

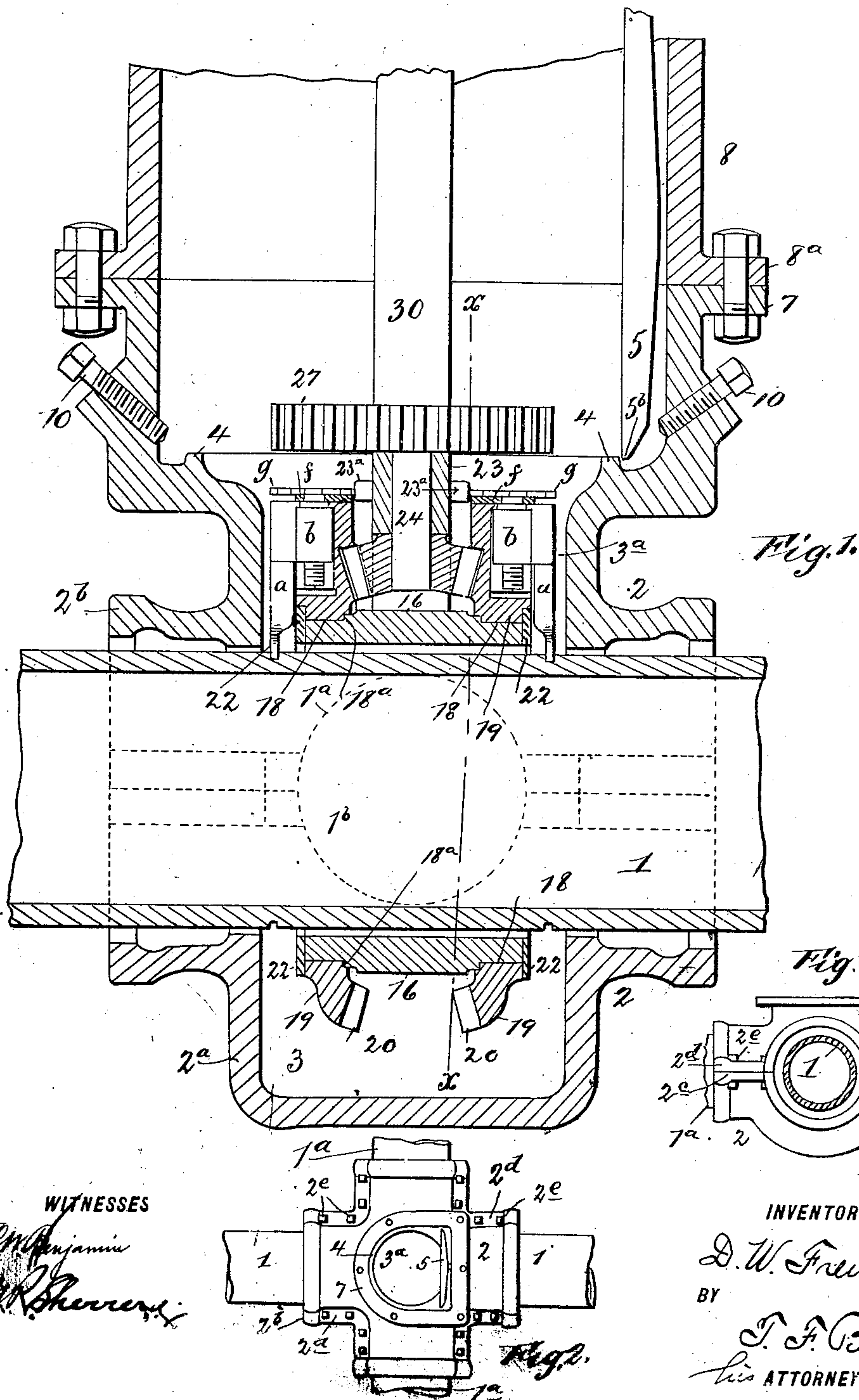
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4 Sheets—Sheet 1

D. W. FRENCH.
PIPE CUTTER AND BRANCH CONNECTION.

No. 587,091.

Patented July 27, 1897.



WITNESSES

C. M. Benjamin
M. R. Sherrill

INVENTOR

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BY

T. F. Brown
his ATTORNEY

(No Model.)

