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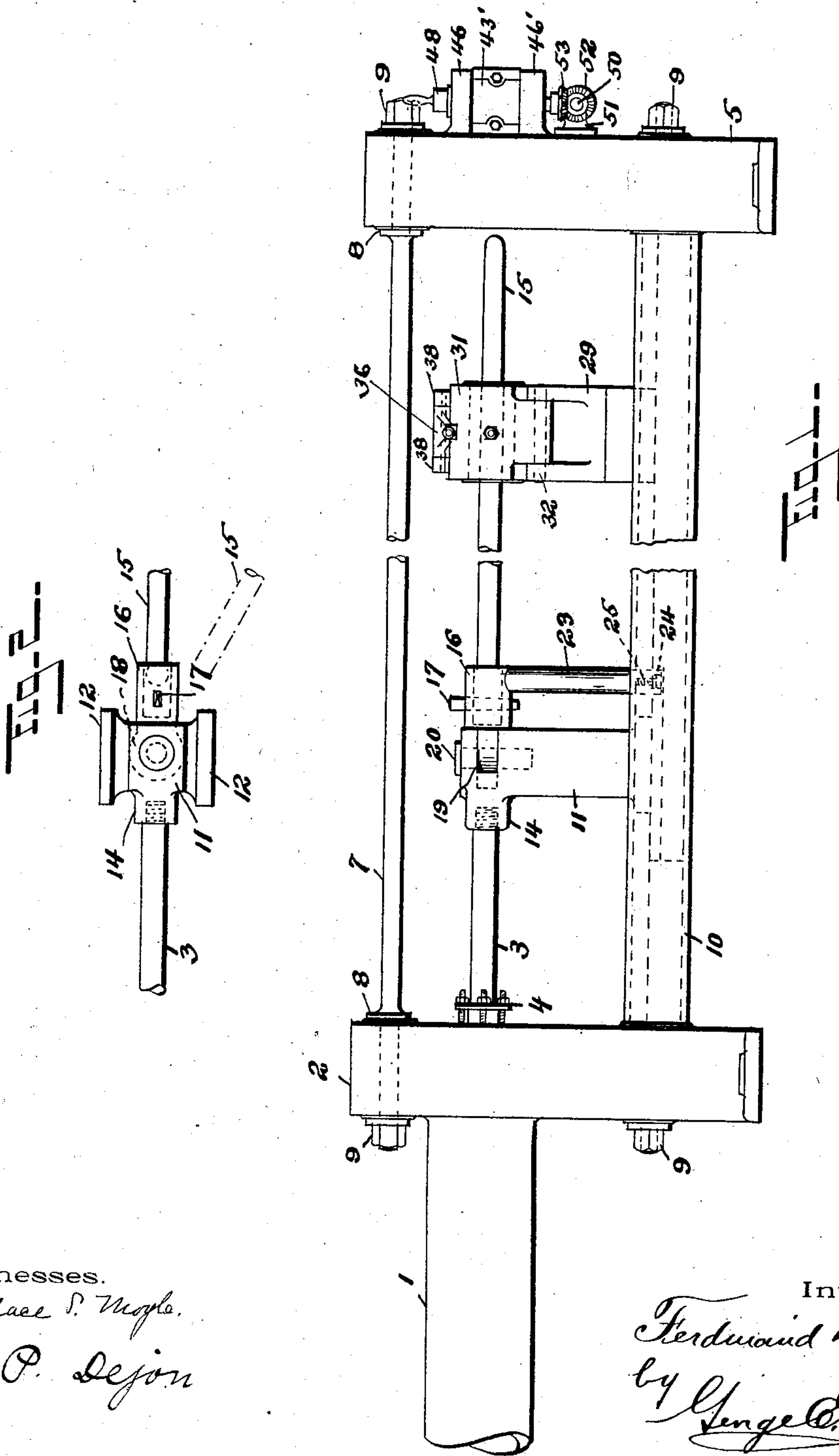
Patented Sept. 30, 1902.

F. DEMING.  
TUBE MACHINE.

(Application filed May 31, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses.

