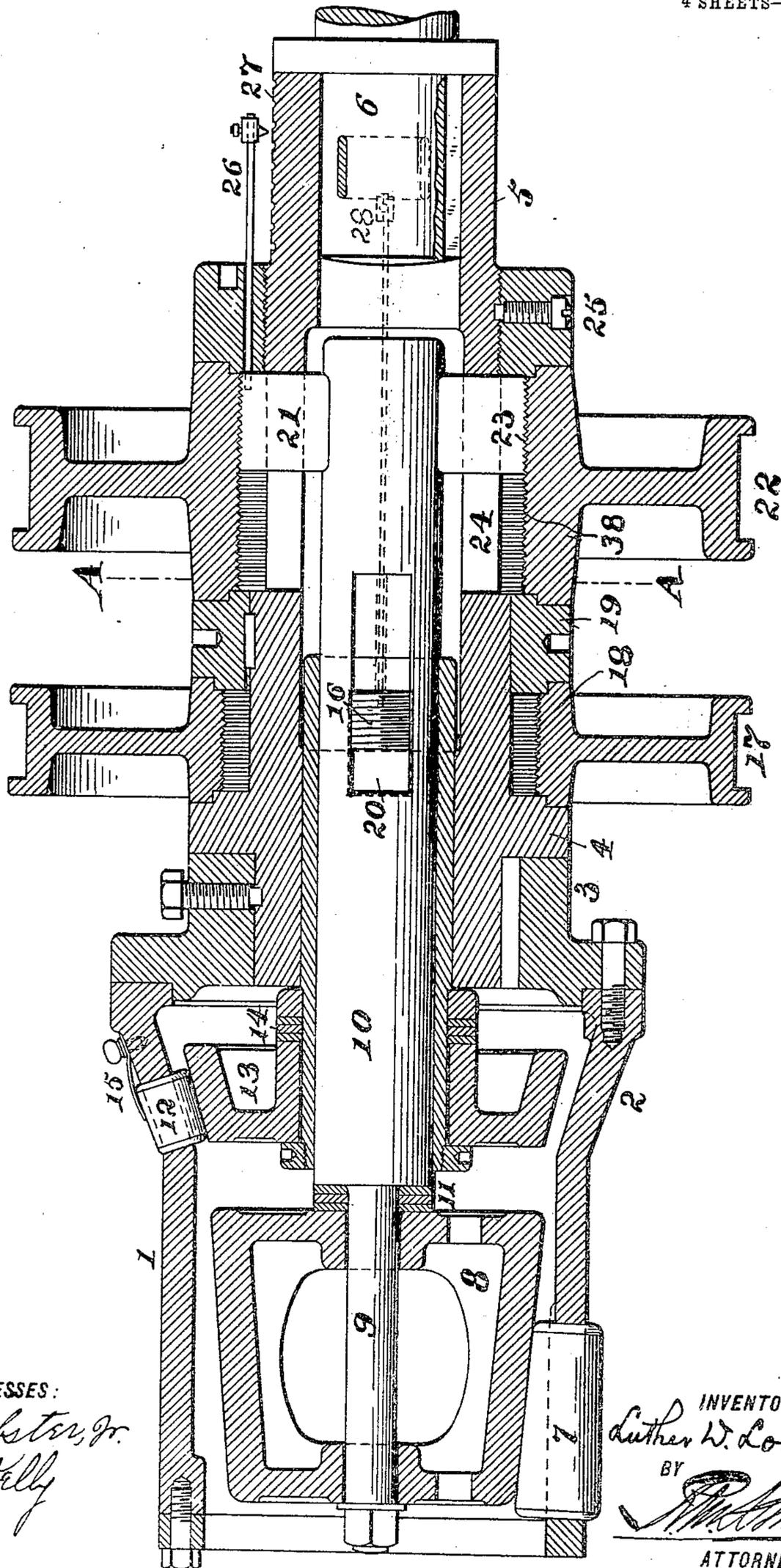


L. D. LOVEKIN.
EXPANDING AND FLARING TOOL.

APPLICATION FILED NOV. 3, 1904.