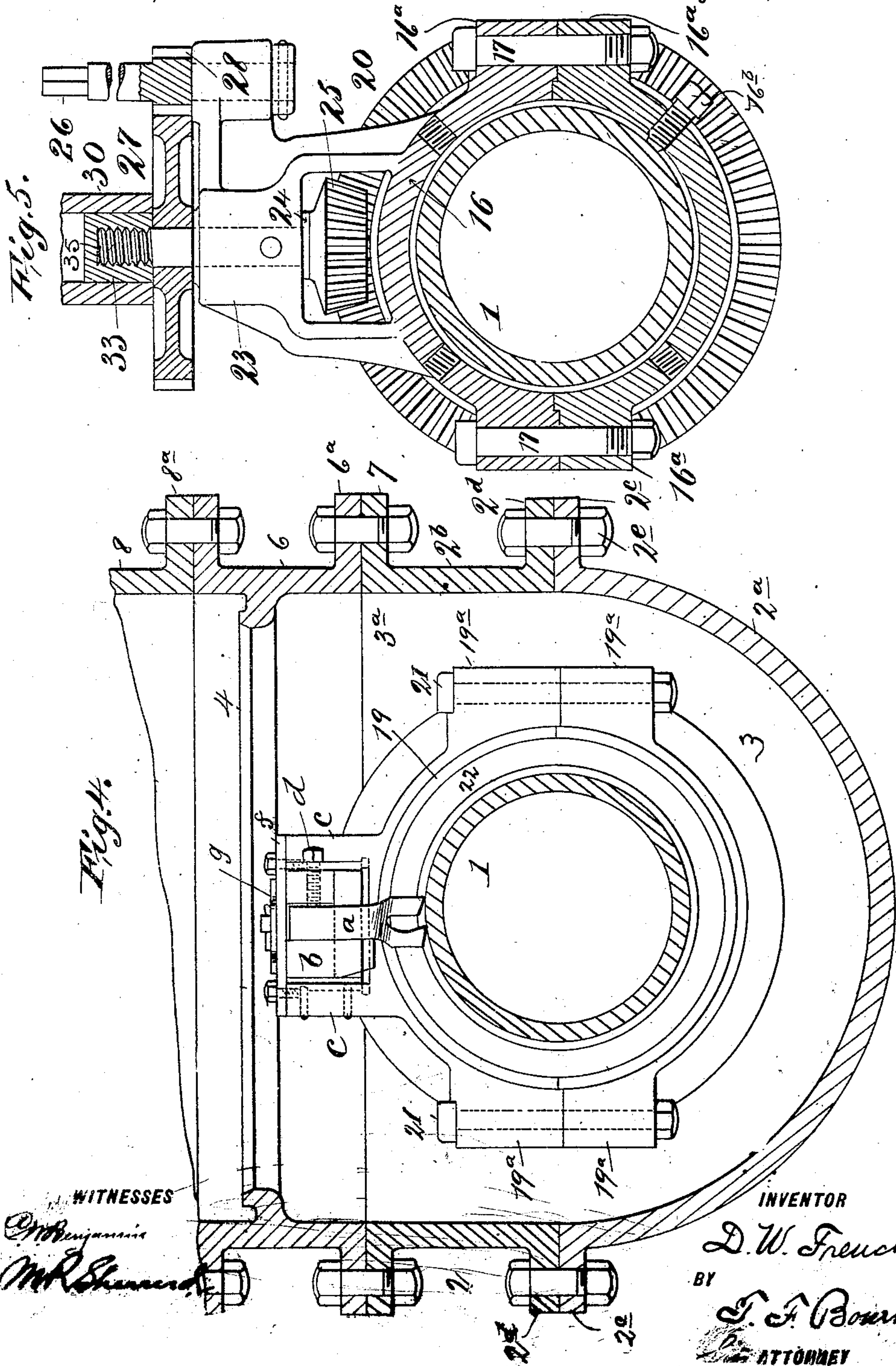
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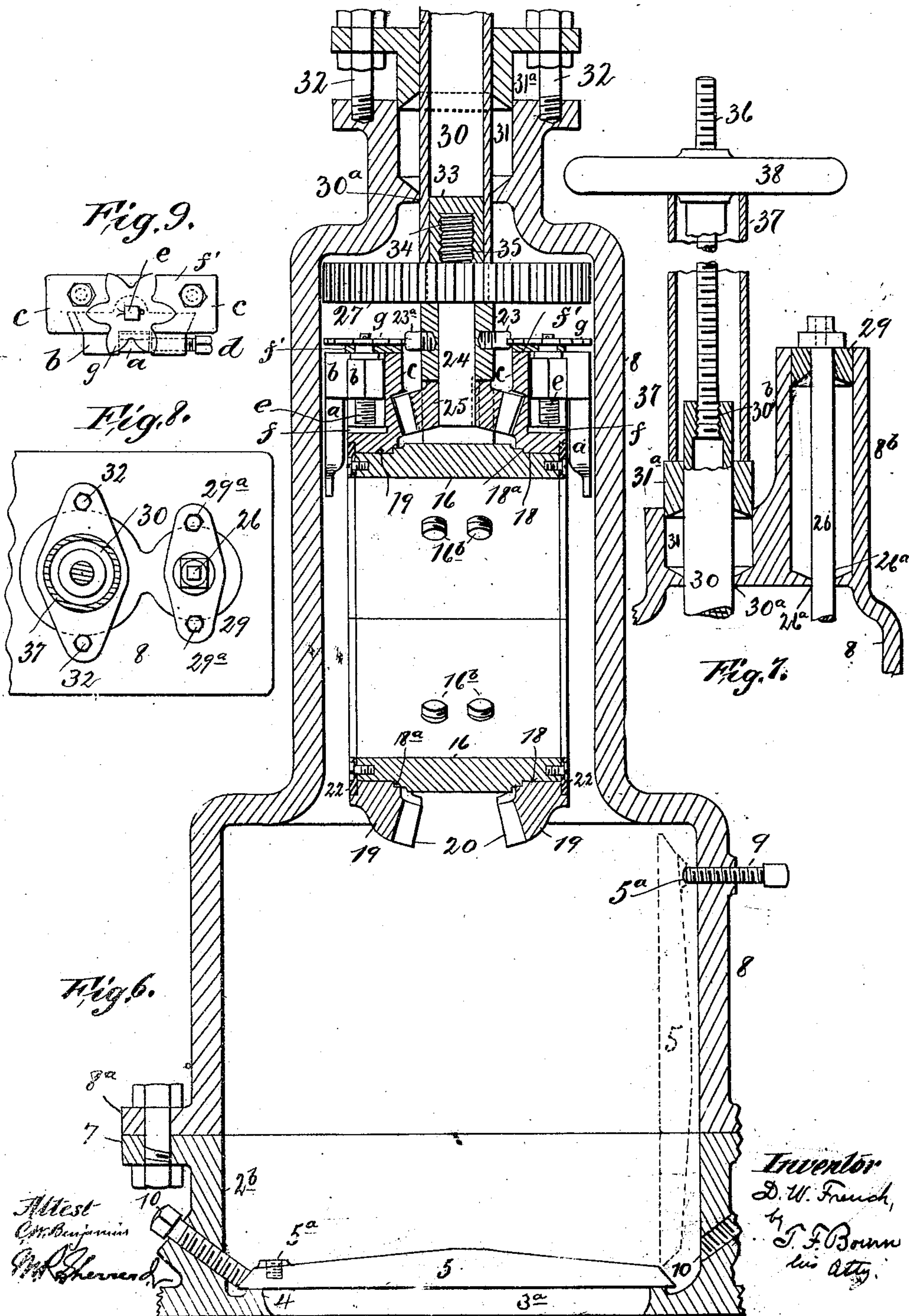
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