Wallace S. Maple.

J. P. Dejon

Inventor.

Ferdinand Deming  
by George C. Hall  
Attorney.

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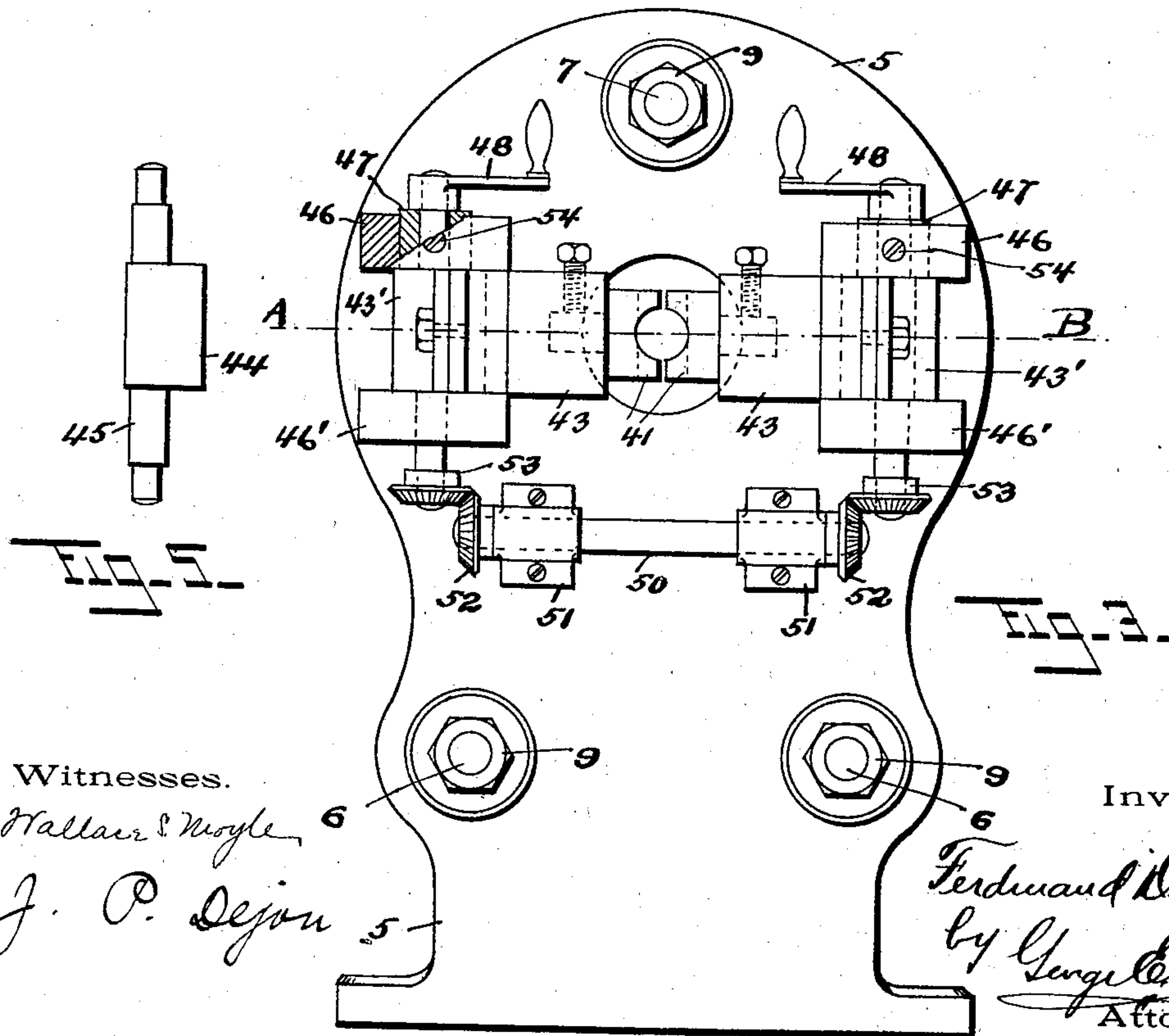
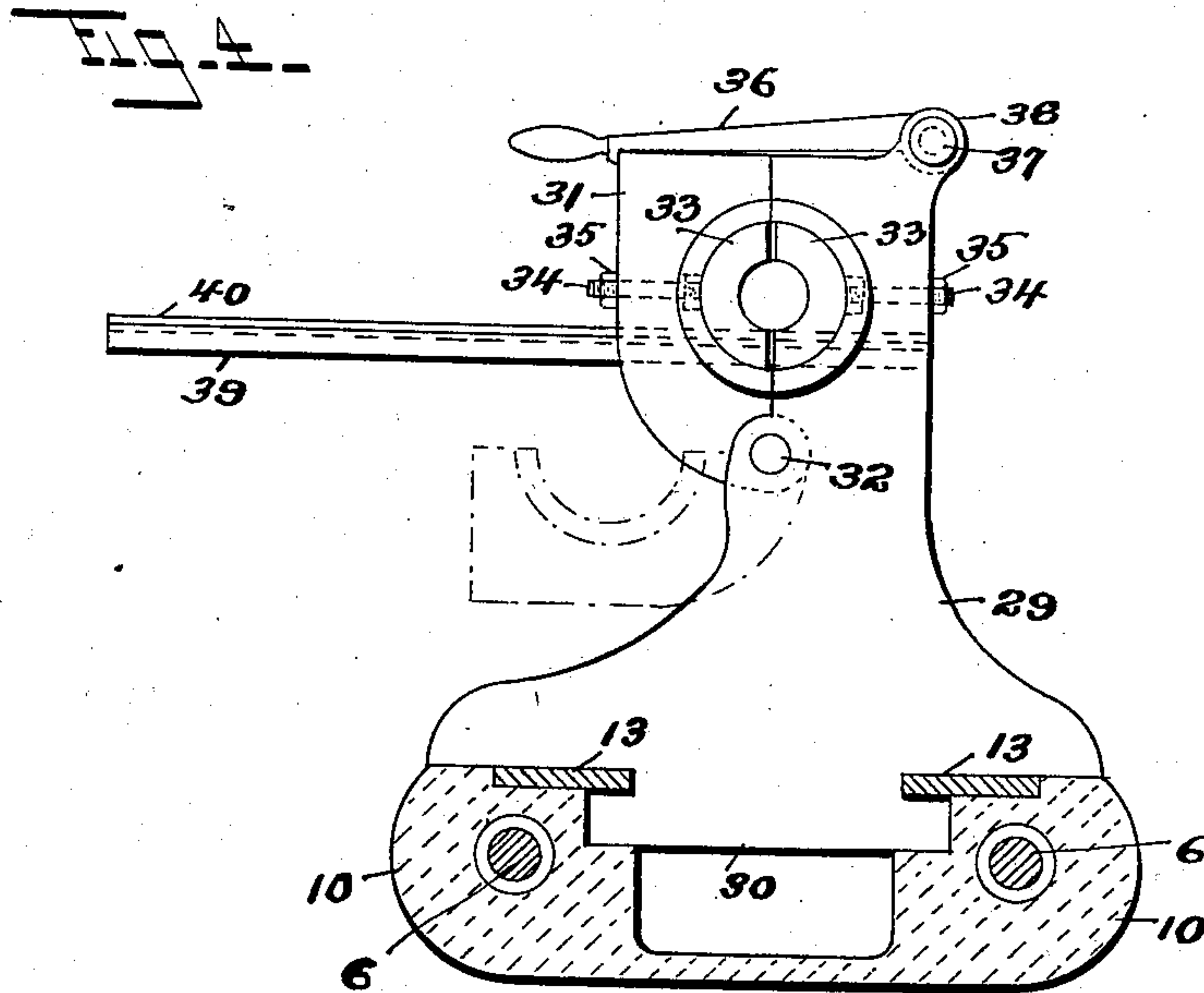
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Fig. 6.

