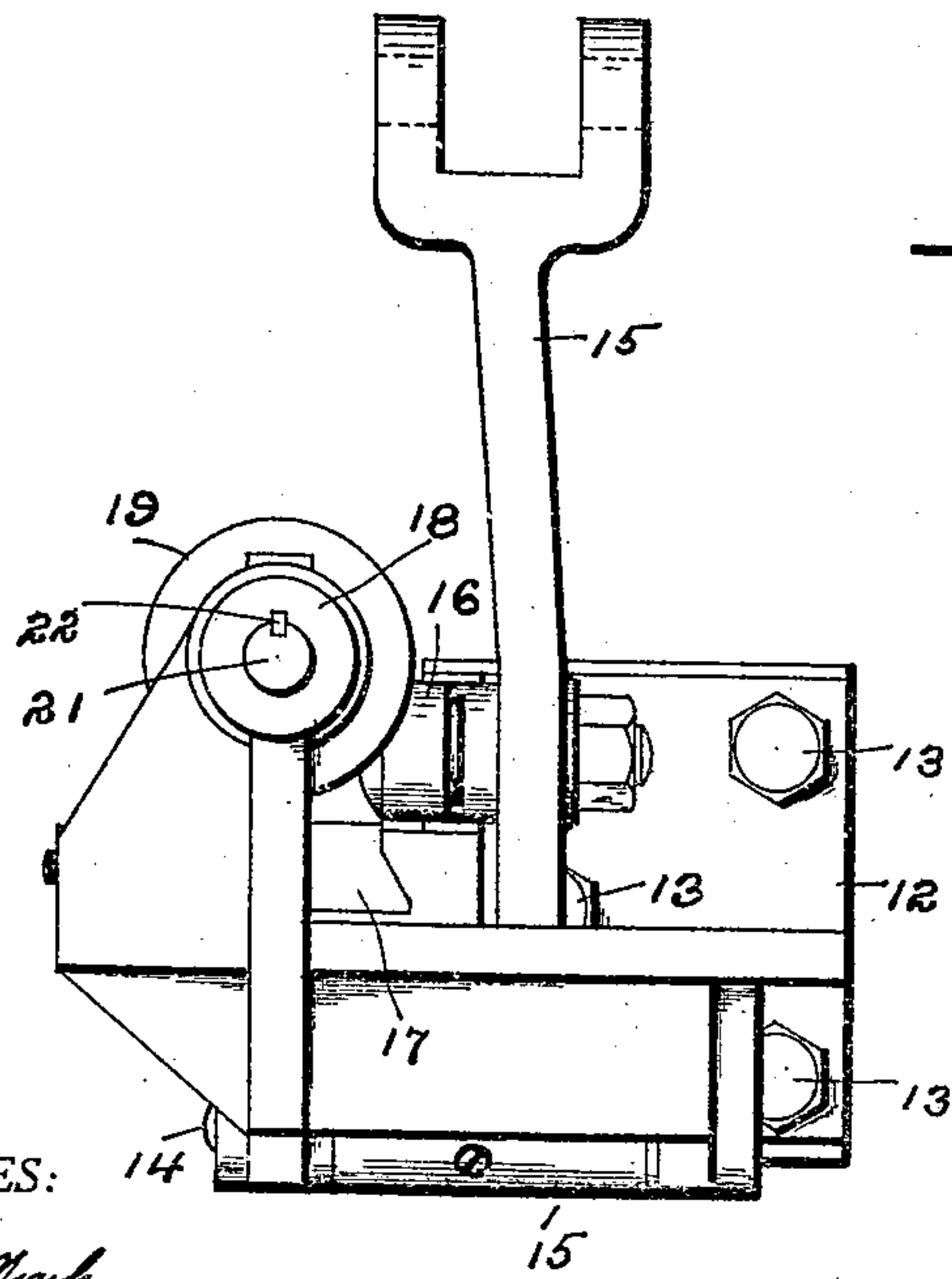
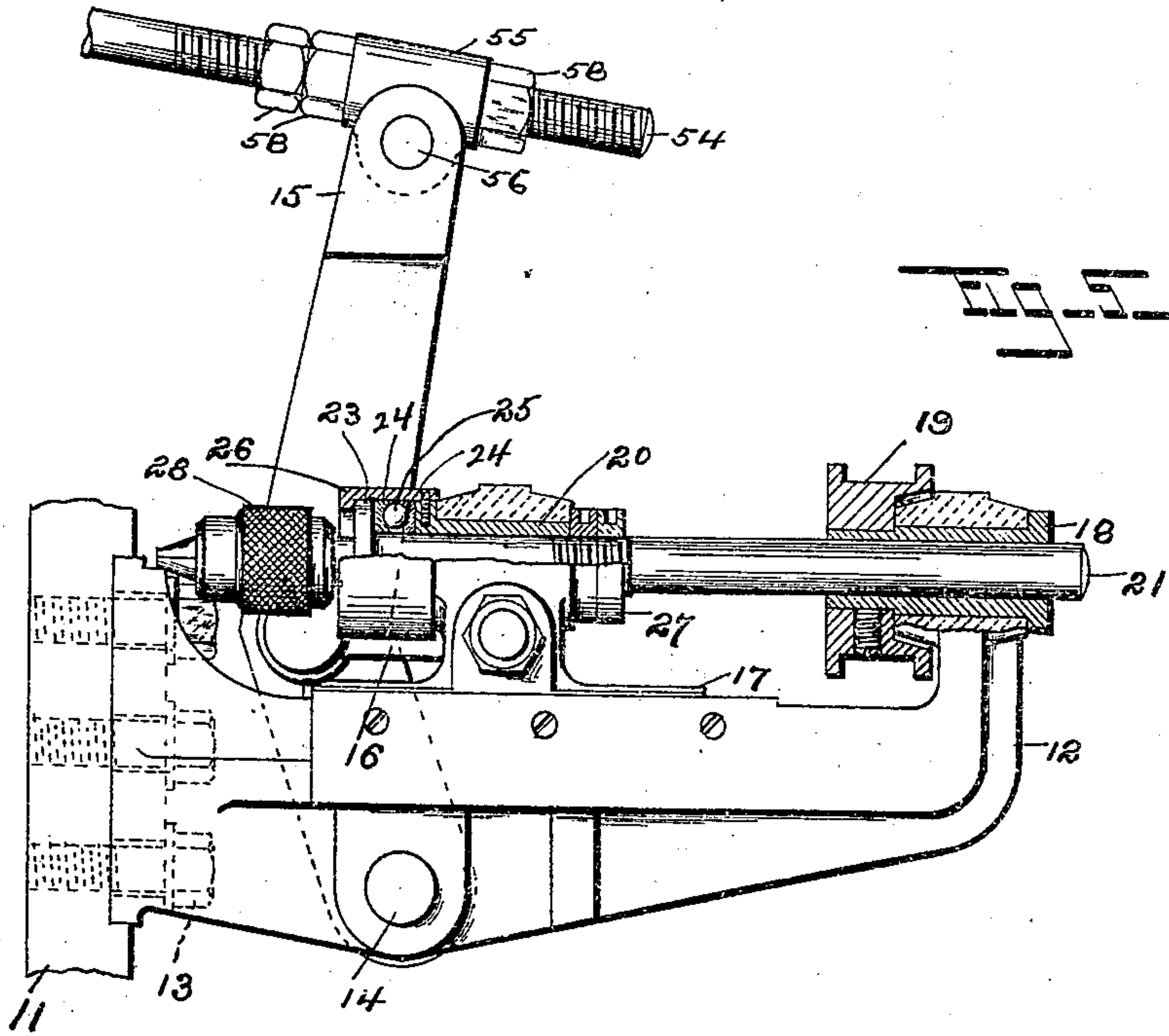
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5 SHEETS—SHEET 4.