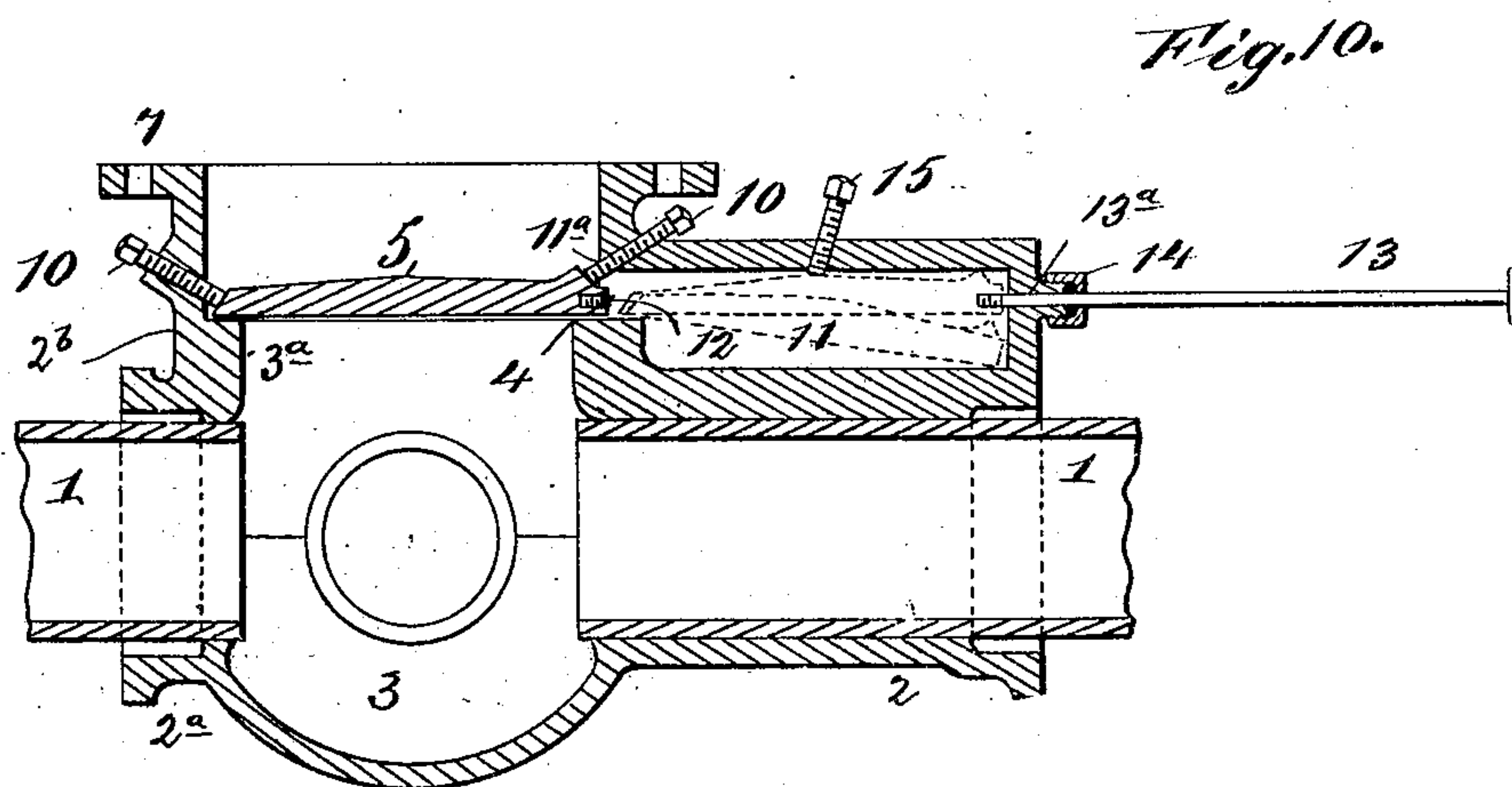
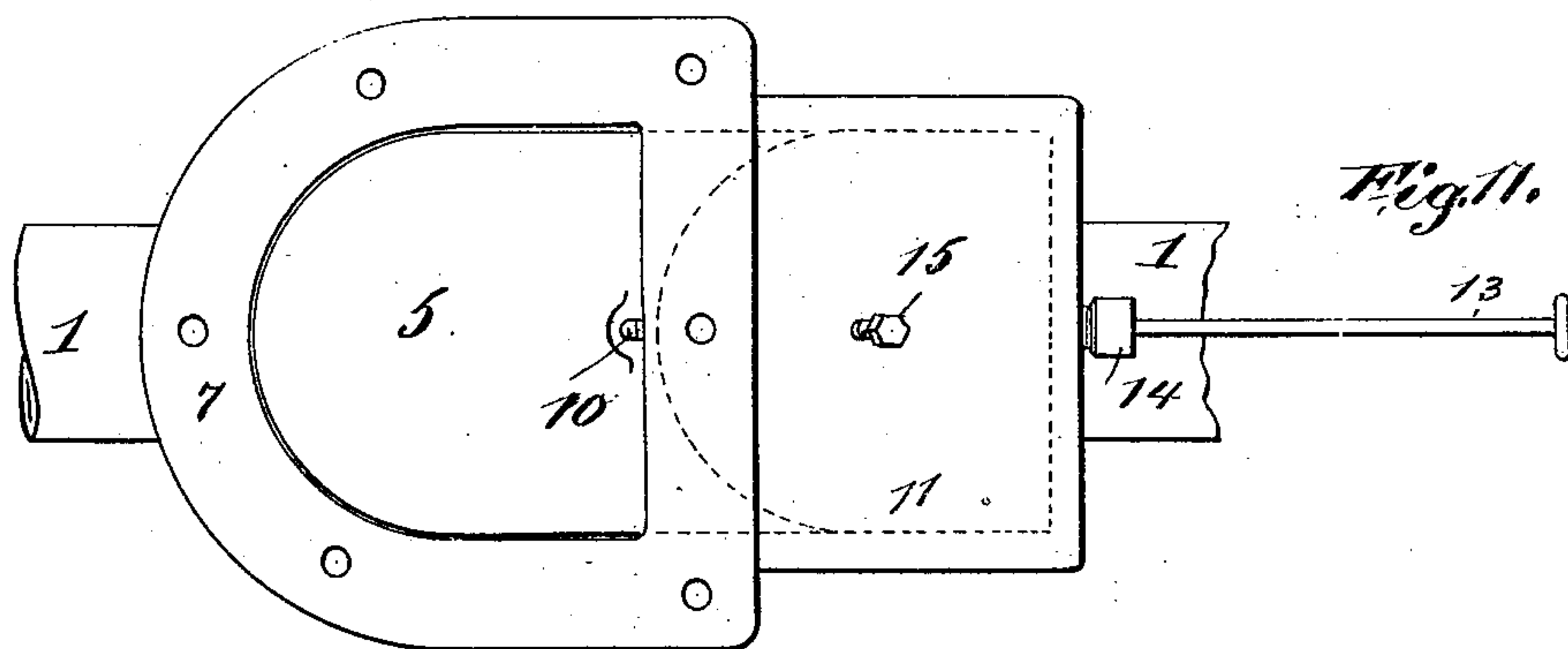
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Attest:
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his Atty.

