

(No Model.)

2 Sheets—Sheet 1.

T. J. BRAY.

MACHINE FOR COLD ROLLING METALLIC PIPE.

No. 440,130.

Patented Nov. 11, 1890.

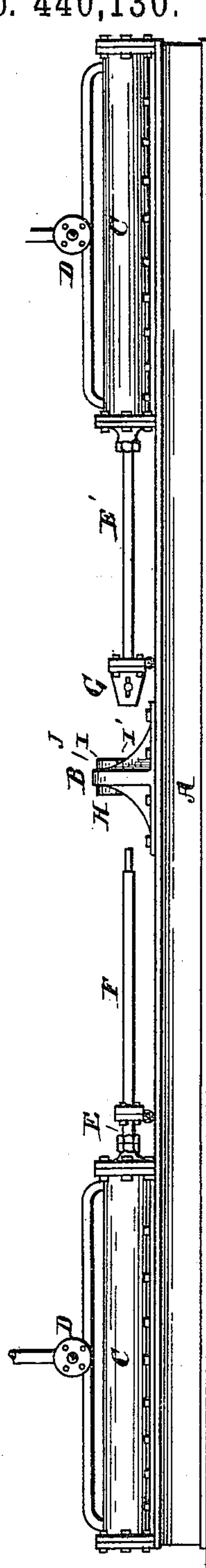


Fig. 1.

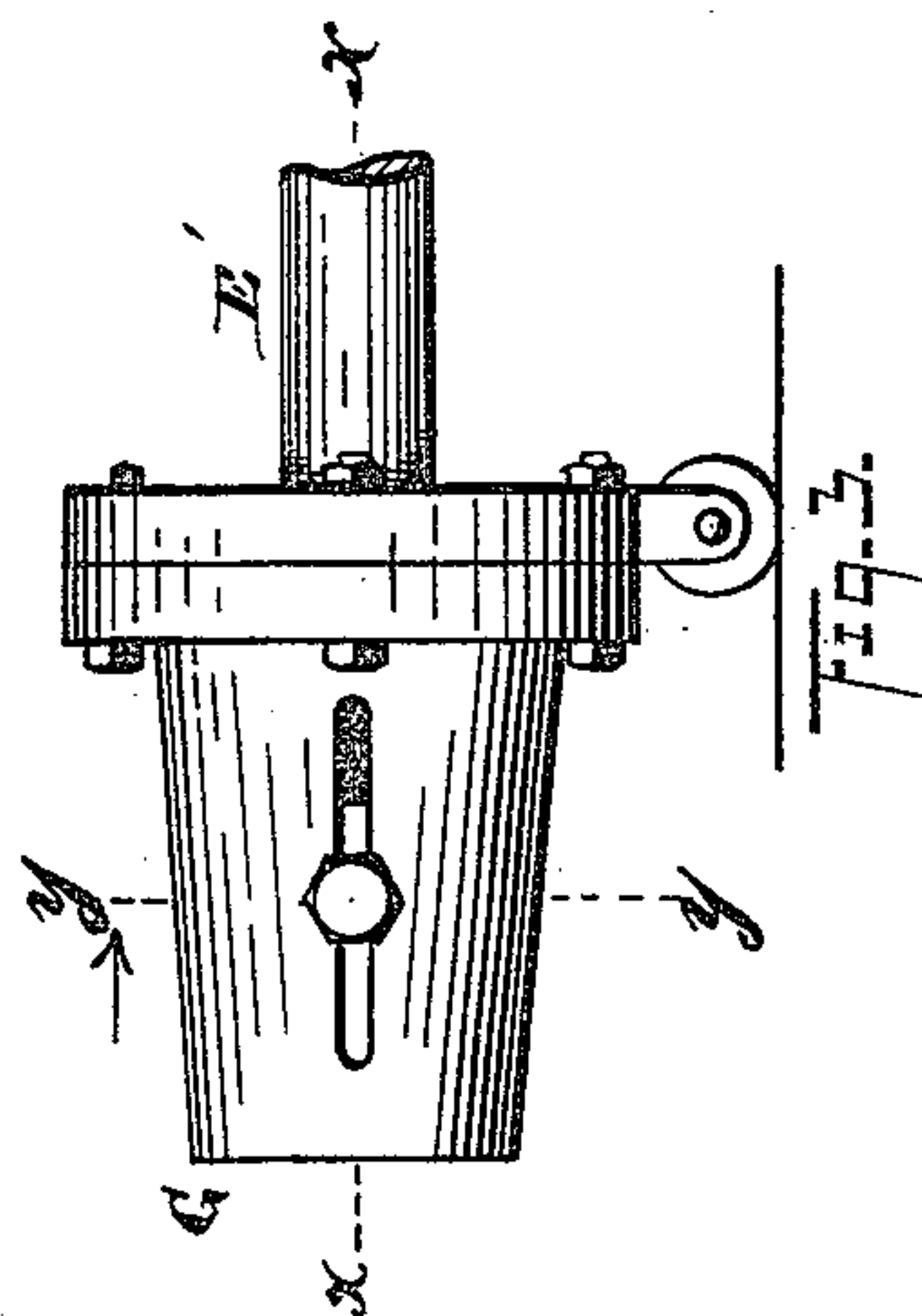


Fig. 2.