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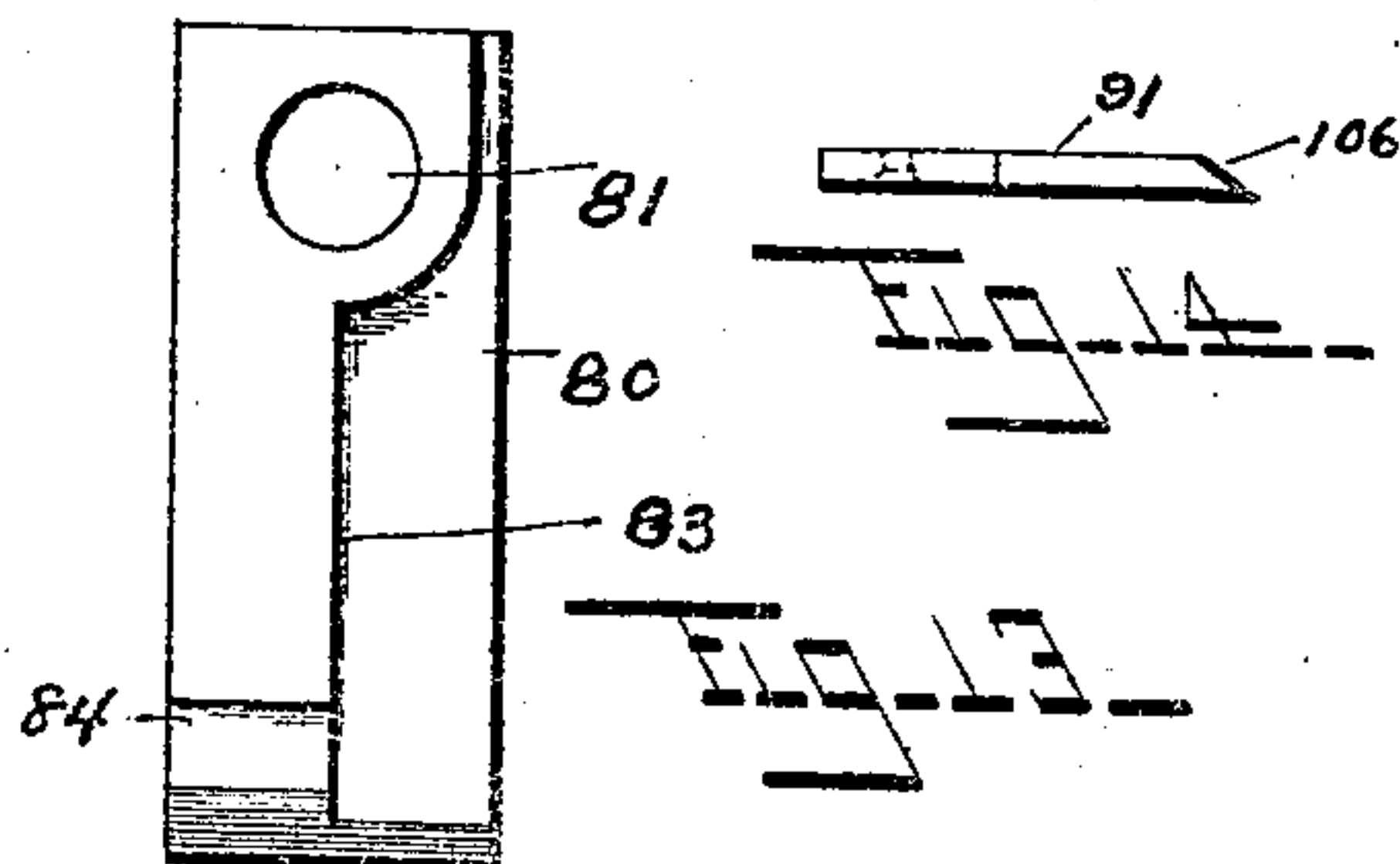