UNITED STATES PATENT OFFICE.

DAVID W. FRENCH, OF HOBOKEN, NEW JERSEY.

PIPE-CUTTER AND BRANCH CONNECTION.

SPECIFICATION forming part of Letters Patent No. 587,091, dated July 27, 1897.

Application filed January 9, 1897. Serial No. 618,516. (No model.)

To all whom it may concern:

Be it known that I, DAVID W. FRENCH, a citizen of the United States, and a resident of Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Pipe-Cutters and Branch Connections, of which the following is a specification.

The object of my invention is to provide means for cutting out a section of underground pipe, for removing the cutting-machine and the section of pipe cut by it, and for sealing up a casing or branch around the severed part of the pipe without stopping the flow of water through the pipe.

The invention consists in a pipe-cutting machine comprising a split ring or frame arranged to be clamped around a pipe and having two annular guideways, split or divided cutter-carriers or gear-rings adapted to be clamped around said guideways, means carried by said cutter-carriers or gear-rings for supporting cutting-tools, means for feeding said tools, and means for operating said cutter-carriers or gear-rings in unison.

The invention also consists in a split or divided branch or casing adapted to be clamped around a pipe and having an internal chamber adapted to surround a pipe and within which a pipe-cutter may be operated to cut out a section of the pipe, said chamber having a space into which the pipe-cutter can be drawn, said branch or casing having a removable portion to enable the pipe-cutter to be removed, and a valve arranged to be closed between the pipe-cutter and the severed pipe to enable said cutter to be removed while allowing the water to continue to flow.