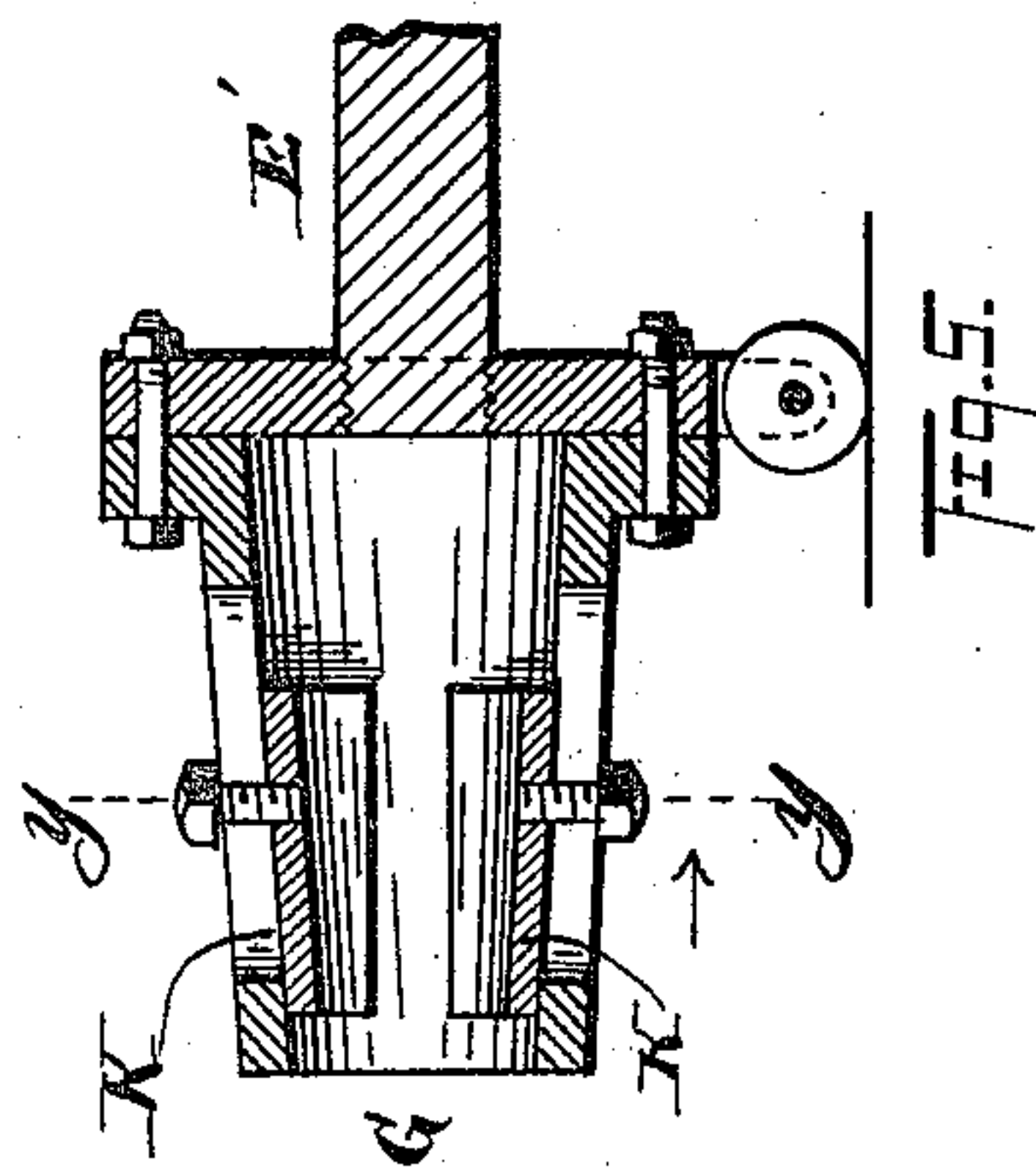


Fig. 3.

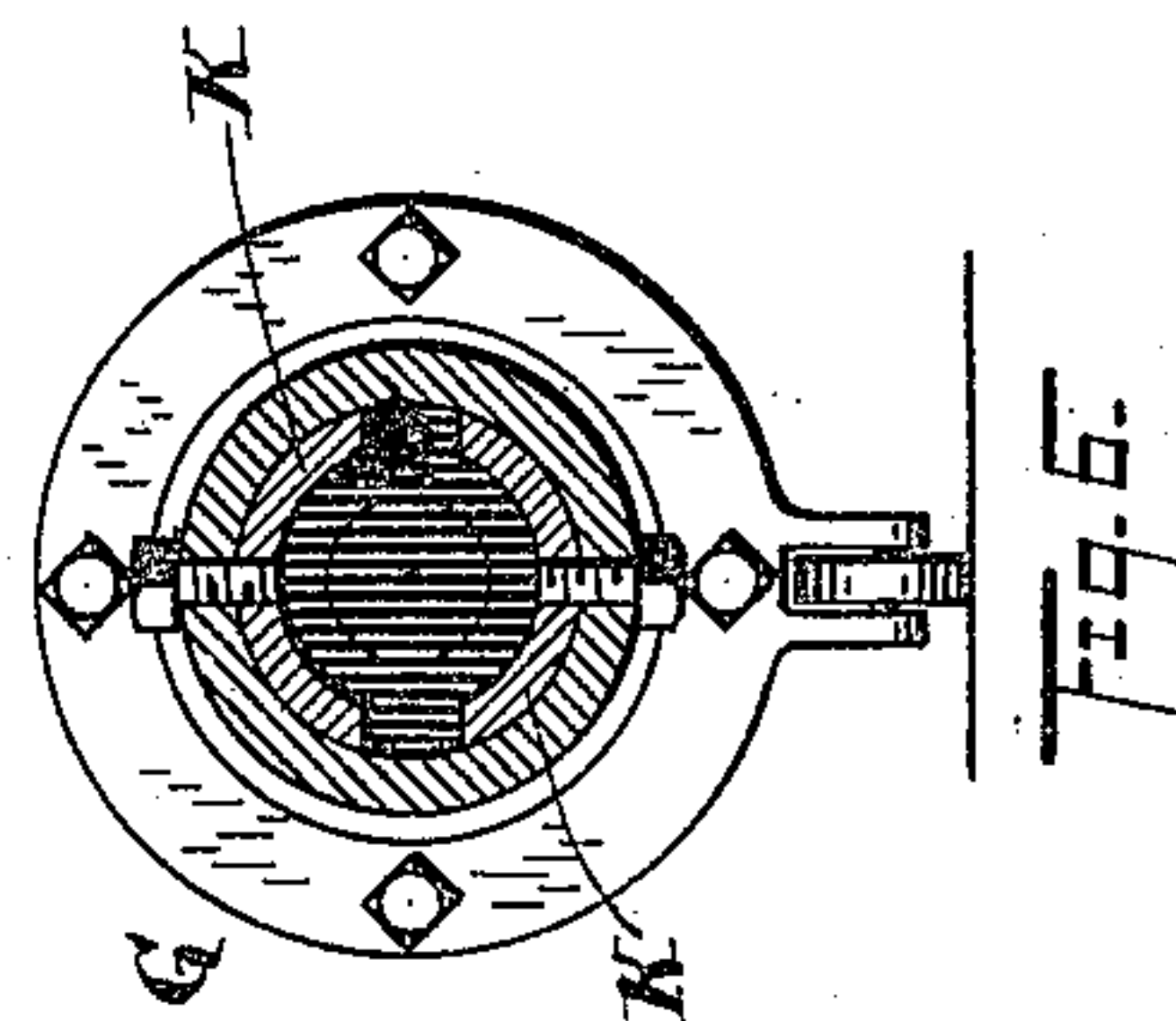


Fig. 4.

