(No Model.) 2 Sheets—Sheet 1.

S. G. HOWE.

PIPE TAPPING AND CONNECTING DEVICE.

No. 563,488. Patented July 7, 1896.

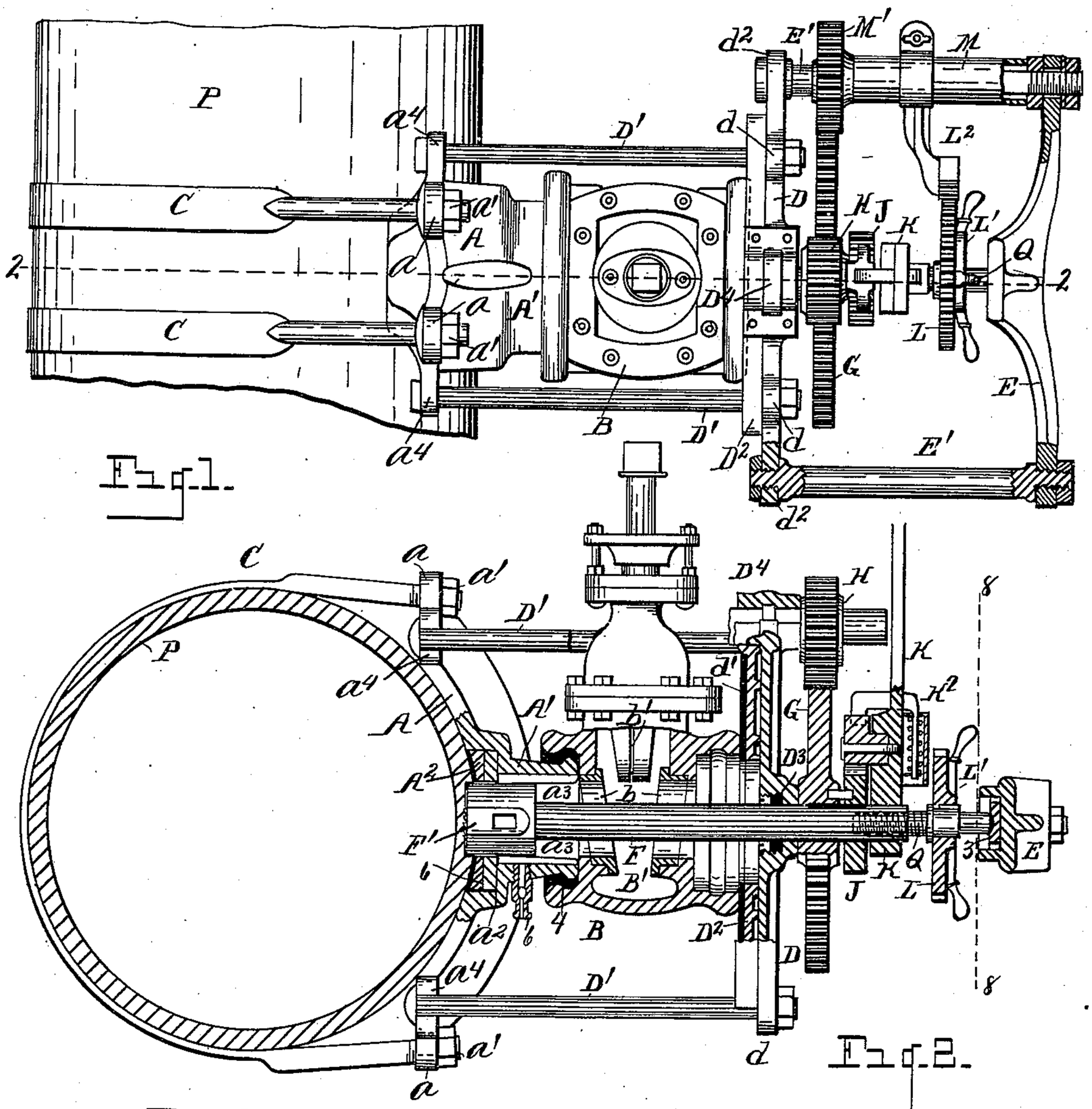


Fig. 1.

Fig. 2.

Fig. 4.

