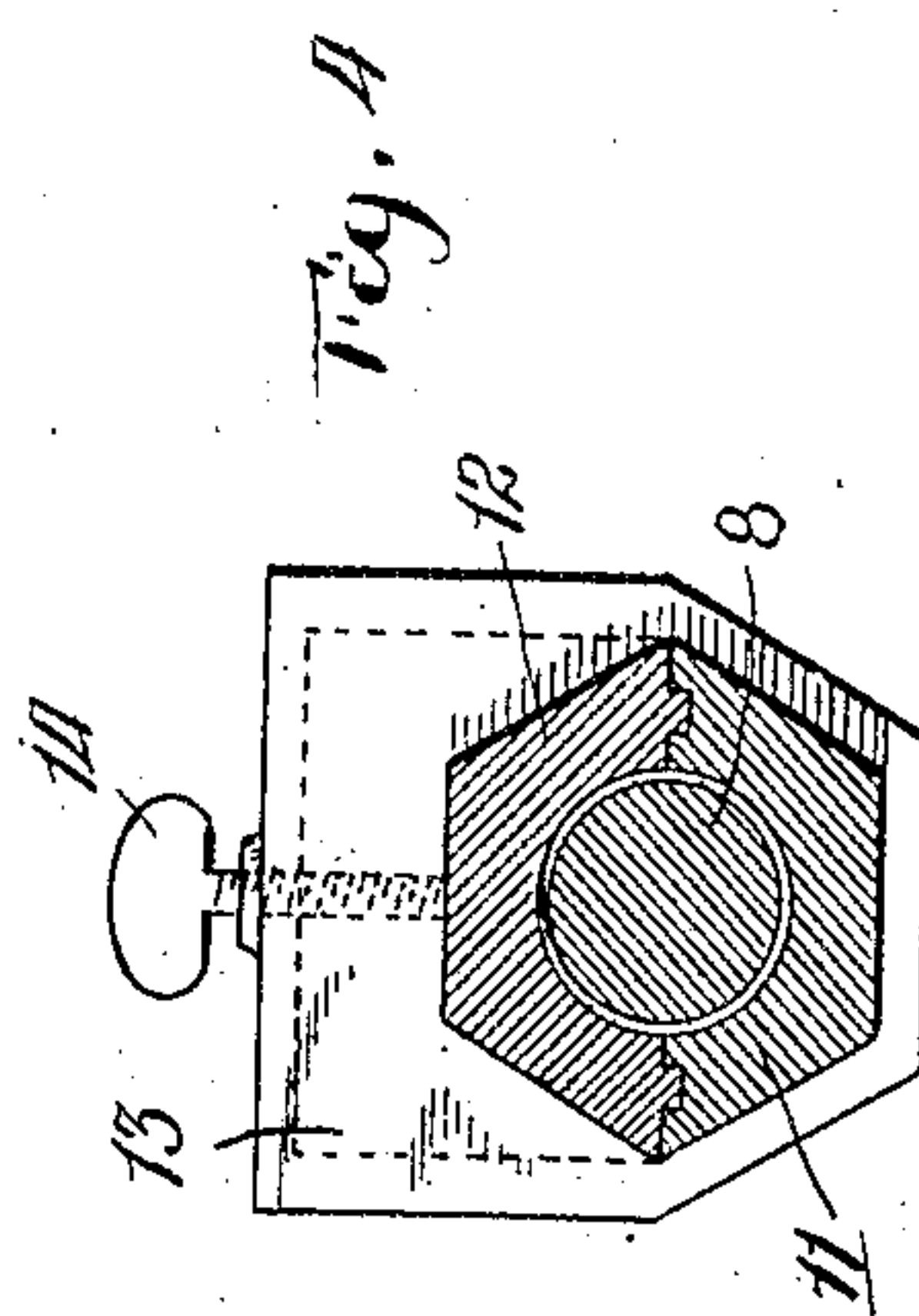