4 SHEETS—SHEET 1.

FIG. 1



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FIG. 2

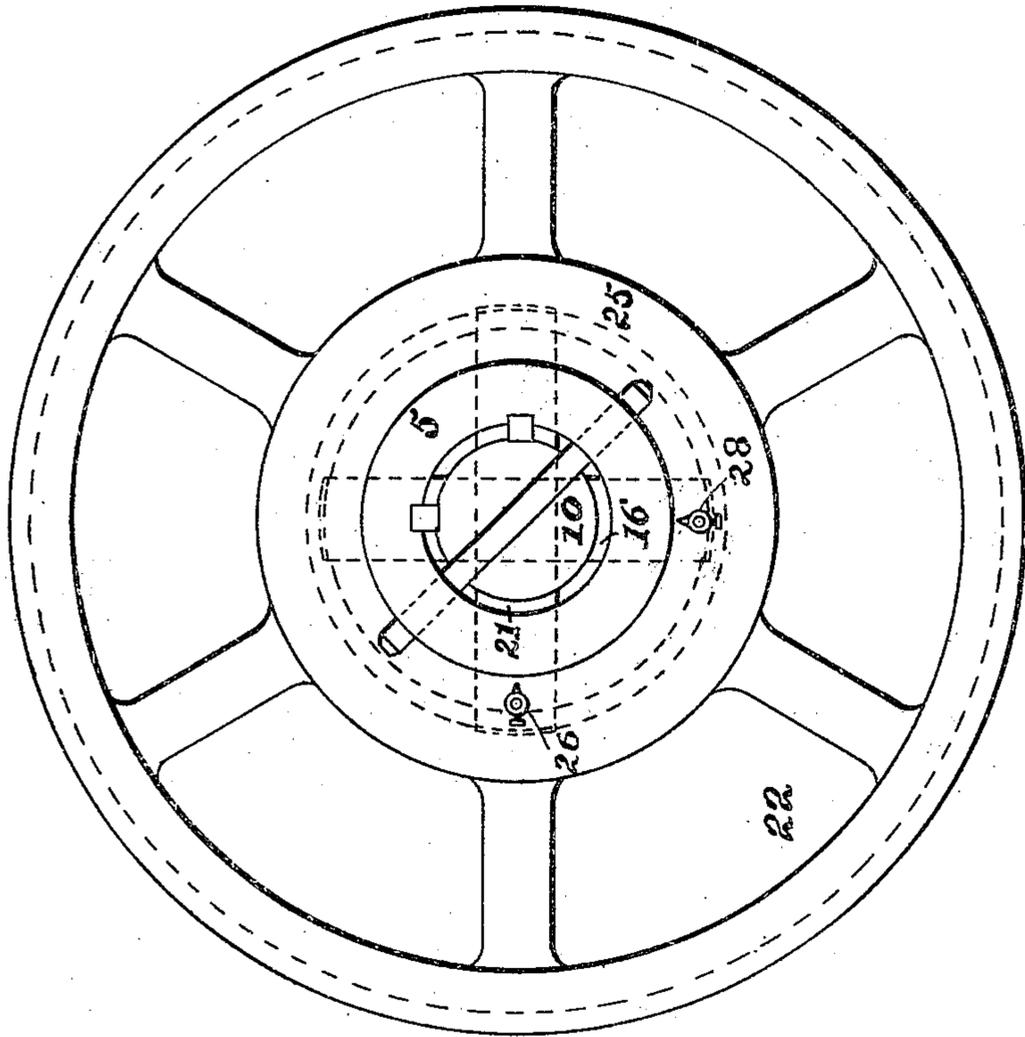
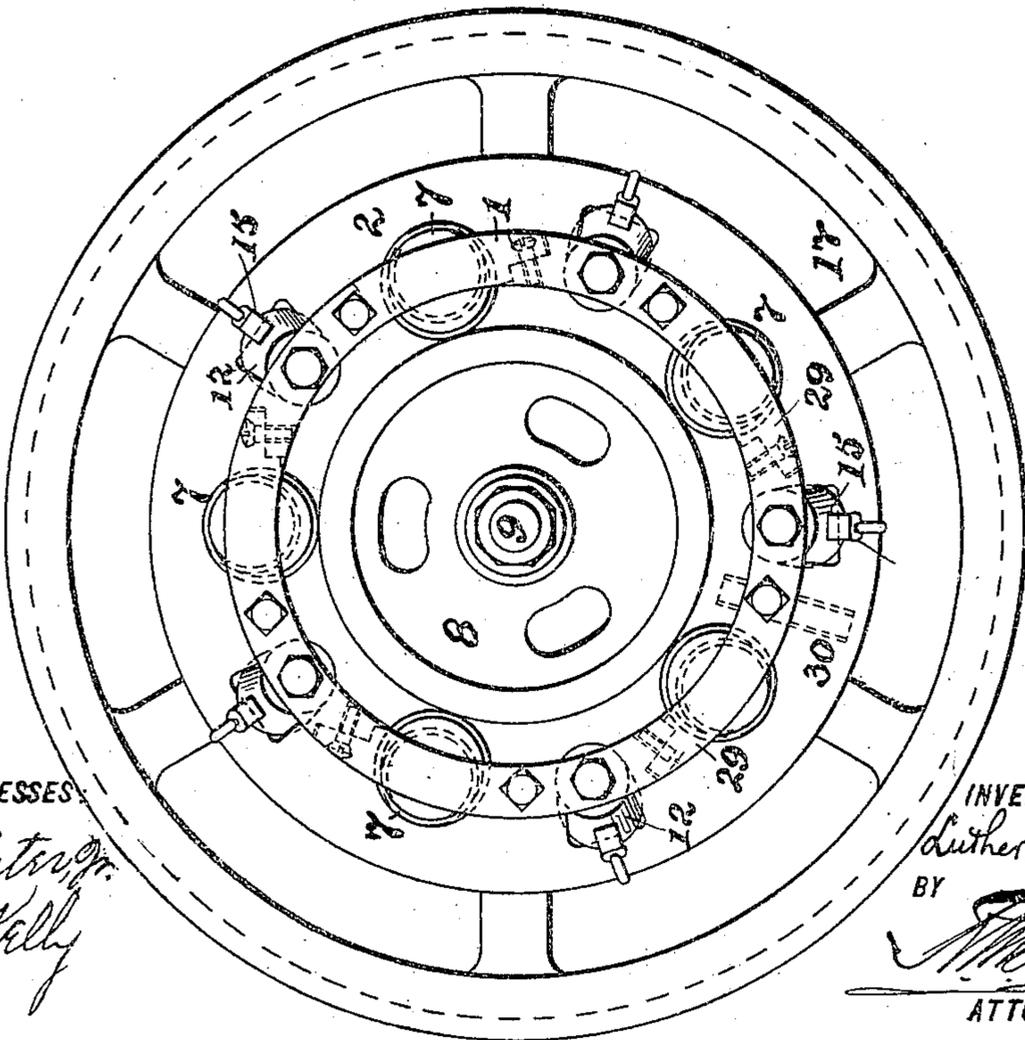