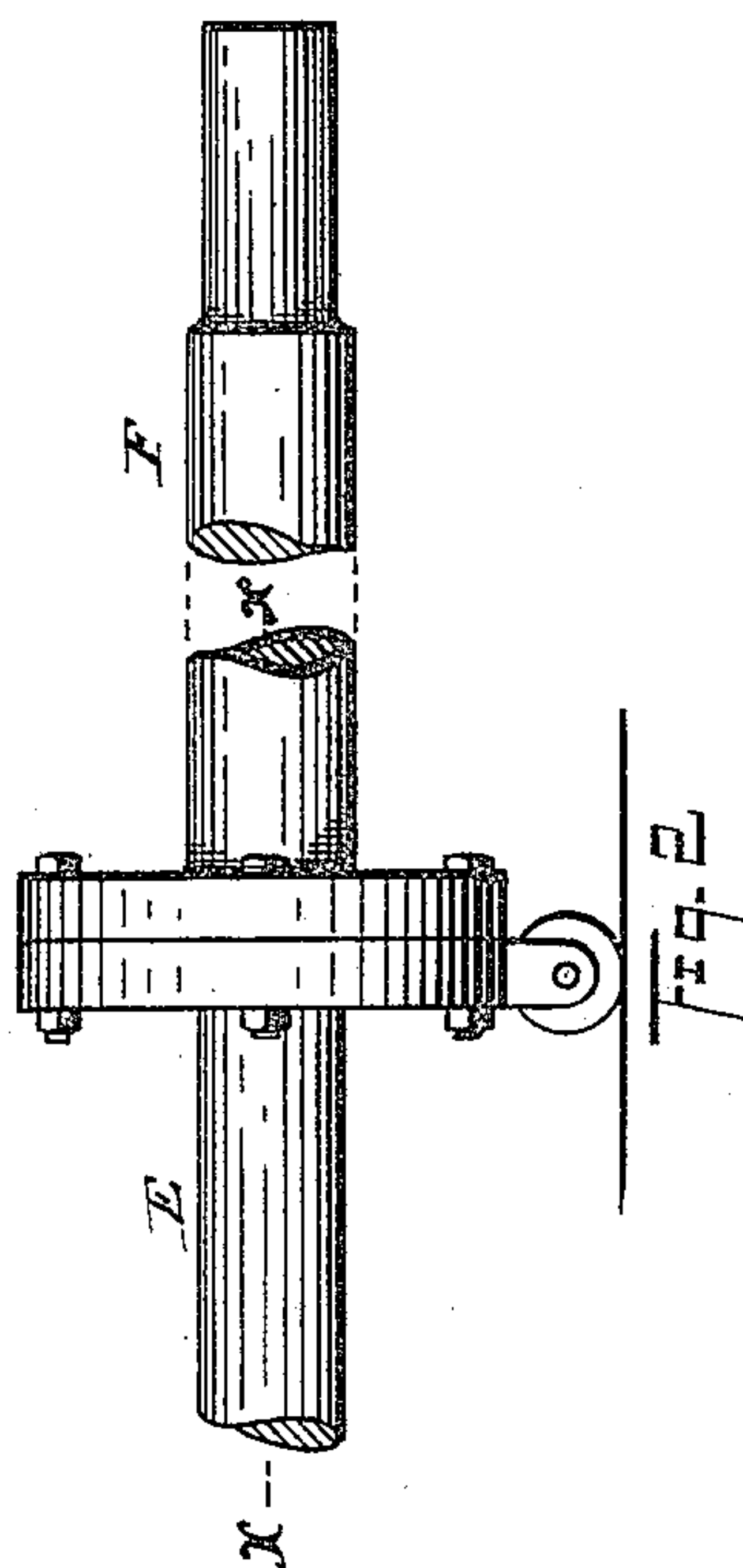


Fig. 5.