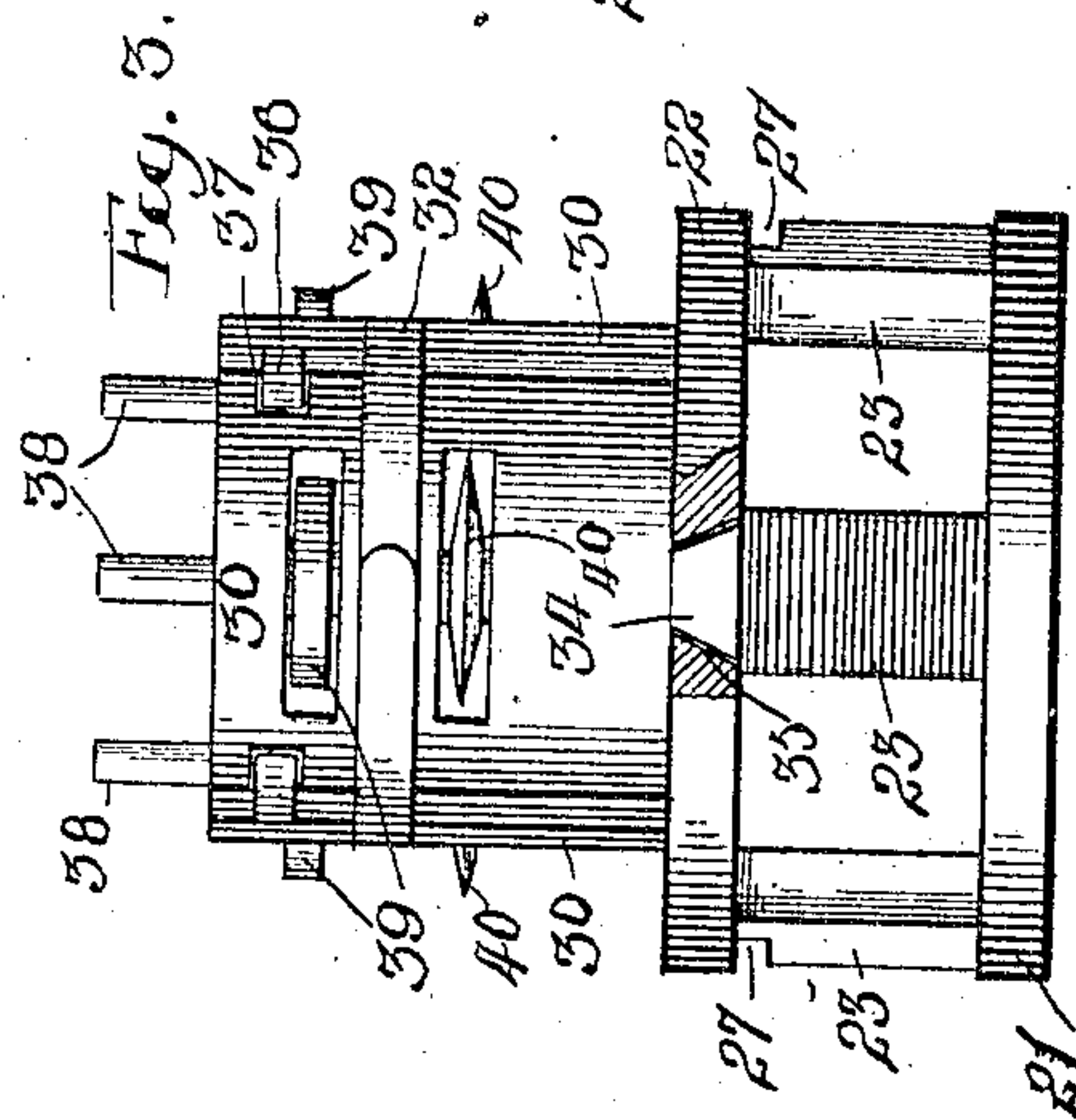
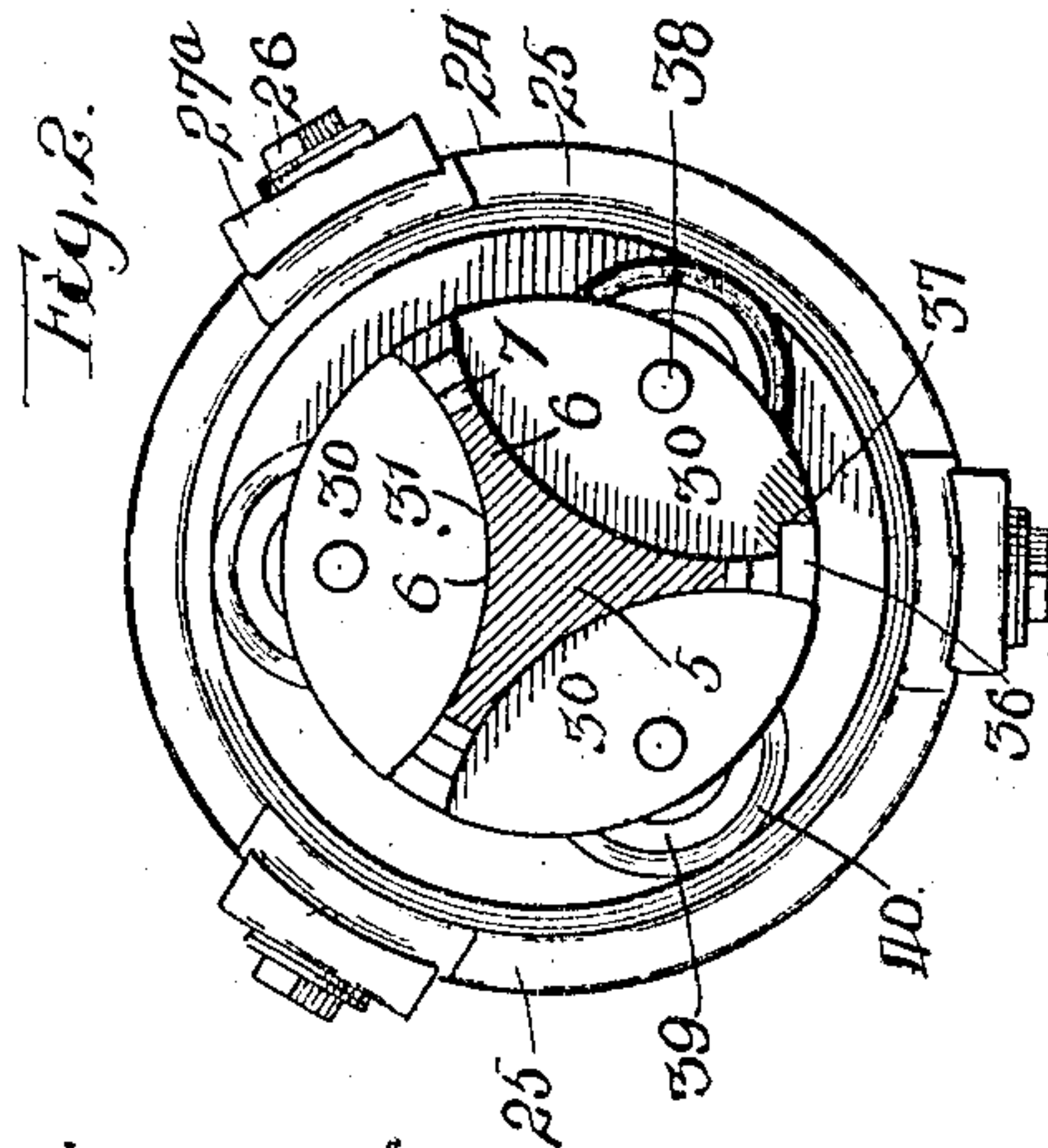