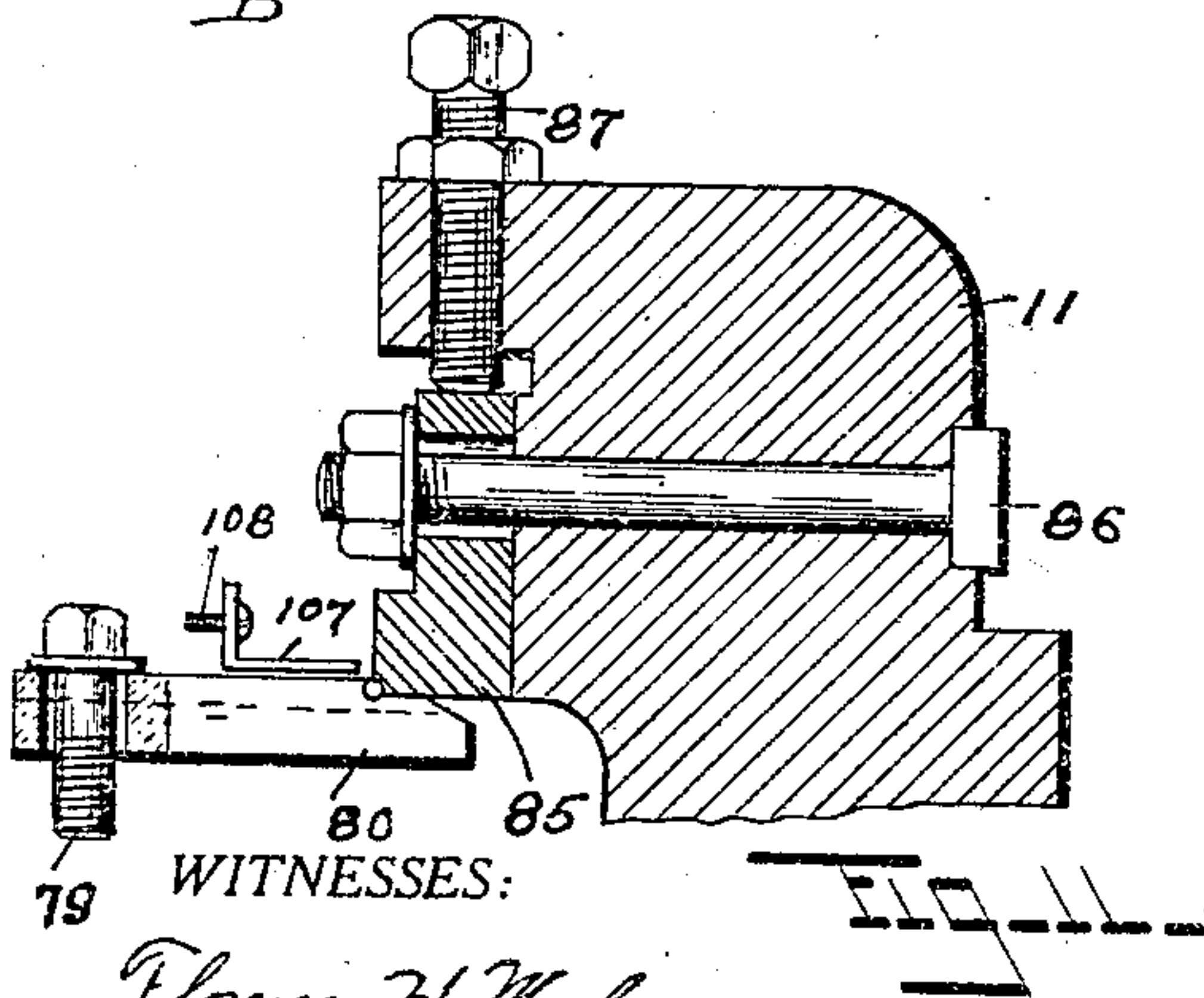
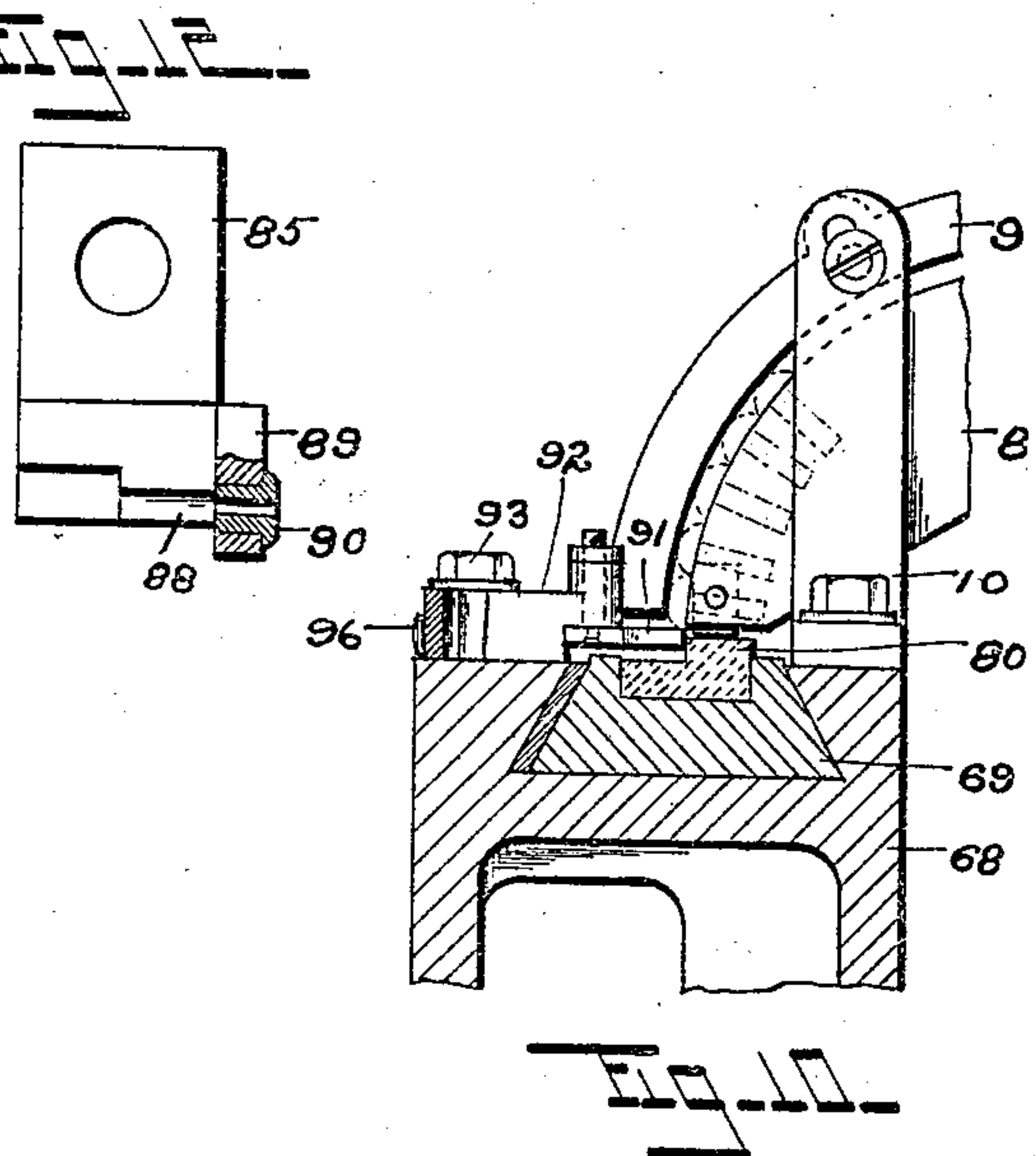
