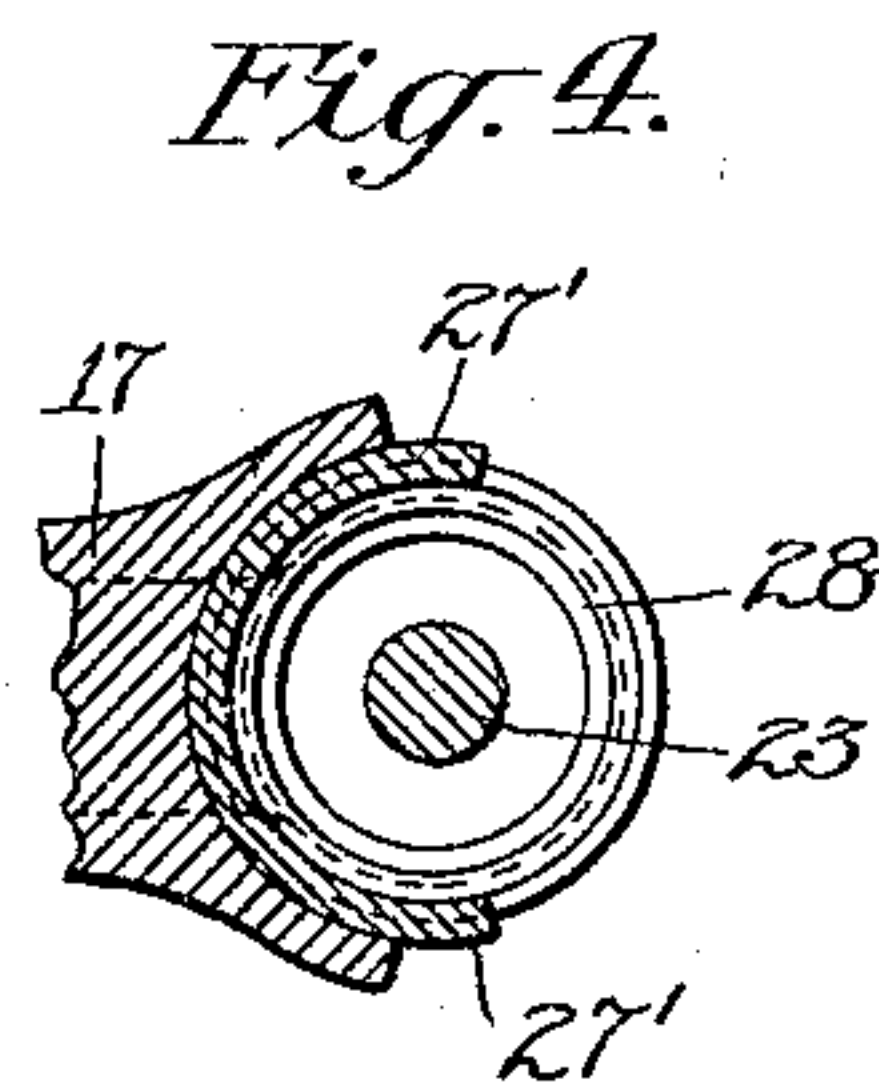
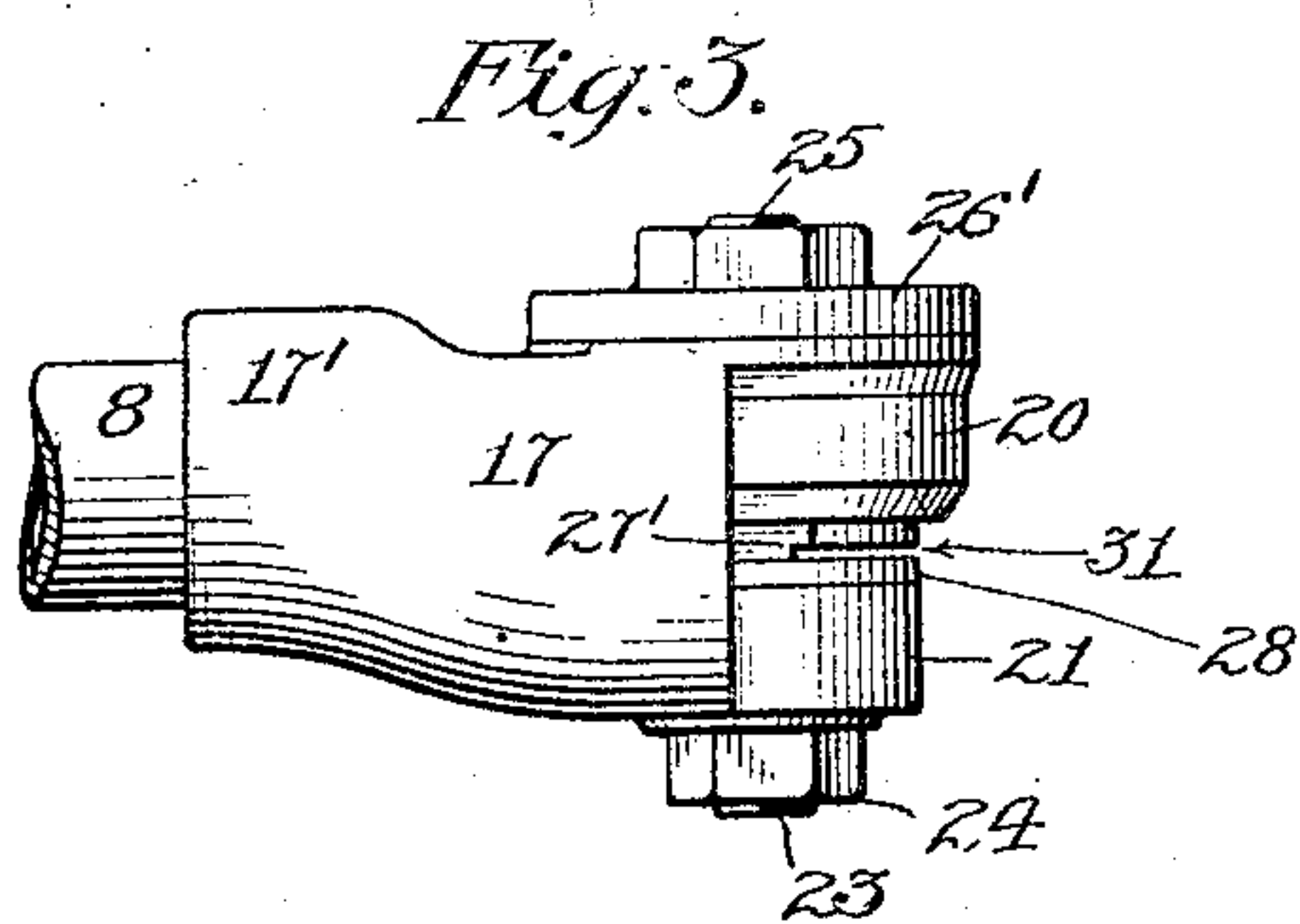