FIG. 3

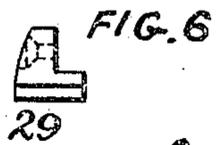
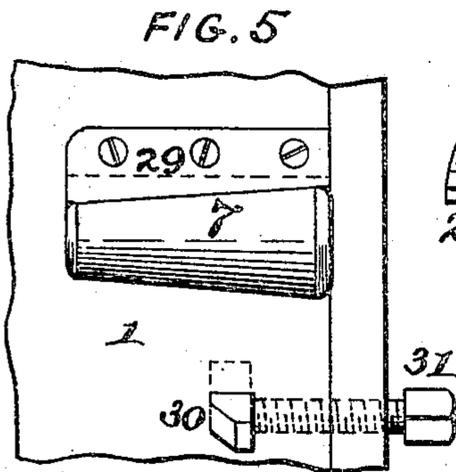
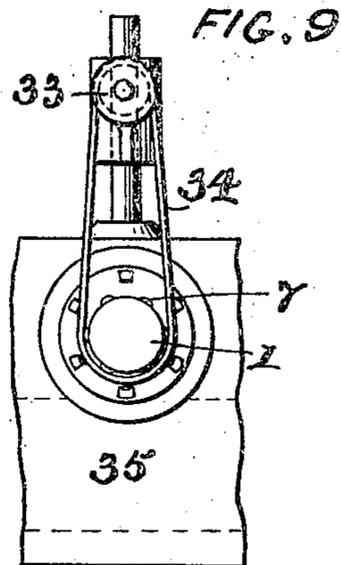
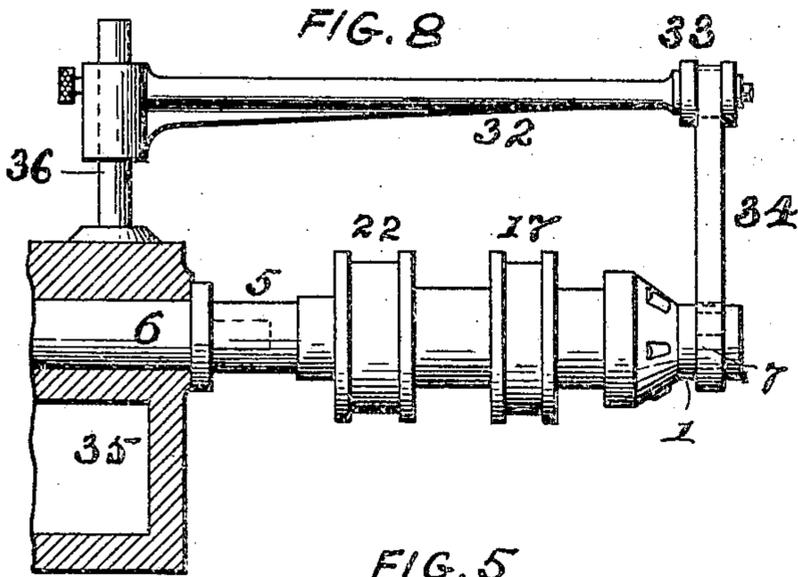
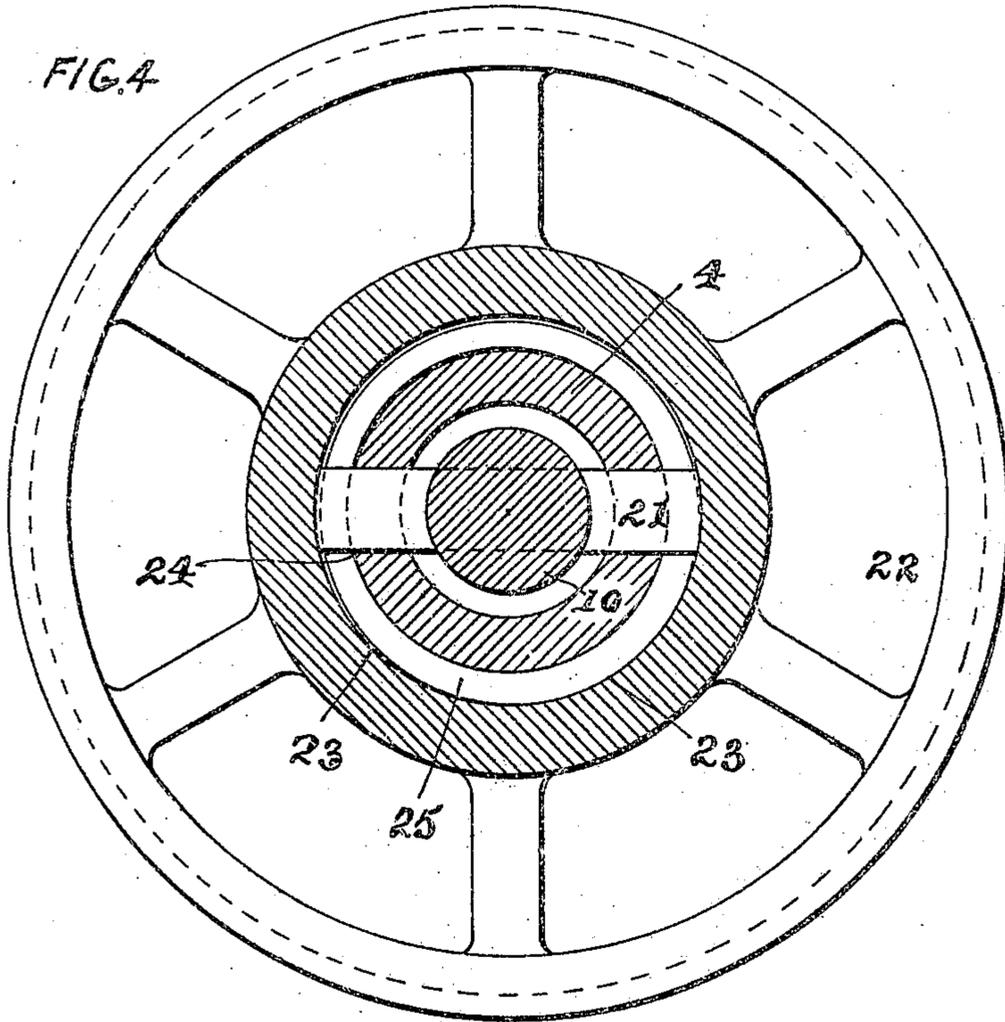