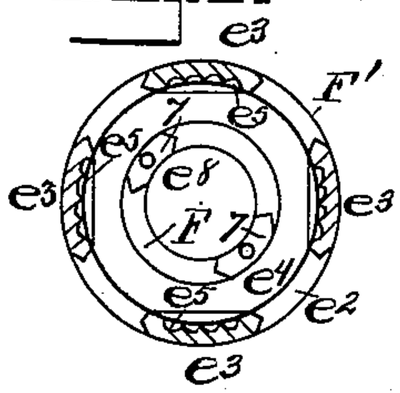
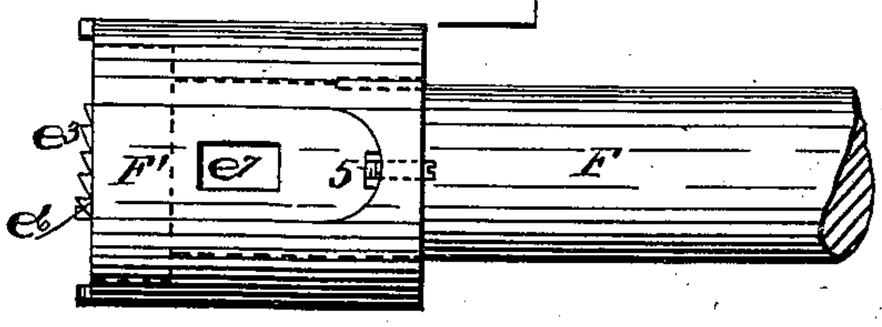


Fig. 3.



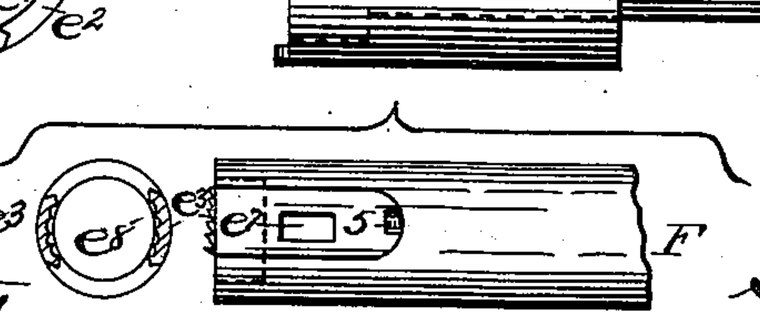


Fig. 5.

WITNESSES

O. B. Barrigar,

John F. Miller

INVENTOR

Solon G. Howe

By his Attorney

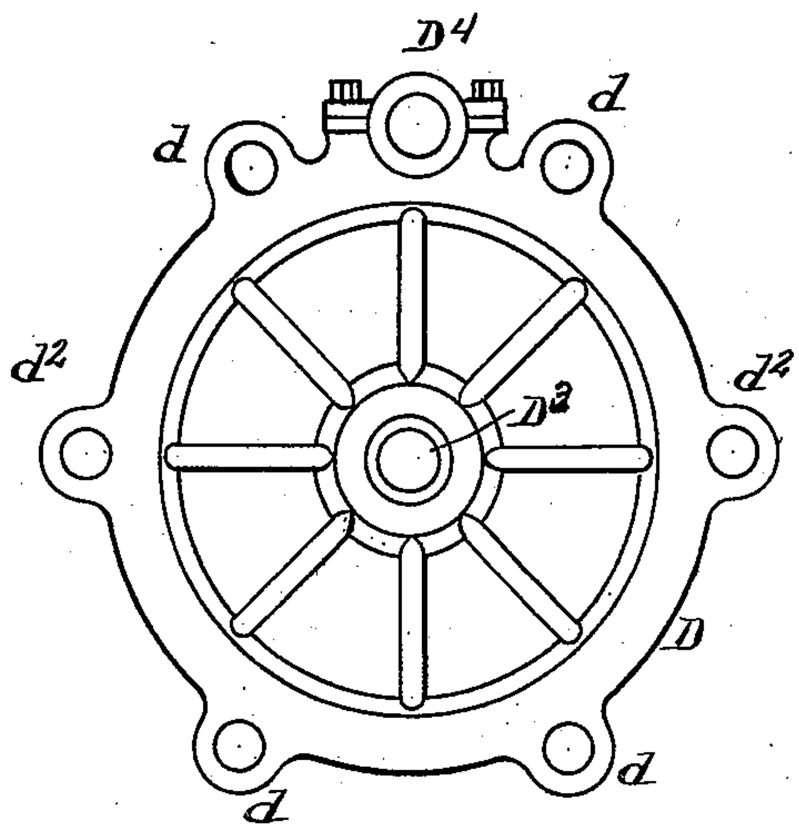
Jewell S. Wright

(No Model.) 2 Sheets—Sheet 2.