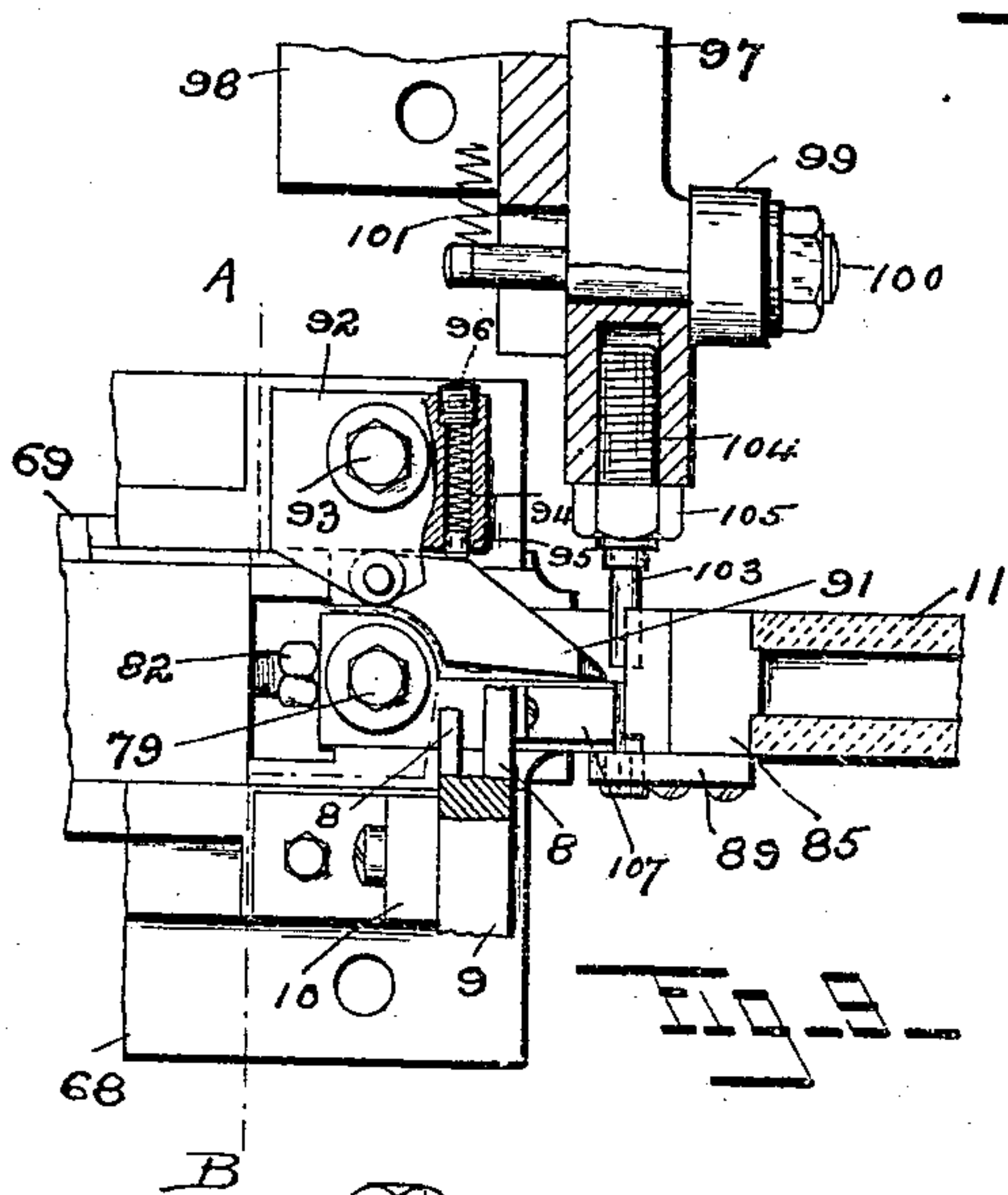
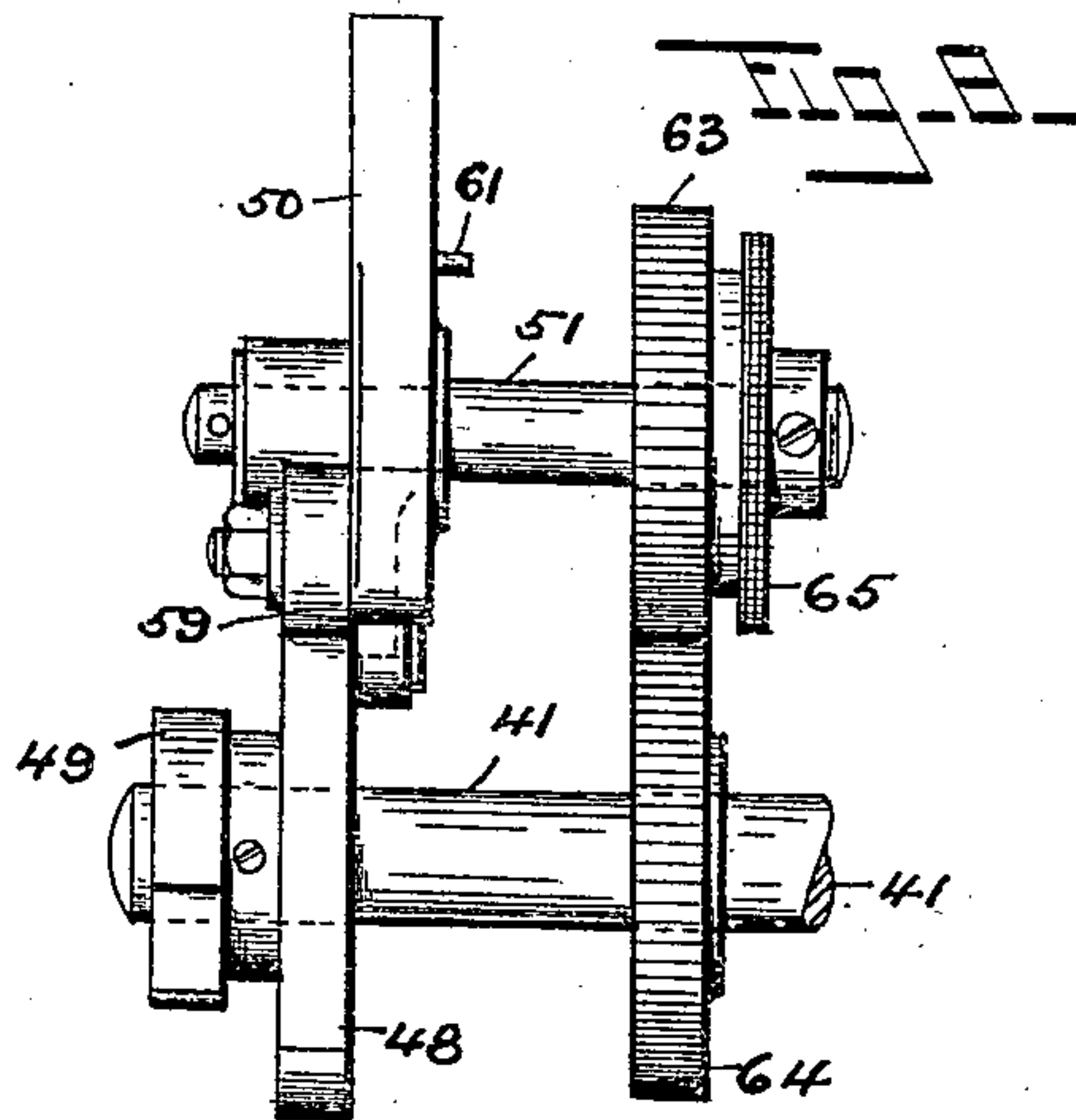
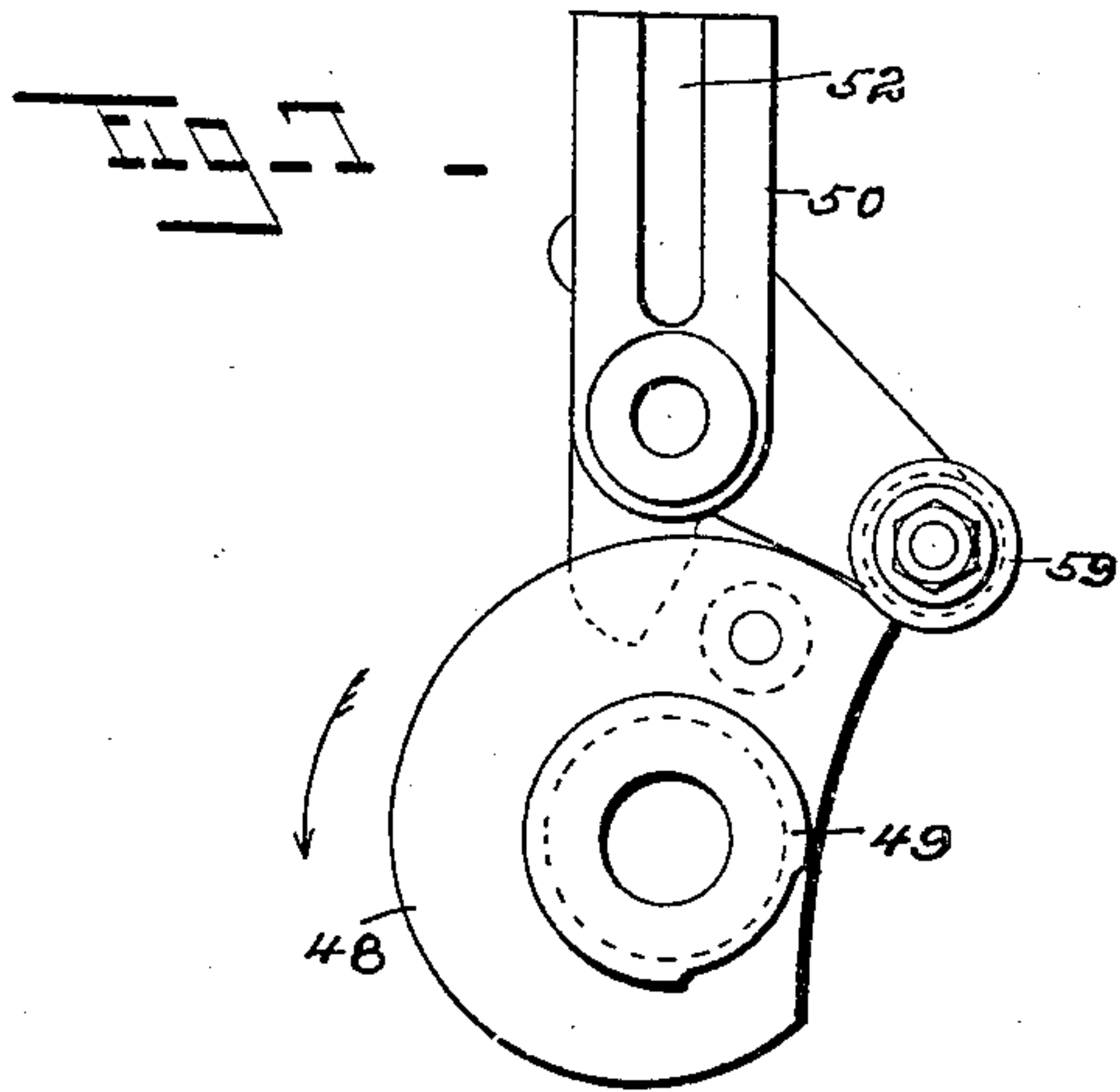
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5 SHEETS—SHEET 5.