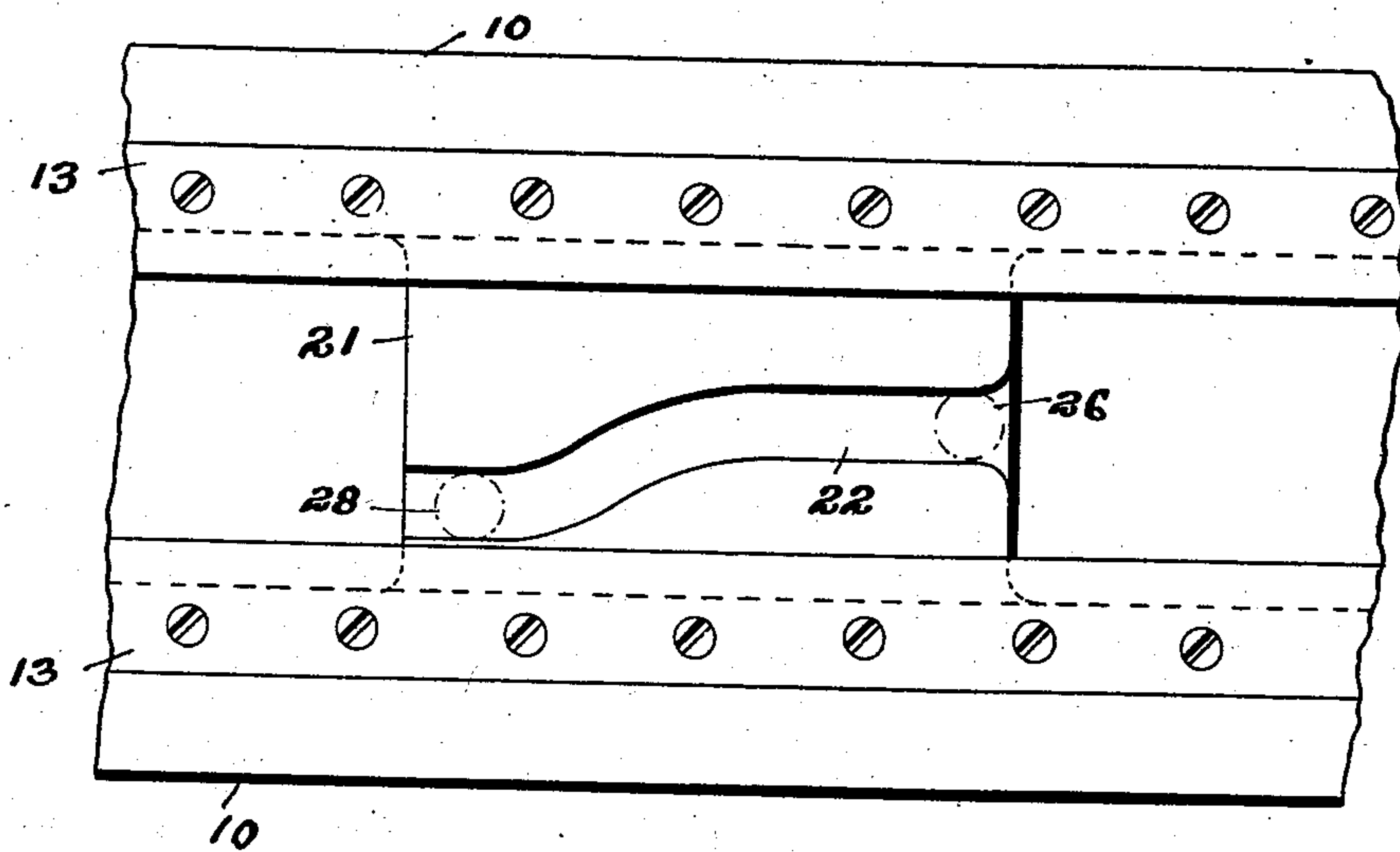