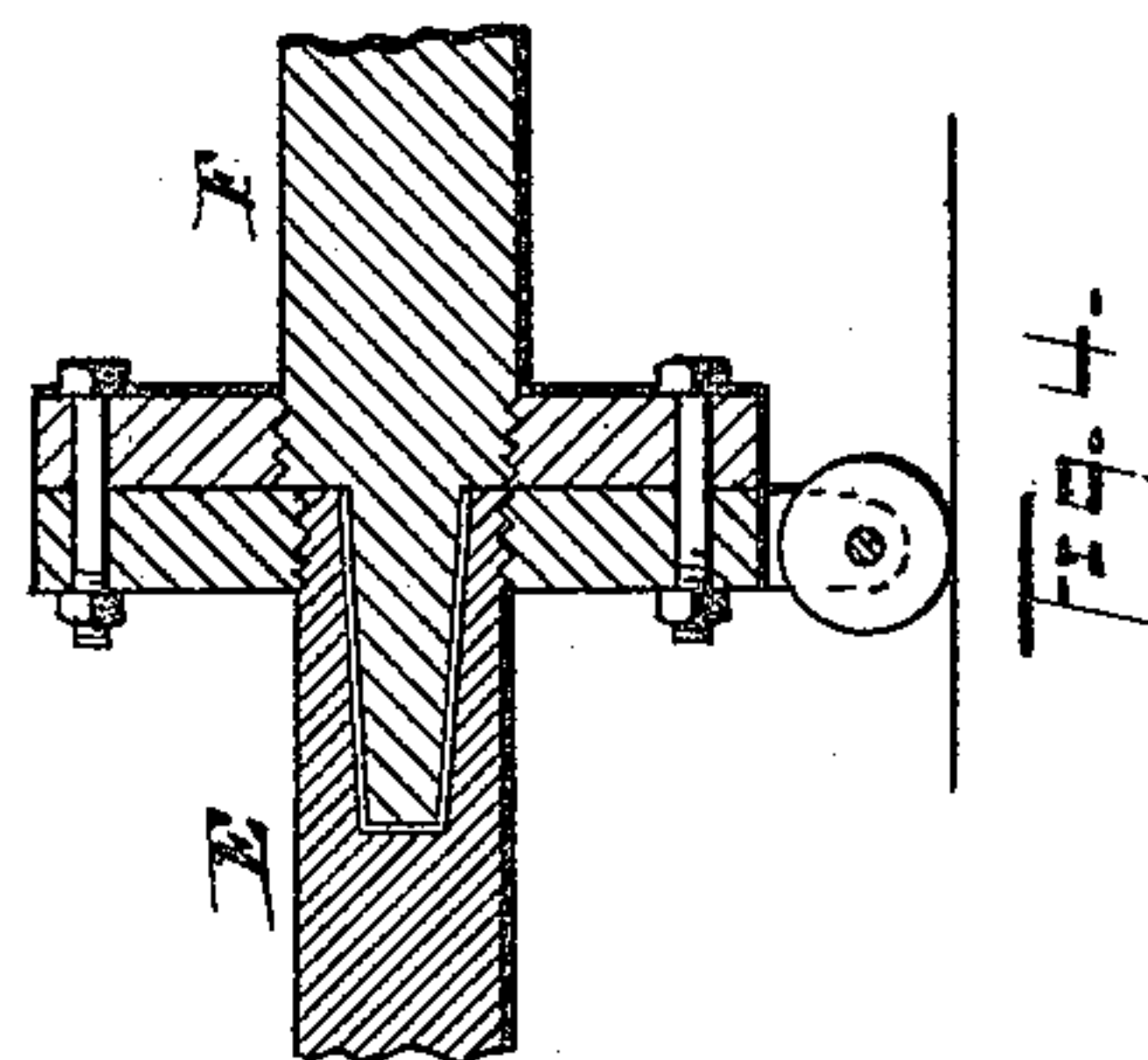


Fig. 6.

Witnessed,
Charles S. Lounis
C. E. Humphrey.

Inventor,
Thomas J. Bray,
by C. E. Humphrey
Attorney

(No Model.)