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# UNITED STATES PATENT OFFICE.

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## DRILLING-MACHINE.

951,296.

Specification of Letters Patent.

Patented Mar. 8, 1910.

Application filed May 26, 1908. Serial No. 435,087.

*To all whom it may concern:*

Be it known that I, RICHARD LESTER WILCOX, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Drilling-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to new and useful improvements in drilling machines, and has for its object, among other things, to provide a machine that will deliver blanks from a hopper to a mechanism that will hold the blank securely against movement while the same is being operated upon, either by a drill, counter-sink reamer, milling or pointing tool, or any other tool of like character, and to accomplish these, and other objects, by mechanism that will be entirely automatic in its operation and composed of the fewest possible parts, so designed as to be economically constructed and readily assembled.

To these, and other ends, my invention consists in the machine, having certain details of construction and combinations of parts, as will be hereinafter described and more particularly pointed out in the claims.

Referring to the drawings, in which like numerals of reference designate like parts in the several figures; Figure 1 is an elevation of my improved machine complete; Fig. 2 is an elevation looking from the left of Fig. 1; Fig. 3 is a plan view with the hopper mechanism removed; Fig. 4 is a partial end elevation looking from the right of Fig. 1; Fig. 5 is a side elevation, partly in section, of the spindle and adjacent parts; Fig. 6 is an end elevation thereof; Fig. 7 is an end elevation of the mechanism for actuating the spindle; Fig. 8 is a front elevation of the parts shown in Fig. 7 with some of the parts adjacent thereto; Fig. 9 is an enlarged plan view of the holding mechanism with the parts adjacent thereto; Fig. 10 is a sectional end elevation of the holding mechanism upon line A—B of Fig. 9; Fig. 11 is an enlarged fragmentary elevation of a portion of the frame upon line C—D of Fig. 2 showing the movable die and fixed die in the relative positions occupied by them during the drilling operation; Fig. 12 is an eleva-

tion of the fixed die; Fig. 13 is an enlarged plan view of the movable die; and Fig. 14 is an elevation of the stripping finger.