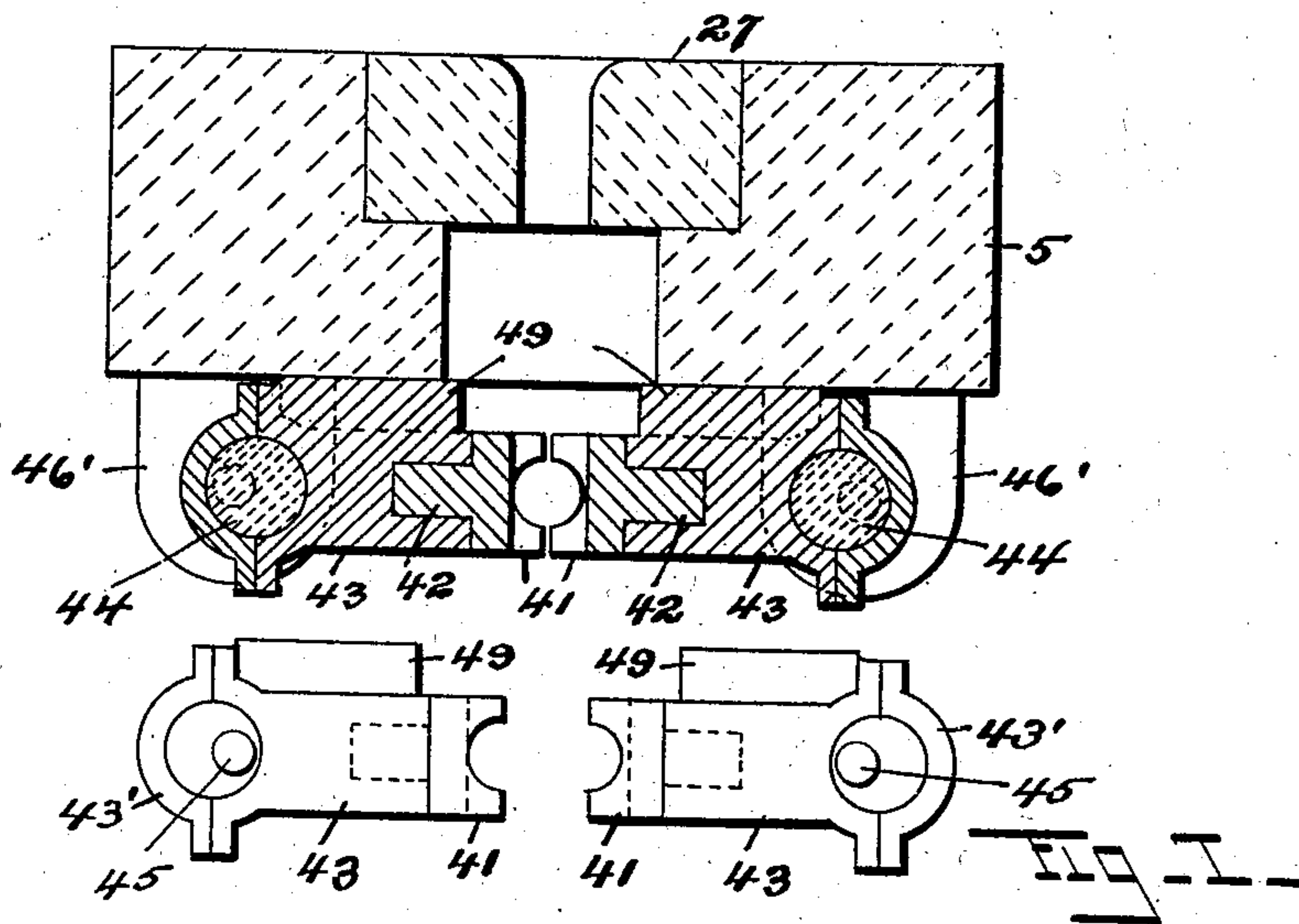