The invention also consists in the novel details of improvement and the combinations of parts that will be more fully hereinafter set forth, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part hereof, wherein—

Figure 1 is a vertical central section through the pipe-cutter and branch or casing shown mounted on a pipe, also in section, the upper portion of the casing or what I term its "bonnet" being removed. Fig. 2 is a plan view, on a reduced scale, of a split branch or casing in position on a pipe, showing a valve and its seat carried thereby. Fig. 3 is a side

elevation thereof. Fig. 4 is a cross-section, slightly modified, of the devices shown in Fig. 1, illustrating the pipe-cutter and its tool-carrying devices. Fig. 5 is a cross-section of the pipe-cutter, showing means for operating the tools. Fig. 6 is a vertical section corresponding to Fig. 1 through the upper part or bonnet of the casing, also showing the pipe-cutter in section and illustrating how the pipe-cutter and pipe-section can be removed from the main part of the branch or casing. Fig. 7 is a vertical section at right angles to Fig. 6 through the upper part of the casing or bonnet, showing the tool-operating shaft and means for raising the cutting-machine to the upper part of the bonnet shown in Fig. 6. Fig. 8 is a plan view of the bonnet, showing the tool-operating shaft and the tube, rod, or guide for the cutting-machine in section. Fig. 9 is a plan view showing the tool-guide and feeding-wheel. Fig. 10 is a vertical central section through the split or divided branch or casing, showing means for placing a valve over the space left by the cut-out portion of a pipe after the pipe-cutter and the cut-out portion of the pipe have been removed from the latter; and Fig. 11 is a plan view thereof.

In the accompanying drawings, in which similar numerals and letters of reference indicate corresponding parts in the several views, the number 1 indicates a pipe, and 2 is a branch or casing which is split or divided and adapted to be clamped around said pipe. Said branch is shown as split or divided longitudinally, and the parts 2^a 2^b thereof are shown provided with flanges 2^c 2^d, which are held together around the pipe by bolts 2^e. (See Figs. 1, 2, and 3.) It is evident that the parts 2^a 2^b can be held around the pipe otherwise, if preferred, and that the branch can be divided otherwise than horizontally. The branch in Fig. 2 is shown as having four ways, but of course it may have three or more, if desired. The branch or casing 2 is provided with an internal chamber 3 to surround the pipe to be cut and of sufficient diameter to contain a pipe-cutting device and to allow its cutters to travel around the contained pipe. (See Figs. 1 and 4.) The branches or ways have the usual annular recesses around the pipes to receive packing. One side of the branch or casing is provided with an opening

3^a, leading to chamber 3, to permit the pipe-cutter to be operated within the casing and to allow said cutter and the cut-out section of pipe to be removed. (See Figs. 1, 4, and 10.)

5 The branch or casing 2 or the portion 2^b thereof carries a valve-seat 4, surrounding or in line with the opening 3^a, and a valve 5 is provided to close against said seat to shut off the flow of water after a section of pipe has
10 been cut out and removed.

In Figs. 1, 6, and 10 I have shown the seat 4 as cast integral with the corresponding portion 2^b of the branch or casing 2. In Fig. 4 the seat 4 is shown carried by a tube or casting 6, that is bolted to branch 2, the tube 6
15 having a flange 6^a, that rests on a flange 7, carried by branch or casing 2, said flanges being held together by bolts.

Above the seat 4 is a bonnet or cover 8,
20 shown provided with a lower flange 8^a, adapted to rest on flange 7, carried by branch or casing 2, or on an upper flange on tube or casting 6, said flanges being held together by bolts or screws, the area of the bonnet being
25 sufficient to receive a pipe-cutter within it, as hereinafter shown. The bonnet 8 when in position on branch or casing 2 constitutes an enlargement of chamber 3.

In Figs. 1 and 6 the valve 5 is shown in the
30 form of a plate adapted to stand vertically within bonnet 8 and to drop upon seat 4. I have shown said valve as suspended within the bonnet 8 by a screw 9, threaded in the wall of said bonnet and adapted to engage
35 threads in a bore 5^a in said valve. (See Fig. 6.) By preference the position of bore 5^a relatively to seat 4 is such that when the valve 5 is suspended by screw 9 its lower edge 5^b will lie behind seat 4 and be raised from the
40 surface of the casing. By this means when the screw 9 is withdrawn from bore 5^a the valve will descend slightly to move bore 5^a out of line with screw 9, so that when screw 9 is again screwed inwardly it will push valve
45 5 over (without reengaging the threads in bore 5^a) to cause the valve to descend upon seat 4, as in full lines in Fig. 6. Screws 10, threaded in casting 2^b, are then screwed down upon valve 5 to hold it firmly upon its seat.

50 In Fig. 10 the valve 5 is shown arranged to be slid horizontally over seat 4, and for this purpose the casing 2^b is shown provided with a pocket or chamber 11, having an opening 11^a in line with seat 4. The bottom of chamber 11 is preferably below the plane of the
55 surface of seat 4. The valve 5 is shown provided with a threaded bore 12, adapted to receive the threaded end of a rod 13, which is adapted to slide through an opening 13^a in
60 the wall of chamber 11 and through a stuffing-box 14. With this arrangement the valve 5 can remain in chamber 11 until it is desired to close opening 3^a, whereupon rod 13 will be pushed inwardly, thus sliding valve 5
65 over seat 4, where it may be held by screws 10. If it is desired to thereafter permit passage of water through opening 3^a, (as to a

branch pipe connected with flange 7,) the valve 5 can be withdrawn into chamber 11, the rod 13 being then unscrewed therefrom, 70 which will allow the corresponding end of the valve to drop down in said chamber, where it may be held by a screw 15, threaded in the wall of chamber 11.