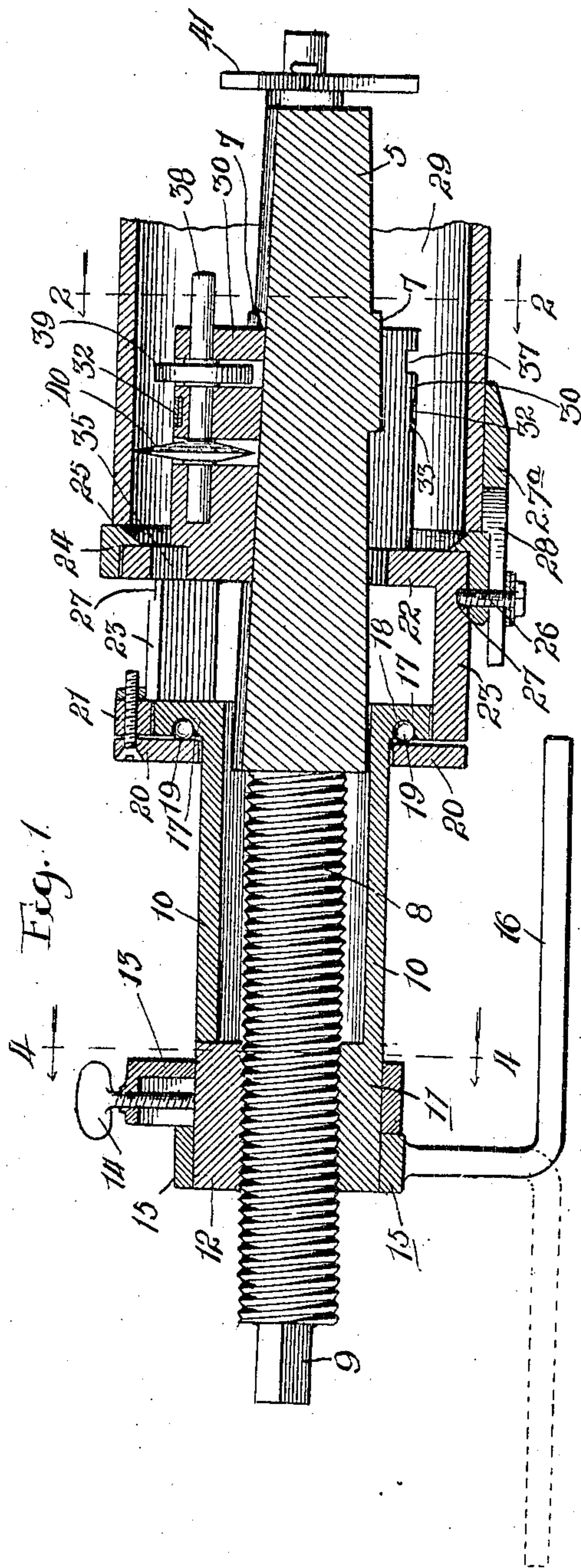