Fig. 8.

Witnesses.

William S. Hoyle  
J. P. Lejon

Inventor.

Ferdinand Deming  
by George B. Hall  
Attorney.



# UNITED STATES PATENT OFFICE.

FERDINAND DEMING, OF WATERBURY, CONNECTICUT.

## TUBE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 710,046, dated September 30, 1902.

Application filed May 31, 1901. Serial No. 62,490. (No model.)

*To all whom it may concern:*

Be it known that I, FERDINAND DEMING, a citizen of the United States, and a resident of Waterbury, in the county of New Haven and State of Connecticut, (now temporarily residing in the town of Trubia, Kingdom of Spain,) have invented certain new and useful Improvements in Tube-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in tube-machines of that class in which seamless tubes are formed from a blank of sheet metal by a drawing-punch which forces the disk through a drawing-die.

It is the object of my invention, among other things, to construct a tube-machine of this general character without side rails, and thereby permit ready access to the drawing-punch, to provide means whereby the punch will be automatically moved into and out of alinement with the drawing-die, means for supporting the forward end of the punch, means attached to the tube-machine for stripping the tube from the punch after it is drawn, and, further, to so design the parts that they may be constructed with the least possible cost and readily assembled.

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

Referring to the drawings, in which like numerals designate like parts in the several figures, Figure 1 is a side elevation of the tube-machine. Fig. 2 is a plan view of the cross-head and punch-head. Fig. 3 is an end view of the bulkhead containing the drawing-dies. Fig. 4 is an end elevation of the punch-support with the rails in cross-section. Fig. 5 is an elevation of the eccentric-shaft for the strippers. Fig. 6 is a transverse section of the bulkhead shown in Fig. 3 upon line A B. Fig. 7 is a plan view of the stripper-blocks and carriers, and Fig. 8 is a plan view of a portion of the rails and cam-plate.

As the draw-benches are now ordinarily constructed the drawing-punch operates between side rails which prevents ready access thereto and is always rigidly connected with the piston-rod, so that for each reducing op-

eration the bench must be long enough to permit the tube to be inserted between the end of the drawing-punch and the bulkhead. The strippers are usually split rings which are inserted within a recess in the face of the bulkhead and form a cumbersome means for stripping the tubes from the drawing-punch, because it necessitates the placing of separate parts into the bulkhead after each drawing operation, which parts when separated are very liable to be injured. These, and many other, objections I overcome by arranging the side rails, &c., so that the punch is not inclosed or obstructed upon either side, which facilitates ready access thereto whereby it can be readily lubricated and the tube-drawing operation is in plain sight of the operator; by mounting a pair of stripper-blocks in the bulkhead so as to be movable toward and away from each other and readily operated without being detached; and by pivotally connecting the drawing-punch with the piston-rod and through cam mechanism automatically throw the forward end of the punch outward during a portion of the rearward movement of the piston and drawing-punch, in which position the tube can be slipped onto the punch, and during the forward movement of the piston and drawing-punch, the latter is automatically swung into alinement again with the drawing-dies, which construction permits the bench to be greatly shortened, thus economizing considerable floor-space.

I have added to my bench a device for supporting the forward end of the drawing-punch, both when in line with the drawing-die and when it is swung outward, which device comprises a stand having a side member hinged thereto which is thrown downward when the punch is swung out of alinement with the drawing-die.

Referring to the drawings, the numeral 1 designates the hydraulic cylinder, which is connected at its forward end with a bulkhead 2, 3 the piston-rod, having a piston-head thereon (not shown) operative within the cylinder 1, and 4 a packing-gland in the face of the bulkhead 2. At the opposite end of the machine is a bulkhead 5, which is connected with the bulkhead 2 by means of the rails and tie-rods 6 6 and tie-rods 7, having the



shoulders 8 thereon, all of said rods being provided with nuts 9. The cross-head 11 is movably mounted upon the rails 10, with the feet 12 12 thereof beneath the caps 13 13, which are fastened to the top of the rails, Figs. 4 and 8. The piston-rod 3 can be secured to the cross-head 11 in any preferred manner; but as herein shown it is threaded into the integral boss 14.