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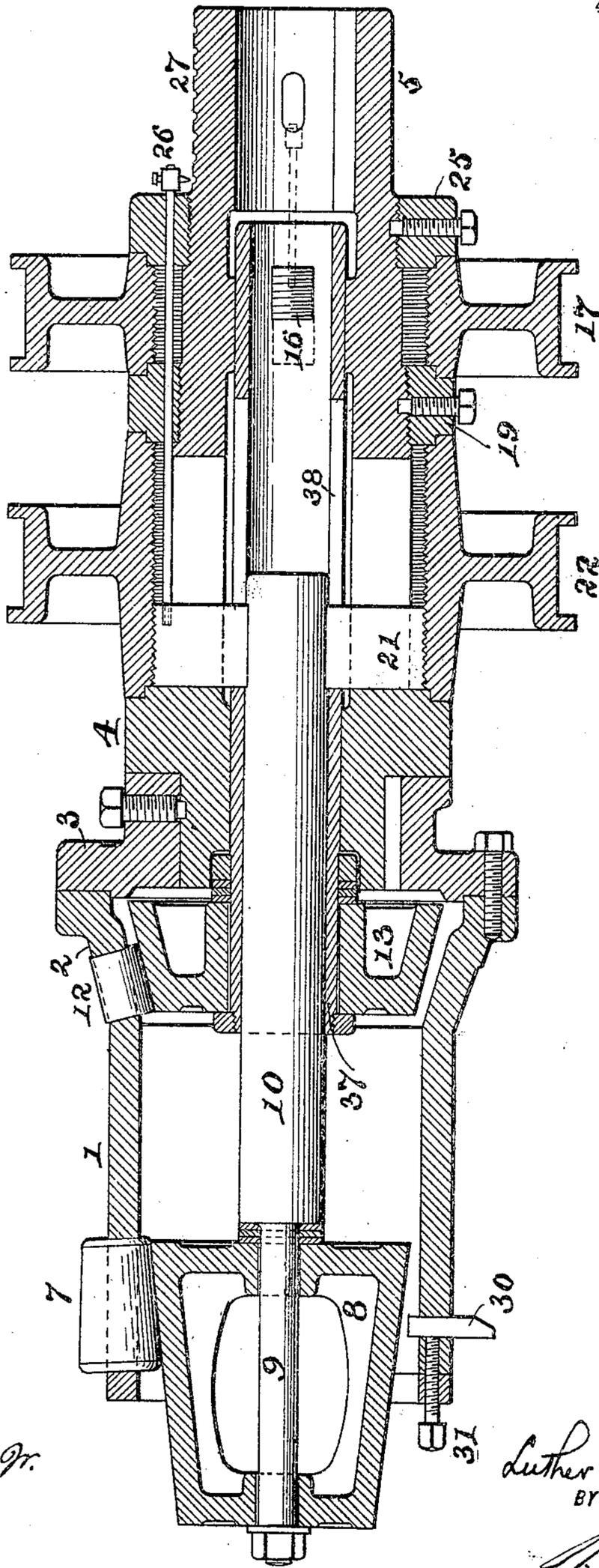
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4 SHEETS—SHEET 4.