The pipe-cutter is arranged and used in 75 connection with the branch or casing and its valve 5 as follows: 16 is a divided or split ring or frame adapted to be clamped around the pipe 1 and having flanges 16^a and bolts 17 to clamp it around the pipe, screws 16^b 80 serving to center said ring or frame upon the pipe. The ring or frame 16 has two parallel annular peripheral guideways 18, having inner guide-shoulders 18^a, upon which guideways cutter-carriers or rings 19 are adapted 85 to rotate, said rings being provided with gear-teeth 20. The rings are split or divided crosswise and have flanges 19^a and bolts 21, by which the rings can be bolted around guideways 18. It will be seen that the guideways 90 18 and gear-rings 19 are located at opposite ends of the frame or ring 16. The cutter-carriers or gear-rings 19 are shown held upon the frame 16 and guided to rotate thereon by rings 22, which are split or divided crosswise 95 and held upon said frame by screws. By having the parts 16, 19, and 22 split or divided crosswise they can be clamped upon a pipe whose ends are buried in the ground, it only being necessary to excavate around the pipe 100 sufficiently to receive the cutter and the branch or casing 2.

a a are cutting-tools carried by the rings 19 to cut the pipe 1, and said tools are located outside of rings 22 to sever the pipe in two 105 parallel annular lines, so as to cut out a section of pipe. These tools are shown carried by a sliding head or tool-carrier *b*, that is guided to travel toward the pipe in ways *c c*, carried by and projecting from the rings 19. 110
d is a screw for holding the tool upon its carrier *b*.

e is a screw carried and guided by plates *f f'* and meshing with threads in a bore in the carrier *b*, whereby as said screws are turned 115 the carrier *b* will advance and feed the tool toward the pipe.

The tools are preferably fed automatically by the rotation of rings 19, and for this purpose the screws *e* carry star-wheels *g*, which 120 are adapted to engage projections carried by a yoke or support 23, whereby as the tools are carried around by the rings 19 they will be fed to the pipe intermittently in a well-known manner. 125

By preference the tools are provided with two or more cutting edges, so that if one should break the work can be continued without removing the device from the pipe.

The frame 16 has a yoke or bridge 23, provided with a bore or bearing in which is journaled a shaft 24, carrying a pinion or gear-wheel 25, meshing with the gears 20 of rings 19. When the shaft 24 is rotated, the rings

19 will rotate in unison around frame 16 and pipe 1.

Suitable means may be provided for rotating shaft 24. As the pipe-cutter is to be operated while secured upon pipe 1 to cut out the portion of the pipe upon which it is secured and inclosed water-tight within branch or casing 2, I preferably rotate the shaft 24 by means of a counter-shaft 26 to reduce the tendency of the pipe-cutter to twist or bend pipe 1, so that when the pipe is nearly cut through the cut section will not be twisted out and thus leave a rough surface or burs on the severed ends of the pipe. For this purpose I have shown the shaft 24 provided with a gear-wheel 27 outside of yoke 23 and meshing with a pinion or gear 28 on shaft 26. (See Fig. 5.) The upper end of bonnet 8 is closed and is provided with an aperture 26^a for the passage or journaling of shaft 26 and with a hollow or tubular extension 8^b, that contains a stuffing-box and follower or bushing 29 to make a water-tight joint around shaft 26. (See Figs. 7 and 8.) This stuffing-box or bushing may be held in place by bolts or screws 29^a, connected with bonnet 8. The outer end of shaft 26 may be squared or otherwise arranged to receive a crank or other handle for rotating said shaft.

To assist in keeping the cutting device from twisting during operation and also to provide means for raising the same vertically from the pipe when a section of pipe is cut out, I connect a shaft, tube, or rod 30 with the shaft 24 or wheel 27, which tube or rod 30 passes through a guide-opening or journal 30^a in the upper part of bonnet 8. (See Figs. 6 and 7.) This tube or rod 30 also passes through a stuffing-box 31 and follower or bushing 31^a at the upper part of the bonnet, which follower or bushing may be held in the bonnet by bolts or screws 32, connected therewith. For convenience I have shown the tube 30 as provided with a plug 33 at its lower end, said plug having a threaded bore 34, meshing with threads 35 on shaft 24 or carried by wheel 27. (See Fig. 6.) By this means tube or rod 30 can be readily detached from the cutting-machine when the latter is removed from the bonnet 8. It will thus be seen that the shaft 26 and tube or rod 30, being parallel and both guided by the bonnet, serve to resist twisting of the pipe-cutter while it is being operated. It is obvious that if power is applied direct to tube or rod 30 it will operate gear 25 to rotate the gear-rings 19.