16 is the punch-block, having the drawing-punch 15 fixed thereto by a key 17, and is provided with an eared portion 18, rotatably secured within a slot 19 in the cross-head 11 by the swivel-pin 20. This mode of pivotally connecting the drawing-punch with the piston allows the punch to be swung into various positions in the same horizontal plane. To automatically throw the drawing-punch into and out of alinement with the drawing-die, I have provided a cam-plate 21, having in its upper surface a cam-slot 22, with a flaring mouth at its forward end, Fig. 8, and within which is operative a cam-roll 24, rotatably secured upon the stud 25 to the arm 23, projecting downwardly from the punch-block 16. When the drawing-punch is returning after a drawing operation, the cam-roll 24 enters the cam-slot 22, its ready entrance therein being facilitated by the flaring mouth above described, its then position being illustrated by broken lines 26 in Fig. 8, and travels therein during its further rearward movement, and at the limit thereof the position of the cam-roll is designated by the broken lines 28. During this travel of the cam within the cam-slot the punch swings in a horizontal plane upon the swivel-pin 20, the forward end thereof being thrown outwardly and out of alinement with the drawing-die, as designated by the dotted lines in Fig. 2, and during the forward stroke of the piston and punch the travel of the cam-roll 24 in the cam-slot 22 returns the drawing-punch to its drawing position concentric with the drawing-die.

To sustain the weight of the overhanging punch, I have provided a support, which comprises a stand member 29, having a T-base 30, movable between the rails 10 and caps 13, (see Fig. 4,) a movable side member 31, hinged to the stand 29 by a rod 32, a latch-lever 36, pivotally secured to the stand member 29 between the ears 38 38 by the stud 37, and halved boxes 33 33 held in place by studs 34, threaded into the box at their inner ends and having jam-nuts 35 upon the outer ends. When the latch-lever 36 occupies the position shown in Fig. 4, the side member 31 is locked against the stand member 29 and the punch can slide therethrough, being held against any movement other than an axial one; but by lifting the latch-lever 36 the side member 31 drops by gravity, leaving one open side, whereby the punch can be moved laterally onto a bracket 39, having a wooden strip 40 thereon. I prefer to use wood, so as to prevent scratching or abrasion of the punch;

but a soft metal or other material may be used, if desired.

As the halved boxes 33 are removably secured, boxes having bores of different diameters can be introduced, thus adapting the support for any size punch. The support is moved longitudinally by means of friction device connected with the cross-head 11, and as any form of friction device can be used I have not deemed it necessary to show the mechanism; but the one I prefer to use is the one shown and described in Letters Patent No. 595,611, issued to me upon the 14th day of December, 1897.

The device for stripping the tube from the punch comprises stripper-blocks 41 41 with semicircular recesses therein of substantially the same diameter as that of the punch, and the shanks 42 thereof being fitted into the stripper-carriers 43, a crank-shaft 45, the eccentric portion 44 of which is rotatable between the body of the carrier 43 and a cap 43' secured thereto, and mounted in lugs 46 46 upon the bulkhead 5, and the crank-arms 48.

For economy I prefer to use the same pair of stripper-blocks for two different size punches, and this result is obtained by boring out the face of the blocks at right angles to each other, as clearly shown in the drawings, Figs. 6 and 7.

The lugs 46 are bored of the same diameter as the diameter of the crank 44, so as to permit the same to pass therethrough, and a journal is provided by the bushings 47, which are fitted into said lugs and held therein by means of the screw 54.

While the punch is passing through the drawing-die the stripper-blocks are in the relative positions shown in Fig. 7—that is, separated from each other as far as possible—and when it is desired to strip the tube from the punch the operator grasps the cranks 48, rotates the crank-shaft 45, and moves the stripper-blocks toward each other to the position shown in Fig. 6, wherein the stripper-blocks frictionally engage the drawing-punch. During the return movement of the punch the tube abuts against the stripper-blocks and is stripped from the punch in a well-known manner. The finished lugs 49 thereon prevent any tilting or canting of the stripper-blocks and any consequent injury to the drawing-punch, thus lengthening the life thereof. It is convenient to operate both of the stripper-blocks synchronously, and to this end I have journaled an intermediate shaft 50 in the standards 51 51, secured to the face of the bulkhead 5 and carrying upon either end beveled gears 52 52, which mesh into the beveled gears 53 53, fixed to the lower end of the crank-shafts 45. It is apparent that by rotating one of the crank-shafts through the crank 48 the motion thereof will be imparted to the other crank-shaft by means of the gears 52 53 and the intermediate shaft 50.