S. G. HOWE.

PIPE TAPPING AND CONNECTING DEVICE.

No. 563,488. Patented July 7, 1896.



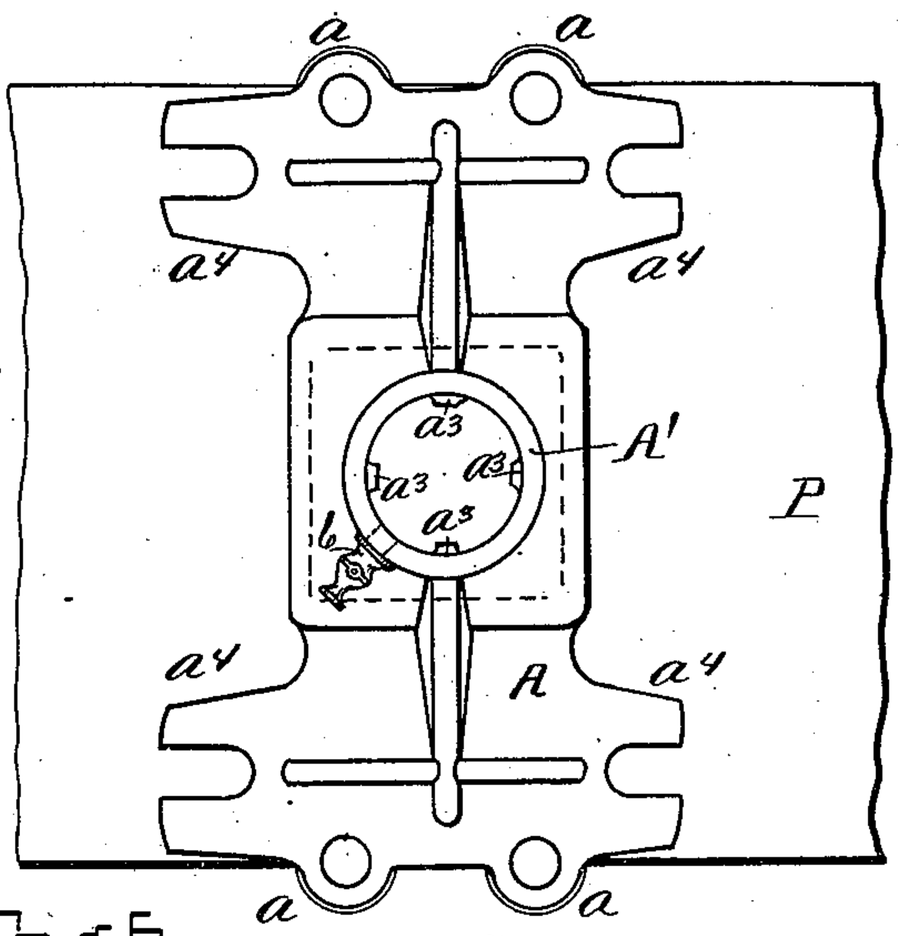


Fig. 7.