In the drawings the numeral 1 designates the bed, 2 the legs, 3 the table secured to the top of the bed, and 4 the bracket for supporting the hopper mechanism, which may be of any preferred construction, but as shown herein consists of the receptacle 5 having a shaft 6 therein carrying the radial arms 7, which, during their rotation, sweep through the receptacle and mass of blanks lying therein, lifting some of them onto the chute, which consists of the side plates 8, rail 9 and bracket 10. The blanks are designed to pass between the side plates 8 with the head resting upon the top thereof, as shown in Fig. 10. Fixed to the table 3 is the frame 11, having mounted thereon the bracket 12 which is secured thereto by bolts 13 which pass through holes in said block of slightly larger diameter than those of said plates, as shown by dotted lines in Fig. 5, so as to permit a limited horizontal adjustment of said block. Fulcrumed to said bracket upon the shaft 14 is the rock lever 15 which is connected to a slide 17, movably mounted in said bracket, by a link 16. Rotatable within the bracket 12 is a sleeve 18 having a pulley 19 fixed thereto, and within the slide 17 is a sleeve 20, and mounted within said sleeves is a spindle 21 which is held against rotation, but not against endwise movement, within the sleeve 18 by the feather 22. Adjacent to one end of the said spindle is a collar 23, preferably formed integral therewith, and between which and the head of the sleeve 20 are the loose collars 24, between which a plurality of balls 25 are inserted to provide a ball bearing whereby the friction upon said spindle is reduced to the minimum during the drilling operation. A collar 26 fixed to the sleeve 20 covers all of said collars and balls to prevent dirt or other foreign substance from entering therein. The collars 27, threaded upon the spindle 21, prevent the endwise movement of the spindle within the slide 17. Fixed to the end of the spindle 21 is a chuck 28 which may be of any preferred form and secured in any of the many ways common to the art, and in which the operating tool is held.



Journalled in the table 3 is the main driving shaft 29 which is driven through the pulleys 30 and having a pinion 31 thereon which meshes into and drives a gear 32 rotatable upon a stud 33 fixed in the side of the frame 11, which meshes into and drives a pinion 34 rotatable upon a stud 35 fixed in the bracket 36 secured to the frame 11. Connected with the gear 32 is a pinion 37 which meshes into and drives a gear 38 rotatable upon a stud 39 fixed in the sector arm 40 which is loosely mounted upon the shaft 41 journalled in the frame 11, and which is rotated from the pinion 42, fixed to the gear 38, that meshes into and drives a gear 43 fixed on said shaft 41. To change the relative speed of rotation of the shaft 41 to that of the shaft 29 gears of varying diameters may be substituted for the gear 38, and to insure the intermeshing of the teeth of these gears with the teeth of the pinion 37 the sector 40 is shiftable about the axis of the shaft 41 and held in any of its adjusted positions by adjustable mechanism not shown here in detail and not being a material part of this invention.

Rotatably mounted within the bracket 36 is a shaft 44 having a pulley 45 fixed thereto at one end and connected by a belt with the pulley 19 and a beveled pinion 46 at the other end which meshes into and is driven by the beveled gear 47 rigidly connected with the pinion 34.

The rotary movement of the main shaft 29 is transmitted to the spindle 21 through the train of gears above described and the belt which connects the pulleys 45 and 19.

The mechanism for actuating the slide 17, and thereby imparting an endwise movement to the operating tools, comprises a cam 48 fixed to the shaft 41 preferably integral with the cam 49, a rock arm 50 loosely mounted upon a stud 51 fixed to the frame 11 and having a slot 52 and within which is adjustably secured a block 53 connected to one end of the rod 54, the other end of which passes through a block 55 pivotally mounted in the rock lever 15 by the pintle 56. The relative position of the rock lever 15 and rock arm 50 is varied by means of the nuts 58 threaded on the rod 54. Rotatable upon the rock arm 50 is the roll 59 which is held normally against the periphery of the cam 48 by the spring 60 which is secured to the pin 61 in the arm 50 and to the pin 62 fixed in the frame 11. During the rotation of the shaft 41 a rocking movement is imparted to the rock lever 15 through the cam 48, rock arm 50 and rod 51, and this rocking movement imparts a longitudinal movement to the slide 17 through the link connection 16.

Rotatably mounted upon the stud 51 is a gear 63 that is driven from the gear 64 on the shaft 41 (Fig. 8) and to which is fixed the sprocket wheel 65 connected by the

sprocket chain 66 with the sprocket wheel 67 upon the shaft 6 of the hopper mechanism.

Secured to the table 3 is the standard 68 having movable therein the slide 69 which is connected with the rock sleeve 70 by a link 71, said rock sleeve being actuated from the cam 72 fixed on the shaft 41 through the lever 73 connected with the frame 11 by the stud 74, and the rod 75 connected at one end to the lever 73 and at the other end to the rock sleeve 70 by a pivotally mounted block 76. Surrounding the rod 75 between the collars 77 (Fig. 3) fixed thereon and the block 76 is a coil spring 78 which exerts sufficient tension against said block to normally actuate said rock sleeve when all of the parts are running smoothly, but if perchance, any portion of the slide mechanism should become clogged, the spring will be compressed during the movement of the lever 73 and no movement will be imparted to the slide parts.

Fixed upon the slide 69 by the screw 79 is the movable die 80 which has a slight adjustment in the movement of its length by reason of the body of the screw 79 being of slightly less diameter than the hole 81 in said die and is held against movement in one direction on said slide in any of its adjusted positions by the set screw 82 which is threaded into said slide with the head thereof against the said die. This die 80 is cut away upon one side parallel to its length to form the shoulder 83 and near the end is provided with the crosswise notch 84 of substantially the same depth as the diameter of the blank.