FIG. 7



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UNITED STATES PATENT OFFICE.

LUTHER D. LOVEKIN, OF PHILADELPHIA, PENNSYLVANIA.

EXPANDING AND FLARING TOOL.

No. 801,326.

Specification of Letters Patent.

Patented Oct. 10, 1905.

Application filed November 3, 1904. Serial No. 231,308.

To all whom it may concern:

Be it known that I, LUTHER D. LOVEKIN, of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented an Improvement in Expanding and Flaring Tools, of which the following is a specification.

My invention has reference to expanding and flaring tools; and it consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to provide a suitable construction of expanding and flaring tool for large pipes and which shall have independent means for spreading the expanding-rollers and the flaring-rollers, each capable of being operated without regard to the other, whereby after the expanding of the pipe within the flange has been accomplished the flaring operation may be at once performed without removing the expanding-rollers from the mandrel.

My improved tool consists of a mandrel having a head carrying the expanding and the flaring rollers combined with independent tapered rolls within the mandrel-head for respectively spreading said rollers and independent longitudinally reciprocable parts for adjusting the said tapered rolls under hand control.

My invention also combines with the longitudinally-reciprocable parts gages to measure the extent of movement of either or both of said parts for the purpose of determining the extent of the expansion or flaring, or both, given to the pipe without the necessity of removing the tool from the pipe.

My invention also comprehends details of construction, which, together with the improvements specified above, will be better understood by reference to the drawings, in which—

Figure 1 is a longitudinal sectional elevation of an expanding and flaring tool embodying my invention. Fig. 2 is an end view of same with the operating spindle or shaft removed. Fig. 3 is a front end elevation of same. Fig. 4 is a cross-section of same on line A A of Fig. 1. Figs. 5 and 6 are elevations of details, showing the means for holding the expanding-rollers and the trimming-cutters. Fig. 7 is a longitudinal elevation of a modification of my invention; and Fig. 8 is an elevation, and Fig. 9 a front view, of means for holding the expanding-rollers from falling

out of their recesses in the head when not within the pipe.

The tool herein described is adapted to be used in a specially-organized machine in which the pipe and flange are held and the expanding and flaring tool inserted within the end of the pipe and rotated by power while having the expanding-rollers spread to expand the pipe within the flange or advanced when flaring the expanded pipe or while trimming the end of the pipe flush with the face of the pipe-flange.

4 is a mandrel having the hub 5 at the rear, which is keyed firmly upon the end of the rotating spindle or shaft 6. This shaft is usually journaled in the head 35, Fig. 8, forming part of the machine. The forward end of the mandrel 4 has a flange 3 secured to it, and to this flange is bolted the head 1 2, the part 1 being cylindrical and provided with the tapered expanding-rollers 7 and the part 2 being tapered and provided with the tapered flaring-rollers 12. The rollers 7 rest upon the surface of a tapered thrust-roll 8, which is journaled upon a spindle 9 of the follower-shaft 10. The friction of the end thrust of this roll upon the shaft 10 may be reduced by employing antifriction-collars 11.

The flaring-rollers 12 when not in use may be held in place by springs 15. These springs are turned around out of the way of the rollers when they are inserted within the pipe and employed in the flaring operation. The flaring-rollers rest upon the tapered thrust-roll 13 within the part 2 of the head and are moved longitudinally by the tubular shaft 37, which also carries the follower-shaft 10, before referred to. This tubular shaft 37 is guided within the mandrel 4 and is provided with antifriction-collars 14 to receive the end thrust of the roll 13. Both the rolls 8 and 13 are loose upon the spindle 9 and tubular shaft 37, respectively, so that they may adapt themselves to the rollers 7 and 12 when within the pipe.

17 is a brake-wheel and is journaled to rotate about the mandrel, its hub being journaled between the flange of the mandrel and the collar 19. The interior surface of the hub of wheel 17 is screw-threaded, as at 18, and meshing with this are the screw-threaded ends of a cross-bar 16, which extends through slot 20 in the shaft 10 and mandrel. When the mandrel is rotated relatively to the wheel 17, or vice versa, an end movement is given to the tubular shaft 37 and the roll 13 to ex-

pand the flaring-rollers 12 or to allow them to retract, according to the direction of movement given to the shaft.