No. 852,341.

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P. MCGREGOR.
PIPE CUTTER.

APPLICATION FILED FEB. 6, 1907.



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UNITED STATES PATENT OFFICE.

PETER MCGREGOR, OF CHICAGO, ILLINOIS.

PIPE-CUTTER.

No. 852,341.

Specification of Letters Patent.

Patented April 30, 1907.

Application filed February 5, 1907. Serial No. 355,918.

To all whom it may concern:

Be it known that I, PETER MCGREGOR, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pipe-Cutters, of which the following is a specification.

This invention relates to cutters for pipes or boiler tubes of the style which employ a sectional cutter head and tapered mandrel; and the object of the present invention is to so construct the device that the tapered mandrel will perform the double function of distending the sections of the cutter head and revolving the same, this double function being performed by a single operation of revolving the stem of the mandrel. In numerous previous constructions it has been the practice to provide a tapered mandrel intended to be advanced by one operation, and a revoluble cutter head intended to be revolved by a separate and distinct operation, thus necessitating two operations in order to perform the cutting. The cutter of the present invention is intended to obviate this difficulty and enable the entire cutting operation to be performed by the simple process of revolving the mandrel which automatically distends the sections of the cutter head at a rate proportionate to the revolution of the cutters, thereby obviating the possibility of distending the cutters at a rate disproportionate to the cutting operation.