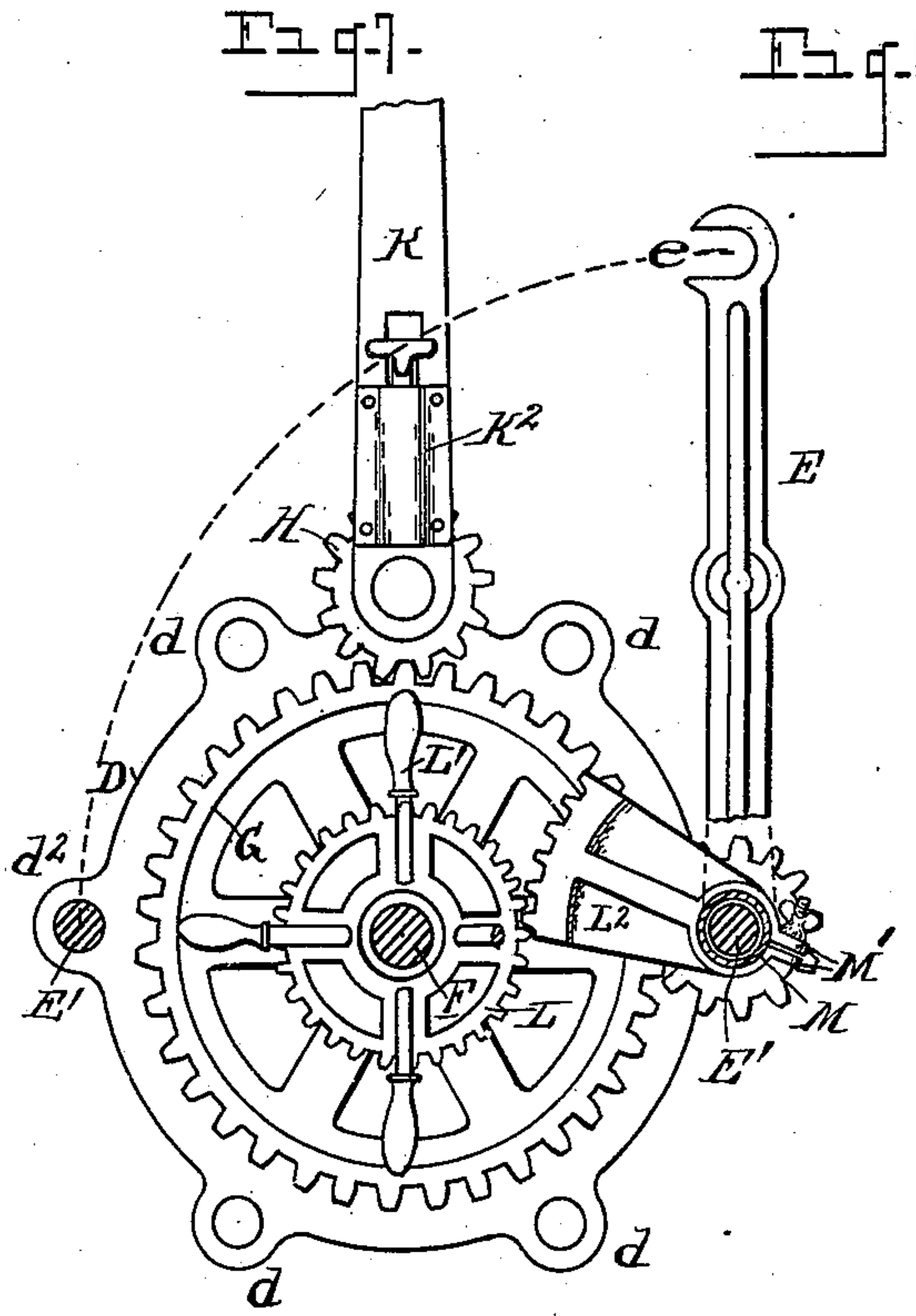


Fig. 6.

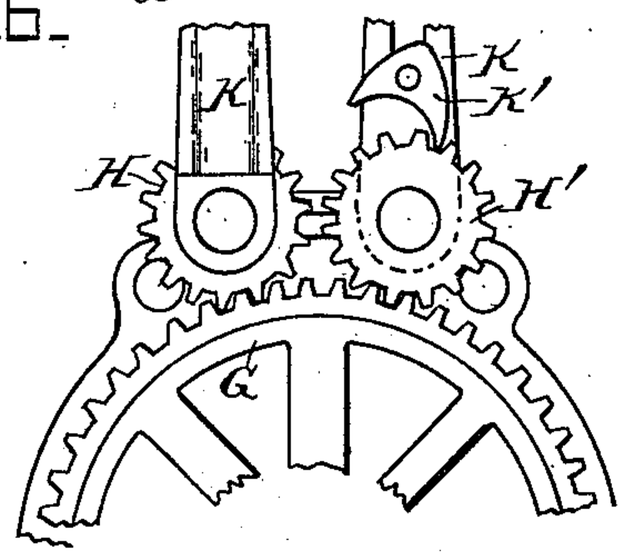


Fig. 9.