The follower-shaft 10 is likewise provided with a cross-bar 21, extending through slots 24 in the mandrel and screw-threaded on its ends, said ends meshing with internal screw-threads 38 in the hub of a second brake-wheel 22. This wheel is journaled between the collar 19 and the collar 25 on the mandrel. A relative movement between the wheel and mandrel causes the shaft 10 and its roll 8 to be moved in one direction or the other, as desired, to spread or contract the expanding-rollers 7.

Secured to the cross-bars 16 and 21 are gages 28 and 26, respectively, which move over the scales 27 on the hub 5 of the mandrel to indicate the extent of longitudinal movement given to the rolls 8 and 13.

In use this tool is rotated in a horizontal position, and by preventing the rotation of the brake-wheels 17 or 22 either the roll 8 or the roll 13 may be advanced, and thereby cause the expanding-rollers 7 or the flaring-rollers 12 to spread in performing their work of expanding and flaring the pipe. The brake-bands are not shown, as they are parts of the organized machine and do not constitute an essential part of the present invention. These wheels 17 and 22 may be held by hand or turned by hand in case the tool is held stationary and the pipe rotated. By reversing the relative rotation of these wheels 17 and 22 with respect to the mandrel the rolls 8 and 13 may be returned to the positions shown in Fig. 1. By this construction it is evident that either roll 8 or 13 may be advanced independently of each other, so that the expanding-rollers 7 may retain the position shown while the flaring operation is being performed, and vice versa. The rollers 7 revolve in slots in the head 1, and the faces of said slots against which the rollers pass may be provided with hard-steel bearings, as indicated at 29, as such will increase the life of the tool and reduce the friction. After the pipe has been expanded and flared within the flange, it is necessary to trim off the projecting edge, and to accomplish this I provide the head 1 with a transverse slot, through which a radial cutter 30 may project and be clamped therein by a set-screw 31. During the expanding and flaring operations this cutter 30 is removed. In place of making the tubular shaft 37 shorter than the shaft 10 at the rear it may be made longer, as shown in Fig. 7. In this case the wheel 17 is at the rear of the tool and wheel 22 at the forward part, this being the reverse of that shown in Fig. 1. In this case the tubular shaft must be slotted, as at 38, to permit the play of the cross-bar 21; otherwise the construction shown in Fig. 7 is substantially similar to that of Fig. 1.

In tools of this class it is advisable to pro-

vide means for holding the expanding-rollers in the head when not inserted into the pipe and yet permit the tool to continue to revolve. This is accomplished as shown in Figs. 8 and 9, in which a leather band 34 is placed around the under side of the head 1, so as to support the rollers 7, and said band is guided at the top over an idler-pulley 33, journaled on an arm 32, adjustably clamped upon a standard 36, secured to the part 35 in which the tool is journaled. During the rotation of the tool the band 34 travels, as will be readily understood, at all times supporting the lowermost rollers 7. This band is slipped back or removed when the tool is being inserted into the pipe, as then the pipe itself will hold the rollers in the head.

I do not restrict myself to the details of construction, as they may be modified without departing from the spirit of the invention.

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

1. In an expanding and flaring tool, the combination of a mandrel provided with expanding-rollers and flaring-rollers, with means independent of the mandrel to spread the expanding and flaring rollers independently, two longitudinally-reciprocable shafts within the mandrel one to operate the means for spreading the expanding-rollers and the other to operate the means for spreading the flaring-rollers, and independent means for adjusting each of said shafts.

2. In an expanding and flaring tool, the combination of a mandrel provided with expanding-rollers and flaring-rollers, with means to spread the expanding and flaring rollers independently, two longitudinally-reciprocable shafts one to operate the means for spreading the expanding-rollers and one to operate the means for spreading the flaring-rollers, and independent means for adjusting each of said shafts each consisting of a wheel rotatable relatively to the mandrel and having an internal screw-thread and a cross-bar meshing with said screw-thread and secured to one of the shafts.