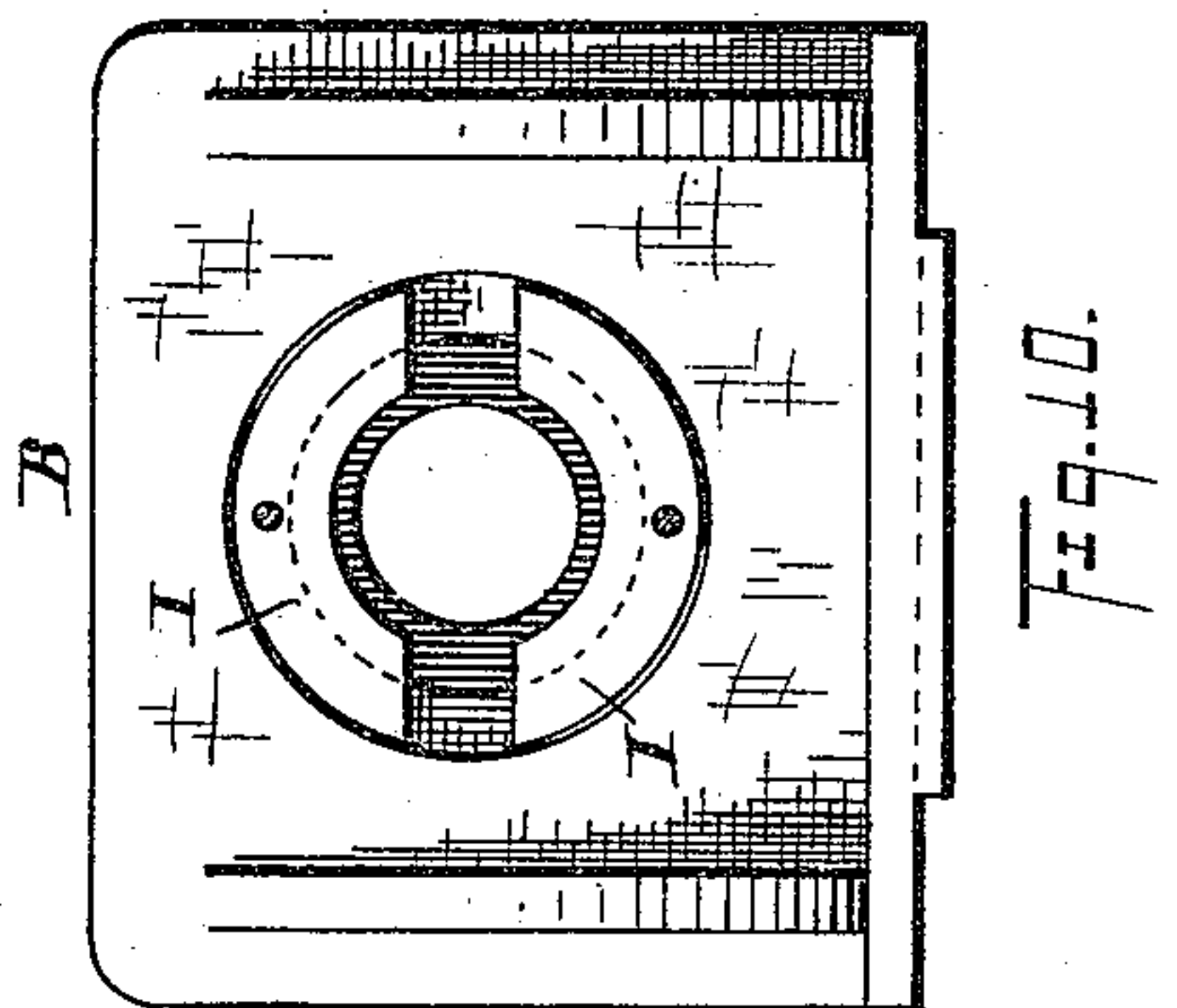
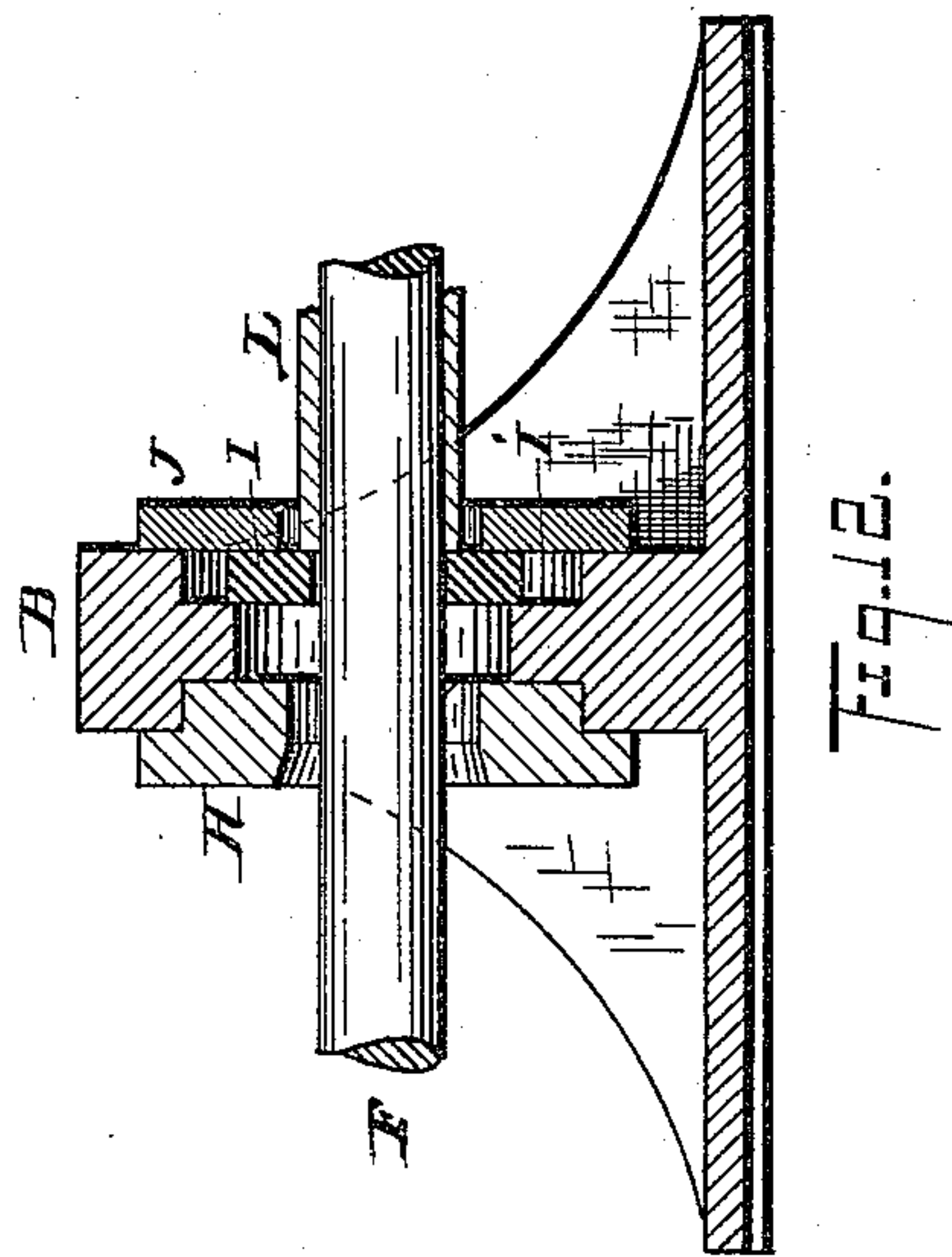
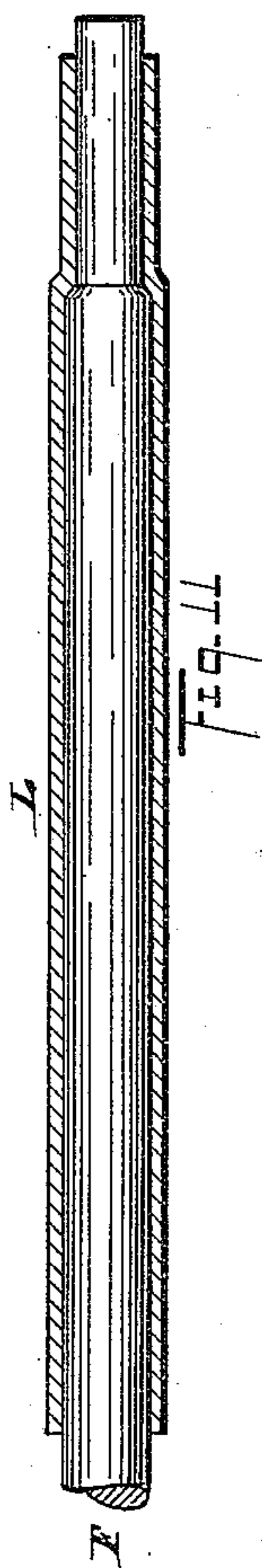