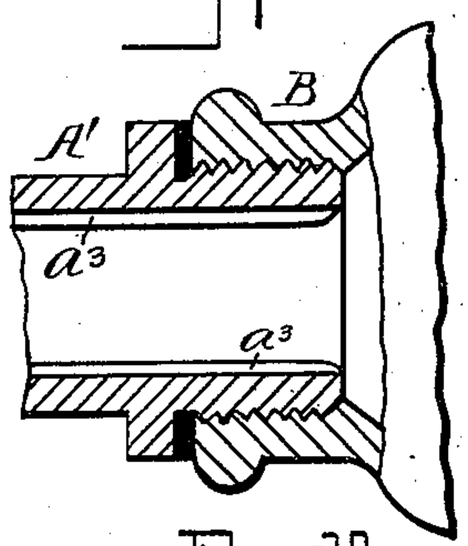


Fig. 10.

Fig. 8.

WITNESSES

O. B. Baenziger.

John F. Miller

INVENTOR

Solon G. Howe

By his Attorney

Newell Wright

UNITED STATES PATENT OFFICE.

SOLON G. HOWE, OF DETROIT, MICHIGAN, ASSIGNOR OF TWO-THIRDS TO DAVID INGLIS AND JAMES W. CHENEY, OF SAME PLACE.

PIPE TAPPING AND CONNECTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 563,488, dated July 7, 1896.

Application filed February 27, 1896. Serial No. 581,007. (No model.)

To all whom it may concern:

Be it known that I, SOLON G. HOWE, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Pipe Tapping and Connecting Devices; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its objects certain new and useful improvements in a pipe tapping and connecting device, without shutting off the service while the connection is being made; and it consists of the general constructions, combinations, and arrangements hereinafter specified and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view. Fig. 2 is a vertical section. Fig. 3 is a detail view of the cutter-head. Fig. 4 is a detail view showing the face of the cutter-head. Fig. 5 is a detail view showing a modification. Fig. 6 is a view in elevation, showing the face of the saddle. Fig. 7 is a view in elevation, showing the face of the tie and supporting plate. Fig. 8 is a view in section on the line 8 8, Fig. 2. Fig. 9 is a view showing a modification of the operating-levers for actuating the drilling mechanism. Fig. 10 illustrates a modification in the connection of the gate with the saddle-sleeve.

The special features of my invention will be readily understood from the following description thereof and their various functions.

Accordingly A represents a saddle engageable upon a water-pipe P, said saddle being provided with a sleeve connection A′, to which may be attached an ordinary stock-gate B. The saddle may be secured upon the pipe in any desired manner, but preferably, as shown, by means of one or more metallic bands C, passed about the pipe and engaged with the saddle. To this end the saddle may be provided with perforated ears a, through which the ends of said bands are engaged and held in connection therewith by means of nuts a'. A suitable packing, preferably a compressible packing A^2, is located between the saddle and pipe, the saddle being shown constructed with a chamber at a^2 to receive said packing. The sleeve of the saddle is provided on its inner surface with ribs a^3, forming guide-bearings, by means of which the gate and sleeve may be kept in proper alinement with the mandrel, the said ribs serving also as guides for the cutting device in starting a cut into the pipe. At the same time the ribs form a space between the mandrel and the inner wall of the sleeve to receive the chips from the cutting-tool.

D indicates a tie and supporting plate secured to the saddle while a cut is being made, as by connecting-bolts D′, the saddle being constructed with suitable lugs a^4, and said plate with suitable ears d, whereby the bolts may be connected therewith respectively.

D^2 is an interchangeable face-plate located between the plate D and the gate B, and provided with suitable packing, as indicated at d', to stop the flow of water from the gate when a cut has been made therethrough and a pressure is on in said gate.

The cutting mechanism is supported by said plate D on the outer face of the gate. Said supporting-plate is provided with a suitable stuffing-box D^3 and one or more bearings D^4 for power-pinions used when large cutting-machines are engaged.