With my improved draw-bench wherein ac-



cess to the drawing-punch is unobstructed and the drawing operation in plain sight of the operator, where the dies are not removed after each drawing operation or the strippers removed from the machine, a better tube can be drawn in less time than at present required with less help, and with my improved swinging drawing-punch a draw-bench of equal capacity with the old style will require much less space.

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

What I claim as new, and desire to secure by Letters Patent, is—

1. In a tube-forming machine, the combination with the drawing-die; of a drawing-punch; means for imparting a reciprocating movement thereto toward and away from the drawing-die; and automatic means for moving the same into and out of alinement therewith.

2. In a tube-forming machine, the combination with the drawing-die; of a drawing-punch; means for imparting a reciprocating movement thereto toward and away from the drawing-die; and automatic means for moving the same into and out of alinement therewith during the reciprocation of said drawing-punch.

3. In a tube-forming machine, the combination with the drawing-die; of a hydraulically-actuated piston; a drawing-punch pivotally connected therewith; means for moving said drawing-punch toward and away from the said drawing-die; and automatic means for swinging the same upon its pivot-mountings into and out of alinement with said drawing-die.

4. In a tube-forming machine, the combination with the drawing-die; of a hydraulically-actuated piston; a drawing-punch pivotally connected therewith and movable toward and away from the said drawing-die; and cam mechanism for moving the said drawing-punch into and out of alinement with the said drawing-die.

5. In a tube-forming machine, the combination with a drawing-die; of a hydraulically-actuated piston; a drawing-punch pivotally connected with said piston at one end; and a member, through which the said punch slides during its reciprocation, for sustaining the other end of said punch.

6. In a tube-forming machine, the combination with the drawing-die 27; of the piston 3 having the cross-head 11 connected therewith; the drawing-punch 15 pivotally secured to the said cross-head by the swivel-pin 20; cam 21; and roll 24 connected with said draw-

ing-punch, all constructed and operating substantially as described.

7. In a tube-machine; a punch-support comprising a rigid standard; a movable member connected therewith; and means for adapting said support to punches of varying sizes, said means comprising halved boxes, the bores of which correspond in size with that of the punch; and threaded means for separably-securing said halved boxes to said standard and a movable member, substantially as shown and described.

8. In a tube-forming machine, the combination with the bulkhead having an aperture therethrough for the passage of a drawing-punch; of projecting parts upon said bulkhead; stripper mechanism comprising stripper-carriers having stripper-blocks connected therewith and movably mounted between said projecting parts; and means rotatably mounted within said projecting parts and said stripper-carrier for moving said stripper-carriers toward and away from the center of said aperture, substantially as described.

9. In a tube-forming machine, the combination with the drawing-die and bulkhead; of stripper-blocks mounted within stripper-carriers; means for moving said strippers and stripper-carriers toward and away from each other and means for actuating the said stripper-blocks synchronously, the said means comprising an idler-shaft having gears therein which mesh into gears upon the said crank-shafts.

10. In a tube-forming machine, the combination with the drawing-die and bulkhead; of the strippers 41 removably secured within the stripper-carriers 43; crank-shafts 45, having cranks 44 thereon; idler-shaft 50 having the gears 52 52 thereon; and gears 53 53 fixed to the crank-shafts 45 and meshing into the said gears 52 52, all constructed and operating substantially as described.

11. In a tube-forming machine, the combination with a punch; of a support, through which the said punch slides during its movement, said support having a movable member which, when open, permits the said punch to be moved out of said support, substantially as shown and described.

12. In a tube-forming machine, the combination with a swinging punch; of a support, through which the said punch slides during its movement, said support having a hinged member connected therewith, so arranged that when in its open position, the said punch can be moved laterally out of said support, substantially as shown and described.

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

FERDINAND DEMING.

Witnesses:

JOHN S. ARNOTT,  
ROBERT FRAZER.