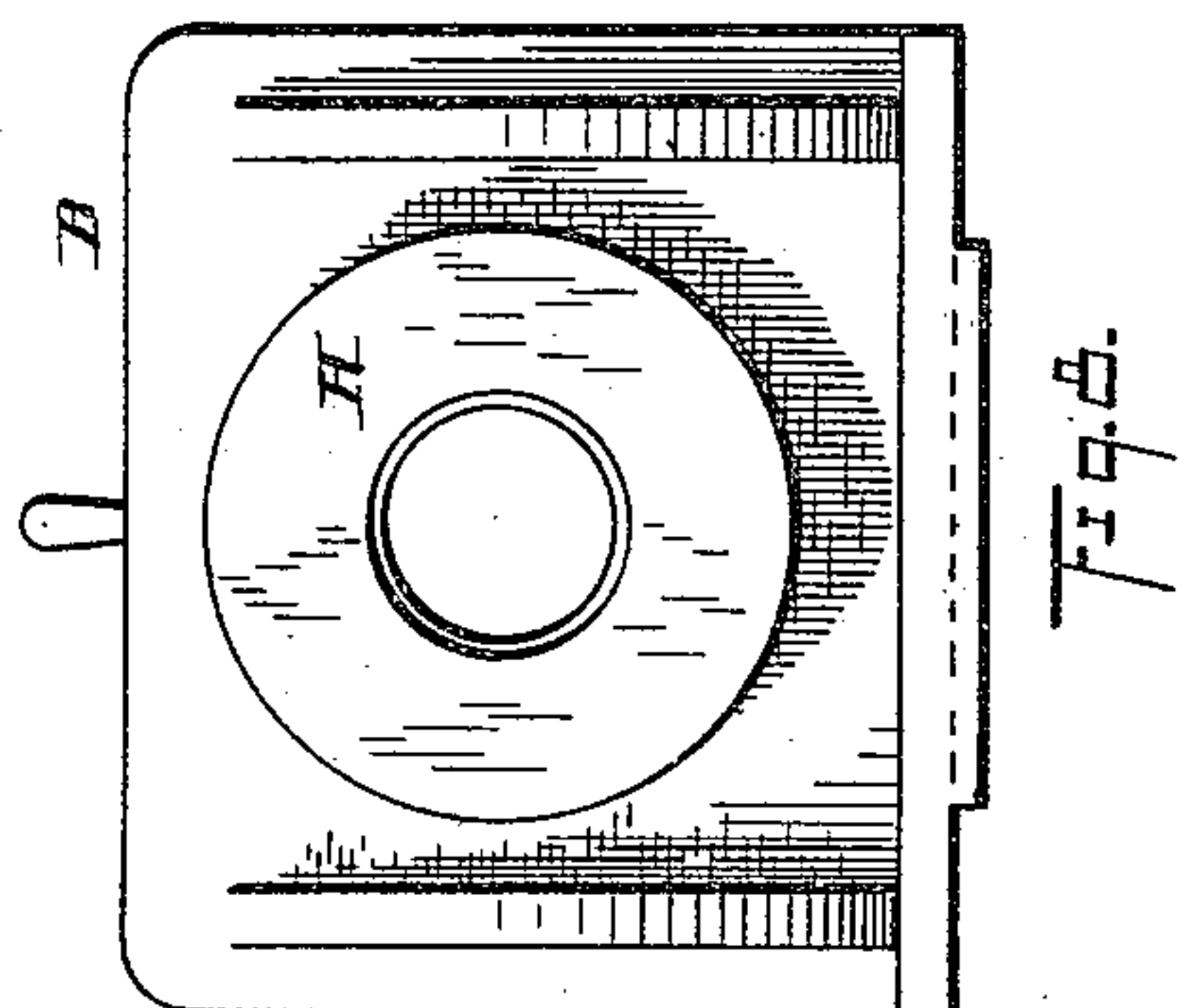
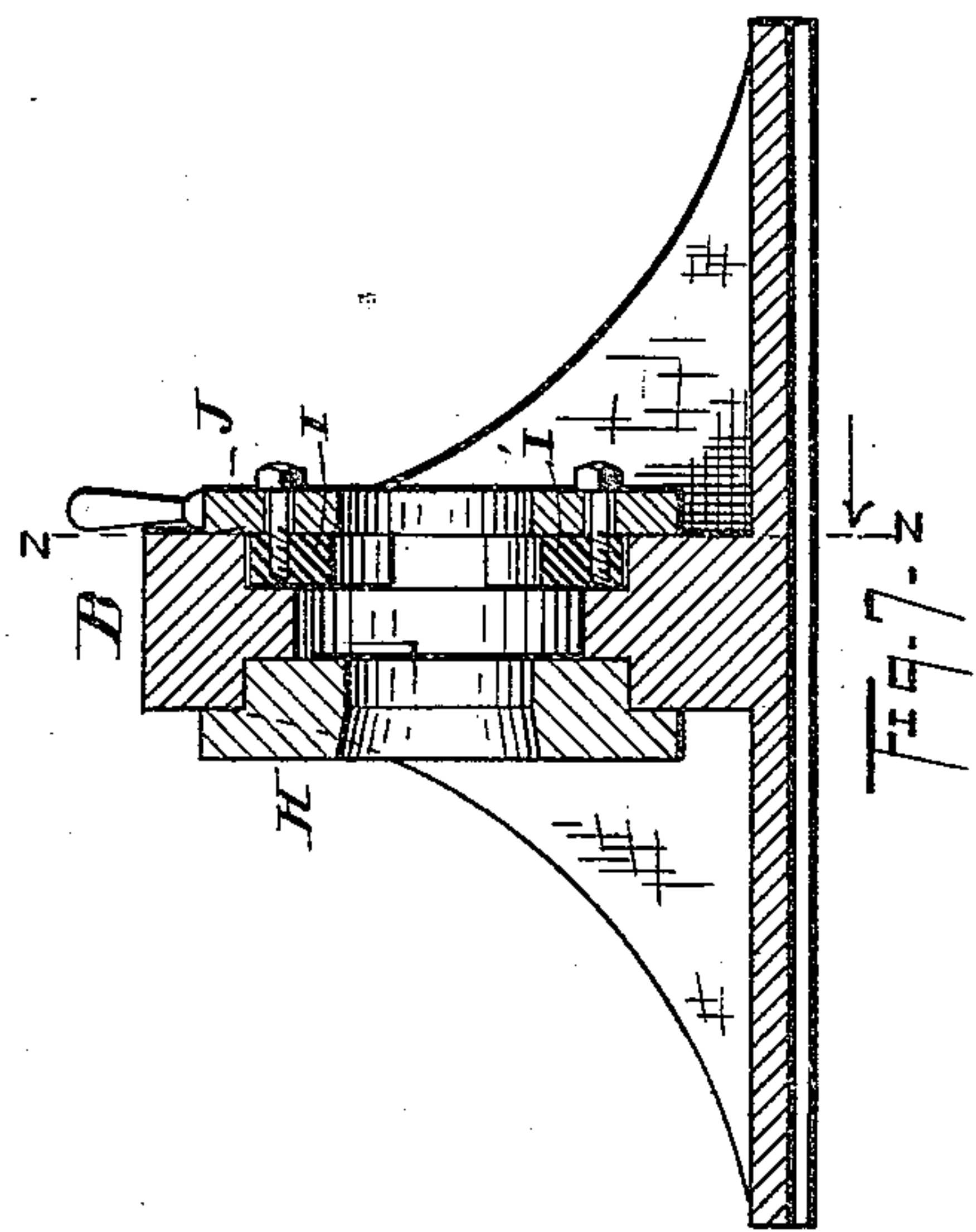
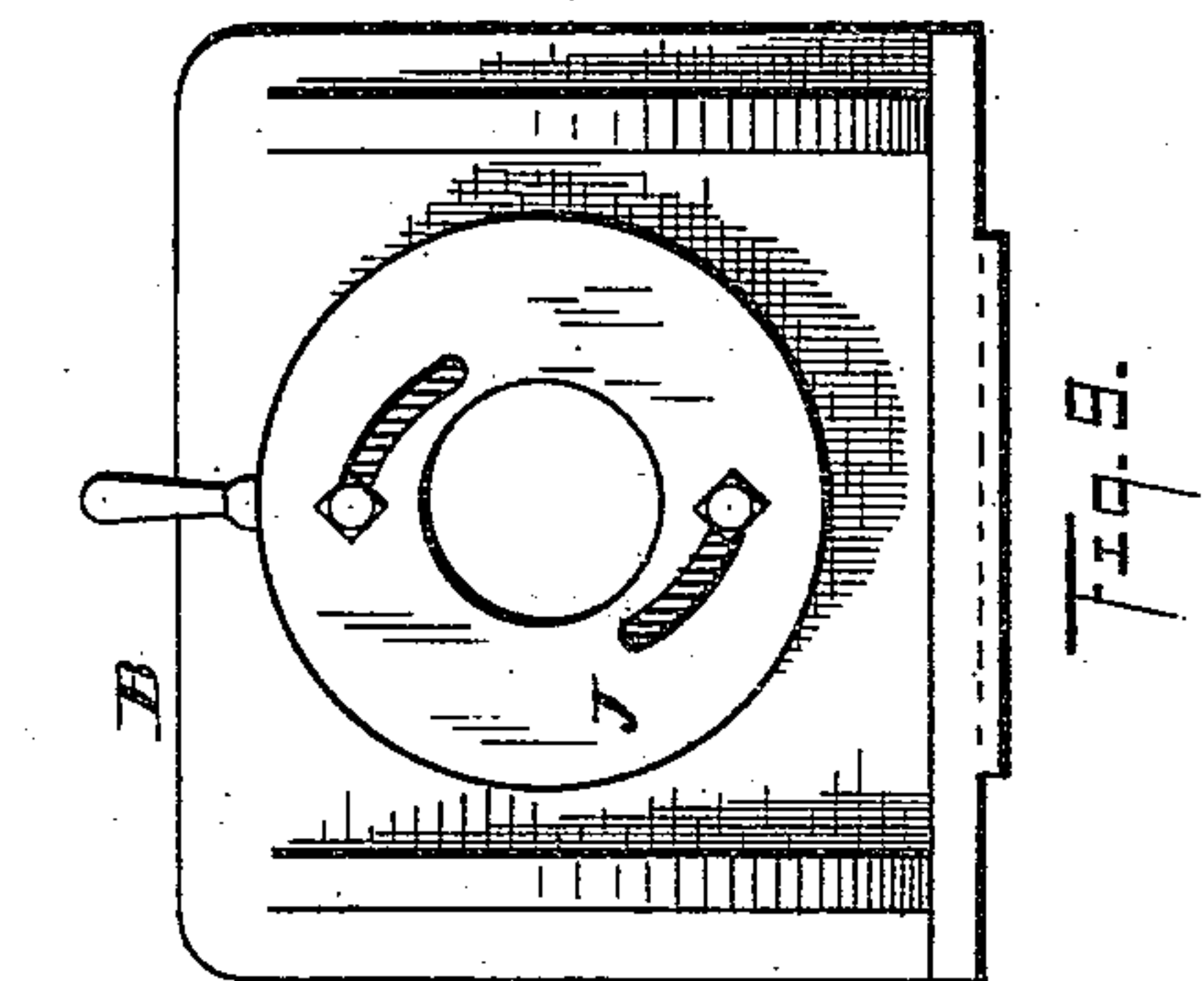
2 Sheets—Sheet 2.