Another object of the invention is to provide means for drawing back the mandrel to initial position after the cut has been performed without the necessity for unscrewing the mandrel, which enables the cutter to be quickly and easily adjusted for subsequent cutting which would not be the case if it were necessary to retract the mandrel by the same slow process by which it was advanced.

Another object of the invention is to provide steadying rollers for holding the pipe cutter in its adjusted position after one or more of the cutters have passed through the pipe.

The invention further relates to the bearings provided for securing an easy rotation of the parts, to the bracket for holding the surrounding cutter sleeve in fixed position; and to the construction of the cutter as a whole, and the individual parts thereof.

The invention consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings Figure 1 is a longitudinal sectional view of the entire cutter; Fig. 2 a cross sectional view taken on line 2—2 of Fig. 1 looking in the direction of the arrow; Fig. 3 a view of the cutter head and connecting portions of the cutter; and Fig. 4 a cross sectional view taken on line 4—4 of Fig. 1 looking in the direction of the arrows.

The cutter comprises a tapered mandrel 5 of substantially triangular formation having concave sides 6 and intermediate ribs 7. The mandrel terminates at its rear end in a screw threaded stem or shank 8, squared at its outer end 9. The stem passes through a sleeve 10 terminating in a head 11 through which the stem is screw threaded. The upper half 12 of the head is preferably made removable from the lower half in order to permit the mandrel to be retracted without the necessity for unscrewing it in the manner in which it is advanced. The sleeve and head are preferably hexagonal in cross section, as shown in Fig. 4, and the head portion of the sleeve is surrounded by a housing 13 through which is entered a thumb screw 14 the inner end of which bears against the removable portion of the head and serves to clamp it into position to engage the threads of the mandrel stem. The end of the head is surrounded by a collar 15 having outwardly projecting therefrom an L-shaped arm 16, which is adapted to be inserted into an adjoining tube or in any other fixed structure, or is adapted to be held in the hand to prevent the rotation of the sleeve as the mandrel is advanced. The sleeve is provided at its forward end with an annular flange 17 having in its rear face a ball race or track 18 in which are inserted ball bearings 19 which are adapted to bear against the inner face of a ring 20. The ring is screwed to a collar 21 which surrounds the flange 17, which collar forms part of the supporting frame for the cutter head and is connected with a circular wall 22 by means of three arms 23, one of which is shown in section in Fig. 3. This construction provides an open and integrally formed cage or frame-work through which the mandrel extends, the cage or frame-work being revoluble around the sleeve 10

upon the balls 19 as a bearing. The circular forward wall 22 is surrounded by a fixed collar 24 having an inwardly extending flange 25 which overlies the forward edge of the circular wall 22, and the collar 24 has entered therethrough a plurality of screws 26 which are adapted to enter grooves or recesses 27 cut in the outer faces of the arms 23 immediately behind the wall 22 to which the arms are connected. These recesses permit the arms and connected portions of the framework to be revolved within the collar 24, the screws 26 serving to guide the frame during its revolution.

The collar 24 has adjustably secured thereto forwardly projecting fingers 27^a each of which is provided with a slot 28 adapted to have one of the screws 26 entered therethrough for clamping the finger in position on the collar. The fingers are adapted to embrace the pipe or tube section 29 which it is desired to cut.