While shaft, tube, or rod 30 can be drawn outwardly by any suitable means to lift the pipe-cutter with the attached cut-out section of pipe into the upper part of bonnet 8, I have shown a convenient means for the purpose as follows: The upper part of tube 30 is threaded at 30^b to engage a threaded rod 36, and around the tube 30 and rod 36 is placed a tube 37, which may rest upon the follower or bushing 31^a. A wheel, lever, or handle 38, having threads in a bore to mesh

with the threads of rod 36, rests upon tube 37, (see Fig. 6,) and when it is turned it will act to raise rod 36 and with it tube 30, and consequently lift the cutting-machine above seat 4.

The manner of using the branch or casing and the pipe-cutter in connection therewith may be described as follows: The frame 16 is first clamped around pipe 1, the cutter-carriers or gear-rings 19 being clamped around guideways 18, and retaining-rings 22 secured on frame 16 around the pipe, the cutting-tools of course being properly set relatively to the pipe. The branch or casing 2 is next clamped around pipe 1 and around the cutting device, so that the latter will be contained within the chamber 3 of said branch or casing. The branch or casing is then packed around pipe 1, and one or more other branch pipes 1^a are connected with the corresponding ways of the main branch, if desired. The bonnet or cover 8 is then secured to the branch or casing 2, as upon flange 7, the valve 5 being meanwhile adjusted in position to leave seat 4 uncovered, but so that it can cover the seat subsequently, the shafts or rods 26 and 30 being also adjusted in their bearings and stuffing-boxes and the bonnet sealed. If desired, the rod 36 may be connected with rod, tube, or shaft 30 at this time and tube 37 placed around the latter under wheel or handle 38, and said wheel or handle can be moved to such position that wheel 38, rod 36, tube 37, and tube or shaft 30 will act to sustain the cutting-machine when the section of pipe is cut out. The parts being thus assembled in working position, shaft 26 is rotated, whereupon both cutter-carriers 19 rotate around frame 16 and the cutters act upon the pipe in unison to sever the same in two parallel lines, thus cutting out a cross-section 1^b of pipe 1 in chamber 3 of branch or casing 2. Water, gas, or other fluid will now fill the branch or casing and its bonnet or cover and surround the cutting-machine, and to remove the machine with its attached cut-out section of pipe it is first raised to the upper part of the bonnet, as in Fig. 6, and then valve 5 is caused to close against seat 4, thus shutting off the flow of water, gas, or other fluid through opening 3^a of branch 2. The bonnet and its contained cutting-machine, with the cut-out section of pipe, can next be removed from the branch or casing 2, and a cover or plate can be fastened over opening 3^a upon flange 7, or with the valve arrangement shown in Fig. 10 a branch pipe can be connected with flange 7 and then valve 5 withdrawn. In either case the valve 5 being closed after the cutting-machine and its attached section of pipe are removed from pipe 1 enables said machine to be taken away from branch or casing 2 without the loss of water or the inconvenience of flowing water or gas interfering with the closing of opening 3^a of branch or casing.

My improvements are equally applicable

for use in connection with water, gas, and oil pipes that are buried underground; and I do not limit my invention to the precise details of construction and arrangement shown and described, as they may be varied without departing from the spirit of my invention.

Having now described my invention, what I claim is—

1. The combination of a divided frame or ring having two parallel annular guideways and means to clamp said frame upon a pipe, with two divided cutter-carriers or rings mounted upon and adapted to travel around said guideways and having gear-teeth respectively projecting toward each other, means for clamping said cutter-carriers or rings around said guideways, means for supporting tools on each of said carriers or rings and for feeding said tools independently, a pinion or gear-wheel located between said cutter-carriers and meshing with the gears carried by both of said cutter-carriers, a shaft carrying said pinion, a gear-wheel to rotate said shaft, a pinion or gear-wheel to operate said wheel, and a shaft for operating said pinion or gear-wheel, substantially as set forth.

2. The combination of a casing adapted to be clamped around a pipe and having a chamber to receive a pipe-cutting machine, said casing being provided with a stuffing-box or bearing, with a pipe-cutter adapted to be clamped around a pipe within the chamber of the casing, and a shaft journaled in said stuffing-box or bearing and connected with said pipe-cutter, and means for sustaining the pipe-cutting machine when the pipe is cut through, substantially as described.

3. The combination of a casing adapted to be clamped around a pipe and having a chamber to receive a pipe-cutting machine, said casing being provided with stuffing-boxes or bearings, with a pipe-cutter adapted to be clamped around a pipe within the chamber of said casing, said pipe-cutter having two parallel shafts or rods that project through said stuffing-boxes or bearings and serving to keep the pipe-cutting machine from twisting within the casing.

4. A branch or casing adapted to be fastened upon a pipe and having a chamber adapted to surround the pipe, which chamber is greater radially than the pipe to be surrounded so as to receive a pipe-cutting machine within it whereby a tool can travel around said pipe within the casing, said branch or casing having an opening leading to said chamber for the passage of the pipe-cutting machine, a valve-seat and a valve to close said opening, said branch or casing also having an opening and a hub leading from said chamber, substantially as set forth.

5. A divided or split branch or casing adapted to be fastened upon a pipe and having a chamber adapted to surround the pipe and that is greater radially than the pipe to be surrounded, to receive a pipe-cutting machine within it whereby a tool can travel

around the pipe, said branch or casing having an opening leading to said chamber, for the passage of a pipe-cutting machine, a valve-seat surrounding said opening, and a valve to close against said seat, said branch or casing also having a plurality of openings leading to said chamber, and hubs extending from said openings, substantially as set forth.