T. J. BRAY.

MACHINE FOR COLD ROLLING METALLIC PIPE.

No. 440,130.

Patented Nov. 11, 1890.



Witnesses.

Will S. Lowrie
C. E. Humphrey.

Inventor
Thomas J. Bray,
by C. E. Humphrey
Attorney.

UNITED STATES PATENT OFFICE.

THOMAS J. BRAY, OF WARREN, OHIO, ASSIGNOR OF ONE-HALF TO THE
PAIGE TUBE COMPANY, OF SAME PLACE.

MACHINE FOR COLD-ROLLING METALLIC PIPE.

SPECIFICATION forming part of Letters Patent No. 440,130, dated November 11, 1890.

Application filed July 21, 1890. Serial No. 359,357. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. BRAY, a citizen of the United States, residing at Warren, in the county of Trumbull and State of Ohio, have invented a certain new and useful Improvement in Machines for Cold-Drawing Metallic Pipe, of which the following is a specification.

My invention has relation to improvements in machines and devices for cold-drawing metallic pipe to reduce its internal and external diameter and compress the surfaces of the metal, and is ancillary and germane to another application filed by me June 10, 1890, the serial number of which is 354,971; and it has for its objects to provide devices by which the pipe to be reduced is simultaneously drawn and forced through the die from opposite sides of the head-block, to secure a smooth and substantially polished surface for the interior and exterior of the pipe, to furnish simple and effective means for stripping the completed pipe from the mandrel, and, generally, to produce new and effective mechanism for securing the above results.