The cutter head comprises 3 sections 30 which, combined together, are of substantially cylindrical formation, being outwardly curved on their outer faces, and the inner faces 31 of the sections are likewise convexly curved to register with the concave formation of the faces of the mandrel which is entered between the sections of the cutter head. The three sections are held together by means of a split ring spring 32 which passes through channels 33 in the respective sections of the cutter head. Each of the sections of the cutter head is provided on its rear edge with a dove tail lug 34 which enters a co-operating dove tail channel 35 in the wall 22, the channels being radially arranged to permit of the in and out movement of the sections of the cutter head. The dove tail formation of the lugs, however, prevents the sections from being moved forward as the mandrel is advanced, and serve to unite the parts firmly. Each of the sections of the cutter head is provided with a stud 36 adapted to enter a recess 37 in the next adjacent section, which arrangement permits the sections to be expanded with respect to one another, but prevents displacement, and holds the parts into an integral whole. Each of the cutter head sections has entered therethrough a pintle 38 upon which is mounted a roller 39 and a cutter 40, the roller being positioned in front of the cutter. The pintle forwardly projects from the cutter head section a sufficient distance to permit of its removal for the purpose of changing or replacing the cutters as the same may become worn or in need of sharpening, or for the purpose of replacing cutters or rollers of one size for cutters and rollers of a different size. The mandrel is provided at its forward end with a spider guide wheel 41 which serves to position the forward end of the mandrel within the tube.

In use the fingers 27^a are adjusted to proper position to embrace the intended tube or pipe and cutters and rollers of a proper size are entered into the cutter head, after which the sleeve 10 is held against revolution by means of the arm 16. The screw threaded mandrel stem is then revolved, which feeds forward the mandrel and at the same time revolves the cutter head as a whole by reason of the engagement of the concave sides of the mandrel with the sections of the cutter head. The cutter head carries with it, in this revolution, the wall 22 and the remaining portions of the frame-work which revolve upon the balls 19 as a bearing. The continued revolution of the screw threaded stem feeds forward the mandrel at a rate proportionate to the cutting operation, and the cutter head is carried around without being advanced, the mandrel sliding forward through and distending the cutter head sections simultaneously with the revolution of the cutter head. In cutting pipes or tubes it will almost always be found that some portions of the pipe are thicker than other portions, so that it rarely happens that all three of the cutters will pierce the pipe or tube at the same time. By providing the guide rollers, which are brought into contact with the uncut surface of the tube simultaneously with the passage of the cutting edge therethrough, the cutter will be prevented from binding or wedging in the cut, and the final cutting operation will be perfectly, easily and cleanly performed, which would be impossible if one of the cutters became wedged or clamped within the cut. Each of the cutters following after the next preceding cutter will enter the cut formed thereby and serve to increase the depth of the cut to a degree proportionately to the distention caused by the advancing mandrel, so that the ratio between the cutting operation and the distending operation will always remain the same, since the one is automatically controlled by the other. After the cut has been completed the mandrel can be quickly retracted by removing the collar 15 and loosening up the housing 13 and thereafter lifting the removable section 12 of the screw threaded head, which allows the screw threaded stem of the mandrel to be pulled back bodily without being unscrewed, thereby effecting a great saving in time in preparation for additional cutting. The invention is one which enables the entire cutting operation to be performed by simply turning the feed stem and without the necessity for two separate and distinct operations and the imperfection in the resulting cut attendant thereon.

In some cases it may be found inconvenient to insert the arm 16 into an adjoining tube or other stationary structure, in which case it is desirable to apply the collar 15 to

the head of the sleeve in such a manner that the arm will project rearwardly, as shown in dotted lines. When in this position it is desirable to use a ratchet wrench for turning the stem of the mandrel, and with each forward turn of the wrench the sleeve will be partially revolved, and with it the arm 16. The ratchet wrench, however, on its return movement will bear against the rearwardly projecting arm and carry back the arm to its initial position, so that, so far as practical results are concerned, the sleeve is held in a substantially fixed position with respect to the mandrel stem.