6. The combination of a divided or split branch or casing adapted to be clamped upon a pipe and having a chamber adapted to surround a pipe and that is greater radially than the pipe to be surrounded, and adapted to receive a cutting-machine within it to enable a tool to travel around the pipe, said branch or casing having an opening leading to said chamber, for the passage of a pipe-cutting machine, a valve-seat surrounding said opening, a valve to close against said seat, and a removable bonnet or cover adapted to be fastened to said branch or casing in line with said opening, the interior of said bonnet or cover constituting a prolongation of the chamber of said casing, said chamber and bonnet or cover being adapted to permit the passage of a pipe-cutting machine, said branch or casing also having an opening and a hub leading from said chamber, substantially as set forth.

7. The combination of a divided or split branch or casing adapted to be clamped upon a pipe and having a chamber adapted to surround a pipe and that is greater radially than the pipe to be surrounded, and adapted to receive a pipe-cutting machine within it to enable a tool to travel around the pipe, said branch or casing having an opening leading to said chamber, for the passage of a pipe-cutting machine, a valve-seat surrounding said opening, a valve to close against said seat, a removable bonnet or cover adapted to be fastened to said branch or casing in line with said opening, and whose volume is such as to permit the passage through it of the pipe-cutting machine, the interior of said bonnet or cover constituting a prolongation of the chamber of said branch or casing, and a stuffing-box carried by said bonnet or cover to receive the driving-shaft of a pipe-cutter, said branch or casing also having a plurality of openings leading to said chamber, and hubs extending from said openings, substantially as set forth.

8. A divided or split branch or casing adapted to be clamped upon a pipe and having a chamber adapted to surround a pipe and that is greater radially than the pipe to be surrounded, said branch or casing having an opening leading to said chamber, a valve-seat surrounding said opening, a valve to close against said seat, a removable bonnet or cover adapted to be fastened to said branch or casing in line with said opening, the interior of said bonnet or cover constituting a prolongation of the chamber of said branch or casing, and a stuffing-box carried by said bonnet or cover, combined with a pipe-cutter

adapted to carry a tool around the pipe within said chamber, and also adapted to travel within said chamber and the bonnet or cover, and a shaft to pass through said stuffing-box to operate said pipe-cutter, and means to sustain said shaft and the pipe-cutter when the pipe is cut through, substantially as described.

9. A divided or split branch or casing adapted to be clamped upon a pipe and having a chamber adapted to surround a pipe and that is greater radially than the pipe to be surrounded, to enable a pipe-cutter to surround the pipe, said branch or casing having an opening leading to said chamber, a valve-seat and a valve to close said opening, a removable bonnet or cover adapted to be fastened to said branch or casing in line with said opening, the interior of said bonnet or cover constituting a prolongation of the chamber of said branch or casing, stuffing-boxes or bearings carried by said bonnet or cover, and two shafts or rods to pass through said stuffing-boxes or bearings, combined with a pipe-cutter adapted to be operated within said chamber of the branch or casing, and arranged to connect with said shafts or rods, said shafts or rods serving to keep the pipe-cutter from twisting within the casing, substantially as set forth.

10. The combination of a divided or split casing adapted to be clamped around a pipe and having a chamber to surround the pipe and an opening leading to said chamber, with a valve and valve-seat, a removable bonnet or cover having a stuffing-box, a pipe-cutter adapted to travel within said chamber and bonnet or cover, a tube or shaft projecting from said pipe-cutter, a threaded rod extending therefrom, a tube to surround said threaded rod, and a threaded wheel or handle to operate on said threaded rod and said tube to raise the pipe-cutter, substantially as set forth.

11. The combination of a branch or casing

having a chamber to surround a pipe to receive a pipe-cutting machine within it and an opening leading thereto, a valve-seat and a flange surrounding said seat, with a removable bonnet or cover having a stuffing-box or bearing and a flange to connect with the flange on the branch or casing, and a valve to close against said seat, and with a pipe-cutting machine, a shaft or rod to project therefrom through said stuffing-box or bearing, and means connected with said shaft or rod to sustain the latter and the pipe-cutting machine when the pipe is cut through, substantially as described.

12. The combination of a divided or split branch or casing having a chamber and an opening leading thereto, a valve-seat and a flange surrounding said seat, with a removable bonnet or cover having a flange to connect with the flange on the branch or casing, a valve having a threaded bore, and a screw adapted to enter said bore to sustain said valve, substantially as described.

13. The combination of a divided or split branch or casing having a chamber and an opening leading thereto, a valve-seat and a flange surrounding said seat, with a removable bonnet or cover having a flange to connect with the flange on the branch or casing, a valve having a threaded bore, and a screw adapted to mesh with the threads in said bore, and carried by the bonnet or casing, said screw being arranged to suspend the valve in an upright position outside of the seat and above the surface of the subtended metal, substantially as set forth.

Signed at New York city, in the county of New York and State of New York, this 2d day of January, A. D. 1897.

DAVID W. FRENCH.

Witnesses:

M. R. SHERRERD,
FRED. A. SMITH.