The fixed die is designated by the numeral 85 and is adjustably connected with the frame 11 by the bolt 86 and the screw 87, the end of which impinges against the top of said die. This die is provided with a notch 88 of a size and shape similar to the notch 84, and is opposite thereto when the movable die is in its innermost position.

In operation when the slide 69 is in its retracted position the notch 84 in the movable die 80 is below the end of the hopper chute and the blank drops therefrom into said notch with the underside of the head against the shoulder 83. The slide carrying the blank now moves forward until the blank engages the notch 88 in the fixed die where it is securely held while being operated upon, after which the slide is withdrawn. To insure the positive alinement of the successive blanks upon the movable die with the heads against the shoulder 83, and to strip them therefrom after the tool operation, I have provided a device which consists of the finger 91, having a beveled face 106 at its front end, pivotally connected with the block 92 fixed on the standard 68 by the bolt 93. This finger is normally held with its front end



against the shoulder 83 by a spring 94 lying in the block 92 between the slidable plug 95 and the screw plug 96 threaded into the block 92 and by its rotation therein capable of varying the tension of said spring. In this position there is space enough between the die and the rear end of the finger to permit a blank to drop from the chute to said die. During the action of the movable die 80 from its retracted to its forward position the head of the blank contacts with the face of said spring pressed finger 91 and moves the blank on said die so that the underside of said head will engage the shoulder 83, and with the blanks in such position will engage the fixed die. During the return movement of the slide the end of said finger will engage the head of the blank and knock it from the movable die when it will fall by gravity into a receptacle conveniently located to receive it. A guide 107 is secured to the side of the chute by the screw 108 to prevent the blanks from falling off the slide during its forward movement. The blanks are held against endwise movement between the dies during the operation of the tool thereon by a holding mechanism that consists of a slide 97 movable within a bracket 98 fixed to the table 3, a roll 99 mounted upon a stud 100 fixed in said slide and held against the cam 49 by a spring 101 secured between the stud 100 and pin 102 on the bracket 98 and a pin 103 held within said slide by a screw 104 and having the jam nut 105 thereon. After the blank has been brought to a position where it is held between the two dies the cam 49 actuates the slide 97 so that the end of the pin 103 engages the head of the blank and is held in contact therewith while the same is being operated upon, after which the slide 97 and pin 103 are withdrawn by the spring 101. The endwise position of the pin 103 within the slide 97 is variable, so as to accommodate heads of different thicknesses, by the screw 104, and the jam nut 105 holds it against slipping in any of its adjusted positions.

In operation the blanks are thrown into the hopper indiscriminately, from which they are automatically delivered separately to the movable die from the chute and are then held rigidly between the two dies against endwise or lateral movement during the operation thereon and during the return movement of the movable die are stripped therefrom.

It is apparent that an endless variety of operating tools may be held within the chuck 28 and an endless number of operations performed upon the rivet blank, the operating tool being supported adjacent to the work within the hardened bushing 90 mounted in the fixed bracket 89.

There are minor changes and alterations that can be made within my invention, aside

from those herein suggested, and I would therefore have it understood that I do not limit myself to the exact construction herein shown and described, but claim all that falls fairly within the spirit and scope of my invention.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a machine of the character described, the combination with a blank holding receptacle; of means for holding the blank against lateral movement; separate means for holding said blank against endwise movement during the tool operation thereon; a reciprocating slide for conveying the blanks to said holding means; means for preventing the displacement of the blanks while on said conveying means; a rotary tool spindle; and means for imparting a reciprocating movement thereto in the same plane as said blank when in said holding means.

2. In a machine of the character described, the combination with a blank holding receptacle; of a die having a blank holding notch therein; a second die having a similar notch therein; means for moving one of said dies so that said notches are brought opposite each other and during its movement carry a blank from said receptacle; means connected therewith for preventing the displacement of said blank while being carried from said receptacle; a reciprocating part movable in a line with said notches when said dies are at rest and contacting with the blank when engaged by said notches; a rotary tool spindle in the same plane as said blank when the same is in said notches; and means for moving said spindle toward and away from said dies.

3. In a machine of the character described, the combination with a blank holding receptacle; of blank holding means, comprising a fixed die and a movable die, each of said dies having a notch therein and between which the blank is held, said movable die carrying the blanks from said receptacle; spring actuated means connected with a fixed part for preventing the displacement of the blanks on said die; a reciprocating member engaging the head of said blank while the same is between said dies; a rotary tool spindle, the axis of which is coincident with the said blank when held by said dies; and means for moving said spindle toward and away from said die.

4. In a machine of the character described, the combination with a blank holding receptacle; of a movable die having a shoulder upon one side thereof; a notch in said die between said shoulder and the side of the die; means for delivering blanks onto said die with their heads against said shoulder; means engaging the said blank for holding the heads thereof against said shoulder dur-



ing the forward movement of said die; a  
fixed die having a notch therein of a size  
and shape similar to the notch in the mov-  
able die; a reciprocating part actuated so  
5 as to bear against the head of the blank  
when held between said notches; a rotarily  
mounted tool, and means for moving said  
tool toward and away from said dies while

said reciprocating part is in contact with  
the head of the blank. 19

In testimony whereof I affix my signature  
in presence of two witnesses.

R. LESTER WILCOX.

Witnesses:

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M. J. NOONAN.