E denotes a feed-screw bar supported upon stud-bolts E′, connected with said supporting-plate D, said plate provided with perforated ears d^2 to receive said bolts.

F denotes a mandrel passing through the stuffing-box D^3 of the plate D, and provided with a cutter-head F′, located within the sleeve A′ when the cutting mechanism is in place for use. G denotes a gear mounted upon said mandrel. (Shown broken away in Fig. 2.)

H denotes a driving-pinion having a shaft journaled in the bearing D^4. Upon the mandrel is engaged a pinion or ratchet-wheel J, made fast to the mandrel.

K is a ratchet-lever engageable with the mandrel F to act upon the ratchet-wheel J. Said lever is provided with a reversible pawl K′ in a housing K^2.

L denotes a feed-wheel engaged upon the mandrel.

My invention contemplates a construction and arrangement of feeding mechanism whereby an automatic or hand feed may be applied to the cutting mechanism, as may be desired. To this end the feed-wheel may be provided with hand-levers L′. In Figs. 1 and 8 I have also shown a segmental gear L^2, arranged to mesh with the feed-wheel if desired, said segmental gear being mounted upon a shaft M, sleeved upon one of the bolts E′, and provided with a pinion M′, meshing with the gear G, by which said pinion is driven to actuate said segmental gear, to drive the feed-wheel automatically. Should it be desired to operate the feed-wheel by hand, the segmental gear may readily be disengaged from the feed-wheel. The feed-screw bar E is preferably constructed with a hook at one end, as shown at *e*, Fig. 8, so that it may be readily disengaged from the corresponding stay-bolt and swung out of the way whenever desired. The feed-wheel is also constructed so as to be readily removed from the mandrel when the feed-screw bar is removed.

My improved mechanism is so arranged and constructed as to provide for the operation of the cutting mechanism either by a ratchet-lever upon the mandrel, as shown in Fig. 2, and hereinbefore described, or by engaging one or more ratchet-levers with a corresponding pinion or pinions H, as illustrated in Figs. 8 and 9, one such pinion being shown in Figs. 1, 2, and 8, and two being shown in Fig. 9, with corresponding ratchet-levers. Where one ratchet-lever is used to engage a pinion H, a single action is secured thereby upon the gear G. The ratchet-lever K may have an interchangeable engagement with the pinions J and H, if desired. Where the two ratchet-levers and corresponding pinions are employed, I am enabled to get a double action upon the cutting-tool, as occasion may require, and a corresponding increase of power or speed be applied to the cutting-tool as may be desired. The feed-screw bar is provided with a friction-plate 3, located in a corresponding chamber of the bar, against which the end of the feed-screw or mandrel bears, said plate being preferably constructed of steel, and recessed to receive the rounded end of the feed-screw Q. This plate is so arranged within said chamber that it may take a central and free position independent of any possible springing or cramping of the stud-bolts and pressure of the feed-screw bar, against which the feed-screw is operated.

The cutter-head E′ is preferably of special construction, although I do not limit myself solely thereto. In the form shown the cutter-head is formed with a supporting lip or flange e^2, reaching nearly to the edge of the cutting tool or tools e^3, having a dovetailed engagement therewith, the lip of the cutting-tool and said flange being of equal thickness, and forming with the cutting-tools a chamber (indicated at e^4) within the cutter-head, into which the core and chips cut from the pipe may enter and be retained. The cutting-tools are also formed with grooves, as shown at e^5, on the inner side thereof, through which the chips cut from the pipe may pass freely into said chamber.

For smaller work the mandrel may be provided with two cutting-tools, as in Fig. 5. For larger work the cutter-head may be provided with more cutting-tools, as shown in Fig. 4. Any desired number of cutting-tools may be employed within the scope of my invention.

In Figs. 2 and 6 I have shown the sleeve of the saddle provided with a stop-cock valve 6, so arranged as to admit and retain a lubricating substance within the sleeve wherever desired, as when a wrought iron or steel pipe is being cut, which lubricating substance may readily be discharged by a flow of water when opening is made into pipe-main, and which may thereafter be closed and secured against leakage. The flow of water through said stop-cock valve will also discharge any chips or other refuse matter collected in the space between the mandrel and the inner wall of the sleeve formed by the ribs a^3.