3. In an expanding and flaring tool, the combination of a mandrel provided with expanding-rollers and flaring-rollers, with means to spread the expanding and flaring rollers independently, two longitudinally-reciprocable shafts one to operate the means for spreading the expanding-rollers and one to operate the means for spreading the flaring-rollers, a gage for indicating the extent of movement of the shaft which adjusts the expanding-rollers, and independent means for adjusting each of said shafts.

4. In an expanding and flaring tool, the combination of a mandrel provided with expanding-rollers and flaring-rollers, with means to spread the expanding and flaring rollers independently, two longitudinally-reciprocable

shafts one to operate the means for spreading the expanding-rollers and one to operate the means for spreading the flaring-rollers, a gage for indicating the extent of movement of the shaft which adjusts the flaring-rollers, and independent means for adjusting each of said shafts.

5. In an expanding and flaring tool, the combination of a mandrel provided with expanding-rollers and flaring-rollers, with means to spread the expanding and flaring rollers independently, two longitudinally-reciprocable shafts one to operate the means for spreading the expanding-rollers and one to operate the means for spreading the flaring-rollers, gages for indicating the extent of movement of each of the shafts, and independent means for adjusting each of said shafts.

6. In an expanding and flaring tool, the combination of a mandrel provided with expanding-rollers and flaring-rollers, with means to spread the expanding and flaring rollers independently, two longitudinally-reciprocable shafts within the mandrel and concentrically arranged one being tubular and inclosing the other and one of which is adapted to operate the means for spreading the expanding-rollers and one to operate the means for spreading the flaring-rollers, and independent means both journaled upon the mandrel for adjusting each of said shafts.

7. In a tool for expanding and flaring pipe, the combination of a mandrel, expanding-rollers therein, flaring-rollers therein, a tapered roll for spreading the expanding-rollers, a tapered roll for spreading the flaring-rollers, a follower-shaft within the mandrel for moving the tapered roll of the expanding-rollers, a tubular shaft surrounding the follower-shaft and also within the mandrel for moving the tapered roll of the flaring-rollers, and means journaled on the mandrel for adjusting said shafts independently within the mandrel.

8. In a tool for expanding and flaring pipe, the combination of a mandrel, expanding-rollers therein, flaring-rollers therein, a tapered roll for spreading the expanding-rollers, a tapered roll for spreading the flaring-rollers, a follower-shaft for moving the tapered roll of the expanding-rollers, a tubular shaft for moving the tapered roll of the flaring-rollers, and means for adjusting said shafts independently within the mandrel consisting of hand-con-

trolled wheels having internal screw-threads and cross-bars respectively connecting the shafts and screw-threads of the hand-controlled wheels.

9. In a tool for flaring pipe, a mandrel having apertures in its sides, flaring-rollers arranged loosely within said apertures and having their outer surfaces projecting slightly beyond the surface of the mandrel, and adjustable springs adapted to be moved into position over the rollers so as to press upon their outer surfaces to hold them in the apertures when not inserted within the pipe and adapted to be moved away from the rollers to expose their outer surfaces when said rollers are inserted within the pipe to be flared.

10. In a tool for expanding pipe, the combination of a mandrel provided with apertures, expanding-rollers loosely supported within said apertures, and a traveling band extending about the lower rollers and mandrel for holding them within the apertures of the mandrel when it is rotating.

11. In a tool for expanding pipe, the combination of the mandrel having apertures in its cylindrical end, removable hardened-steel bearings fitted against the rear inner faces of the apertures and substantially flush with the outer periphery of the mandrel and also having their exposed surfaces within the aperture made flat, and expanding-rollers within the apertures and free to roll against the flat surface of the hardened-steel bearings, whereby the said rollers are propelled forward in the use of the tool by the said hardened-steel bearings and at the same time permit free radial adjustment of said rollers over the flat surface of the bearings.

12. In a tool for expanding and flaring pipe, the combination of a mandrel having a head provided with expanding and flaring rollers, with a removable trimming-cutter extending laterally from the wall of the mandrel-head adjacent to the expanding-rollers, and a clamping-screw extending through the end of the head to hold the trimming-cutter in position.

In testimony of which invention I have hereunto set my hand.

LUTHER D. LOVEKIN.

Witnesses:

R. M. KELLY,
M. J. EYRE.