What I regard as new and desire to secure by Letters Patent is:

1. In a pipe cutter, the combination of a tapered mandrel terminating at its rear end in a screw threaded stem, a mounting for the stem, a portion of said mounting being removable to permit the retraction of the stem, means for clamping the removable portion of the mounting in place, a cutter head, a mounting therefor, and cutters within the head adapted to be expanded by the movement of the mandrel, substantially as described.

2. In a pipe cutter, the combination of a tapered mandrel terminating at its rear end in a screw threaded stem, a mounting for the stem, a portion of said mounting being removable to permit the retraction of the stem, a housing surrounding the mounting, an adjustable screw entered through the housing and adapted to clamp the removable section of the mounting in place, a cutter head, a mounting therefor, and cutters carried by the head and adapted to be distended by a movement of the mandrel, substantially as described.

3. In a pipe cutter, the combination of a tapered mandrel terminating at its rear end in a screw threaded stem, a sleeve surrounding the stem and having a head provided with a screw threaded opening through which the stem is entered, a frame-work surrounding the sleeve, a ball bearing mounting between the frame and sleeve, a cutter comprising sections adapted to be distended by the movement of the mandrel, said sections being mounted to the frame-work and revoluble therewith in conformity with the revolution of the mandrel, and cutters within the sections, substantially as described.

4. In a pipe cutter, the combination of a tapered mandrel terminating at its rear end in a screw threaded stem, a sleeve surrounding the stem and having a head provided with a screw threaded opening through which the stem is entered, a frame-work surrounding the sleeve, a ball bearing mounting between the frame and sleeve, a cutter comprising sections adapted to be distended by

the movement of the mandrel, said sections being mounted to the frame-work and revoluble therewith in conformity with the revolution of the mandrel, and cutters and rollers mounted within the sections of the head, substantially as described.

5. In a pipe cutter, the combination of a triangular mandrel terminating in its rear end in a screw threaded stem, a sleeve surrounding the stem, a head through which the screw threaded stem is entered, a portion of said head being removable to permit the retraction of the stem, means for clamping the removable portion of the head in place, a frame-work revoluble around the sleeve, a sectional cutter head revoluble with and adapted to be distended by the mandrel, the sections of the cutter head being mounted to the frame and revolve therewith, and cutters within the sections of the cutter head, substantially as described.

6. In a pipe cutter, the combination of a triangular mandrel terminating in its rear end in a screw threaded stem, a sleeve surrounding the stem, a head through which the screw threaded stem is entered, a portion of said head being removable to permit the retraction of the stem, means for clamping the removable portion of the head in place, a frame-work revoluble around the sleeve, a sectional cutter head revoluble with and adapted to be distended by the mandrel, the sections being each provided with a dove tail lug adapted to enter a co-operating channel within the frame for holding the parts together and permitting the in-and out-movement of the sections, and cutters within the sections, substantially as described.

7. In a pipe cutter, the combination of a triangular mandrel, a sleeve surrounding the mandrel and provided with an annular flange at its forward end, the flange having in its rear face a ball bearing track, balls within the track, a frame comprising a ring bearing against the balls, a forward wall and arms connecting the ring and wall, the forward wall being provided with radially extending dove tail slots, a sectional cutter head, each of the sections being provided with a dove tail lug adapted to enter one of the slots, a ring surrounding the wall of the frame and adapted to permit rotation thereof, cutters within the sections of the cutter head, rollers within the sections of the cutter head, and a split ring spring surrounding the sections and binding them together, substantially as described.

8. In a pipe cutter, the combination of a tapered mandrel terminating at its rear end in a screw threaded stem, a mounting for the stem, a portion of said mounting being removable to permit retraction of the stem, means for clamping the removable portion of

the mounting in place, a sectional cutter head, a mounting therefor, and cutters within the sections, substantially as described.

9. In a pipe cutter, a sectional cutter head,
5 each of the sections being provided with a shaft having mounted thereon a cutter and a roller of lesser diameter than the cutter, and

means for distending and revolving the sections of the cutter head, substantially as described.

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Witnesses:

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