The numeral 5 indicates compensating-screws, by which cutting-tools may be set out from the cutter-head as said tools are reduced in length by wear, sharpening, and repairs.

The packing A^2 under the saddle surrounds the opening made in the pipe and securely prevents leakage from or around the joint of the saddle upon the pipe about said opening.

The gate B may be engaged upon the saddle-sleeve in any suitable manner. In Fig. 2 the numeral 4 indicates a leaded union or joint connection. In Fig. 10 a screw-threaded connection of said parts is shown.

The gate B may be of any desired construction. As shown, it is formed with a gate-valve chamber B′, having valve-seats *b b* and valve *b′*.

The economy of construction and readiness and simplicity of operation are apparent.

By making the face-plate D^2 interchangeable I am enabled to use the supporting-plate and tapping mechanism with various sizes of gates.

When it is desired to make a small cut, as, for instance, a two-inch cut, the cutting-tools may be engaged directly in the end of the mandrel F, as indicated in Fig. 5, and, as indicated also in Fig. 4, on the inner end of the mandrel, the inner end of the mandrel being shown in Fig. 4 constructed with dovetailed grooves 7 to receive the cutting-tools.

I prefer to construct the cutting-tools so that the cutting-teeth shall have a slight lead, whereby each tooth shall have a separate cut. This construction and arrangement is shown in Fig. 3, where, as will be seen, the heel-tooth on an individual cutting-tool, as the tooth e^6, has the lead, each successive tooth of each tool having the lead of those to the rear thereof.

The cutting-tools e^3 are preferably constructed with a recess e^7, whereby, by means of a suitable instrument, said cutting-tools

may be readily removable from the cutting-head or mandrel, and whereby they may also be driven firmly into place.

Where the tools are engaged directly with the mandrel, the mandrel is formed with an inner chamber, as indicated at e^8, the chamber being indicated in the right-hand portion of Fig. 5 in dotted lines.

What I claim as my invention is—

1. In a wet-pipe tapping and connecting device, the combination with a saddle engageable upon the pipe provided with a hollow sleeve opening therethrough, of a separable gate secured upon said sleeve, a supporting-plate D, an intervening face-plate D^2, bolts securing said supporting-plate to said saddle and upon the outer end of the gate, cutting mechanism supported by the plate D, and automatic feeding devices therefor, for the purpose specified.

2. In a wet-pipe tapping and connecting device, the combination with a saddle engageable about the pipe and provided with an interiorly-ribbed hollow sleeve opening therethrough, of a separable gate secured upon said sleeve, packing on the under side of said saddle about the opening through the sleeve, a supporting-plate secured upon said gate, a mandrel provided with a separable cutting-tool located within said sleeve and gate and projecting through said plate, means supported by said plate to actuate the mandrel and to feed the same to the work, for the purpose specified.

3. In a wet-pipe tapping and connecting device, the combination of the saddle provided with a hollow sleeve opening therethrough, of a separable gate secured thereupon, the supporting-plate secured upon the gate, the mandrel provided with a separable cutting-tool, a gear G mounted upon the mandrel, and an interchangeable feeding device, for the purpose specified.

4. In a wet-pipe tapping and connecting device, the combination of the saddle provided with a hollow sleeve opening therethrough, of a separable gate secured thereupon, the supporting-plate secured upon the gate, the mandrel provided with a separable cutting-tool, a gear G mounted upon the mandrel, a pinion J upon said mandrel, a pinion H meshing with said gear, and a ratchet-lever having an interchangeable engagement with the pinions J and H, for the purpose specified.

5. The cutter-head herein described constructed with a supporting-flange projecting at one extremity thereof longitudinally therewith, and with an interior chamber, and cutting-tools engaged with said projecting flange, said cutting-tools recessed on their inner face to permit the chips entering said chamber, for the purpose set forth.

6. In a pipe tapping and connecting device, a cylindrical cutter-head, provided on its lower annular edge with cutting-teeth, said teeth constructed and arranged to project outward, the one beyond the other in successive order from the toe toward the heel on the lower edge of the cutter-head, for the purpose described.

In testimony whereof I sign this specification in the presence of two witnesses.

SOLON G. HOWE.

Witnesses:
N. S. WRIGHT,
O. B. BAENZIGER.