To the aforesaid objects my invention consists in the peculiar and novel mechanism, construction, and combination of parts, hereinafter described, and then specifically pointed out in the claims, reference being had to the accompanying drawings, forming a part of this specification.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a side elevation of one form of my improved machine; Fig. 2, an elevation, enlarged, of the forcing piston-rod and mandrel, the latter shortened by cutting away the intermediate part; Fig. 3, a similar elevation of the drawing piston-rod and draw-head; Figs. 4 and 5, longitudinal vertical sections of the parts shown in Figs. 2 and 3; Fig. 6, a transverse vertical section of the parts shown in Figs. 3 and 5 at the line Y Y; Fig. 7, a longitudinal vertical section of the head-block with die-block and stripping-jaws mounted therein; Figs. 8 and 9, end elevations of the head-block from opposite directions, showing, respectively, the die-block and stripping-jaws; Fig. 10, an end elevation of the head-block, showing the stripping-jaws with the operating cam-wheel removed at the line z z of Fig. 7;

Fig. 11, a longitudinal elevation of a part of the mandrel and inclosing-pipe, shown in section; Fig. 12, a vertical central longitudinal section of the head-block, showing a portion of the mandrel and pipe thereon and the stripping-jaws closed back of the pipe.

Referring to the drawings, A is an elongated bed, preferably of metal and of the form shown, having mounted substantially centrally thereon a head-block B, and at each end cylinders C C', each provided with valves D D', by which the operative agent, as gas, steam, or water, is admitted and regulated. Inside of said cylinder are pistons, which are connected with and operate piston-rods E E', in the usual manner, of reciprocating-engines, one of which piston-rods E bears a mandrel F and the other E' a draw-head G. Intermediate pipe-connections, which it has not been deemed necessary to show, as their construction and operation will be readily understood by those skilled in the art, unite these valves D D', and by the operation of these valves the piston-rods E E' may be caused to move singly or in unison in the same direction. In the face of the head-block B, toward the mandrel F, is a recess in which is mounted a detachable die-block H, having an orifice with outwardly-beveled edges, its smaller diameter being equal to the size to which it is desired to reduce the outside of the pipe. In the opposite face of the head-block is a corresponding recess, in which is mounted a stripping device consisting of two oppositely-disposed vertically-moving plates I I', having in adjacent edges semicircular notches which fit the mandrel F. These plates are caused to approach and recede from each other by the partial revolution in opposite directions of an annular plate J, having spiral grooves, in which slide bolts projecting from said plate I I'. The mandrel F, attached to the piston-rod E, is longer than the sections of pipe to be made, is of the size of the interior of the desired pipe, and has its inner end reduced, as shown, and for the purpose hereinafter specified.

The draw-head G consists of a hollow tapering case having narrow longitudinal slots on opposite sides, and within which are semicylindrical jaws K K, with corrugated inner faces held in the case by bolts, which enter

and slide in the slots. The cylinders, piston-rods, mandrel, and draw-head are placed in alignment with the die-block and stripping-device.

5 In operation, sections of malleable metallic pipe, as E, welded in any of the approved methods and of a size to readily slide on the mandrel F, are reduced at one end by rolling, forging, or other preferred method to adapt
10 them to fit on the reduced end of the mandrel. These sections, if too hard, are then annealed, but whether annealed or not are pickled in an acid bath to remove the internal and external scale incident to such pipe.
15 A section is then placed on the mandrel F and forced forward until the reduced end passes through the die-block past the stripping-plates I I', which are opened to permit its passage, and enters the draw-head G, the jaws
20 K K of which grasp it by a slight retrograde movement of either of the piston-rods E'. Power is then applied to the cylinders C C', causing the draw-head to simultaneously move in unison toward the cylinder C', and
25 operate severally to draw and push the pipe L, mounted on the mandrel through the die-block H, wherein its external periphery is forced inward and its internal periphery compressed against the polished face of the mandrel.
30 When the pipe L passes beyond the plates I I', the annular plate J is partially revolved, forcing the plates I I' against the mandrel back of the pipe. The motion of the piston-rod E is then reversed and draws
35 the mandrel F back through the die-block C and out of the pipe L, which is stripped therefrom by the plates I I', which prevent its return with the mandrel, and has, by reason of compression against the mandrel and die-
40 block, a smooth and polished inner and outer surface.

I do not intend by this description to limit my invention to the proportions or exact construction shown in the accompanying drawings, as it is apparent that the former will be
45 governed by the nature of the work to be done. Trifling changes may be made in the latter—as, for instance, a different draw-head may be substituted for the one shown, other
50 means may be adopted for moving the stripping-plates, and other minor changes made without departing from my invention, which I claim to be—

1. A machine for cold-drawing metallic pipe, embodying the following elements: a
55 base, a head-block intermediately mounted thereon, bearing a die-block and a stripping device, a mandrel to form the interior of the pipe, a draw-head to grasp the pipe on said
60 mandrel, and forcing-cylinders disposed on opposite sides of said head-block to actuate said mandrel and draw-head, substantially as shown and described.

2. The combination, with the supporting-base and the head-block mounted thereon, arranged to support a die-block and stripping device, of the forcing-cylinders provided with
65 piston-rods bearing, respectively, a mandrel and a draw-head, substantially as shown and described.

3. The combination, in a machine for cold-drawing metallic pipe, of a base, a head-block intermediately mounted thereon, arranged to hold a die-block, a mandrel arranged to carry and force the pipe through
75 said die-block, stripping devices, and oppositely-moving plates, arranged to be manipulated by hand and arrest the return of said pipe with the retrograde movement of the mandrel, substantially as shown and described.

4. The combination, with a supporting-base and a head-block intermediately mounted thereon and arranged to bear a detachable die-block, of forcing-cylinders arranged on
85 opposite sides of and in alignment with said head-block and bearing on their respective piston-rods a mandrel and a draw-head, substantially as shown and described.

5. The combination, with the head-block and mandrel arranged to enter and carry the
90 pipe through it, of the reciprocating plates I I' and cam-wheel J to actuate said plates, substantially as shown and described.

6. The herein-described head, consisting of the hollow tapering slotted case G and the
95 internally-corrugated semicircular sliding jaws K K, arranged to slide therein and retained by bolts, substantially as shown and described.

In testimony that I claim the above I here-
100 unto set my hand.

THOMAS J. BRAY.

In presence of—

H. A. MILLER,
H. R. GILBERT.