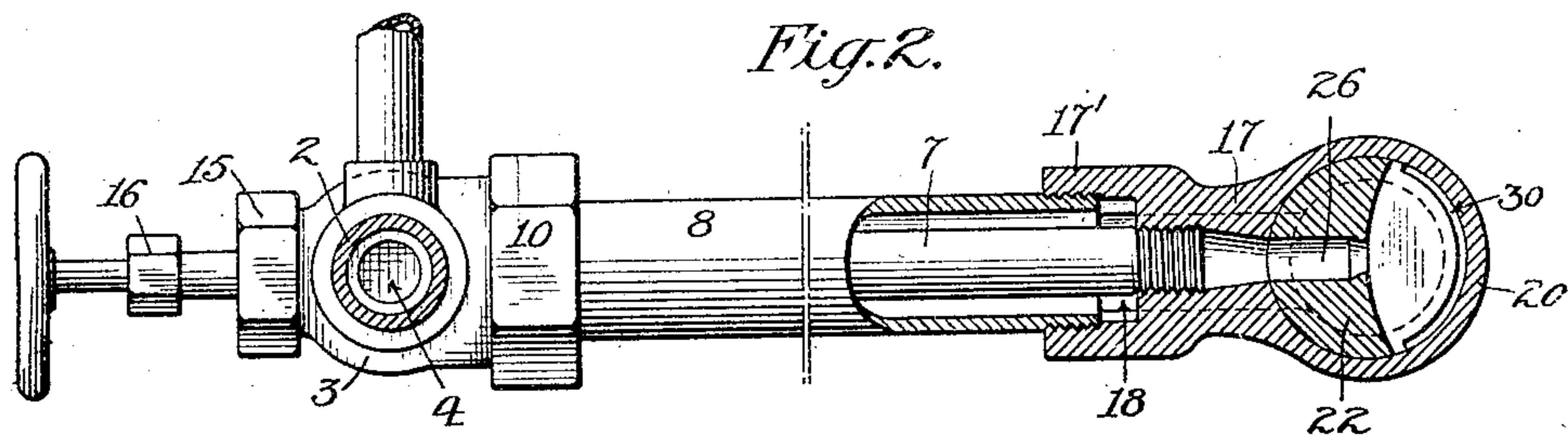
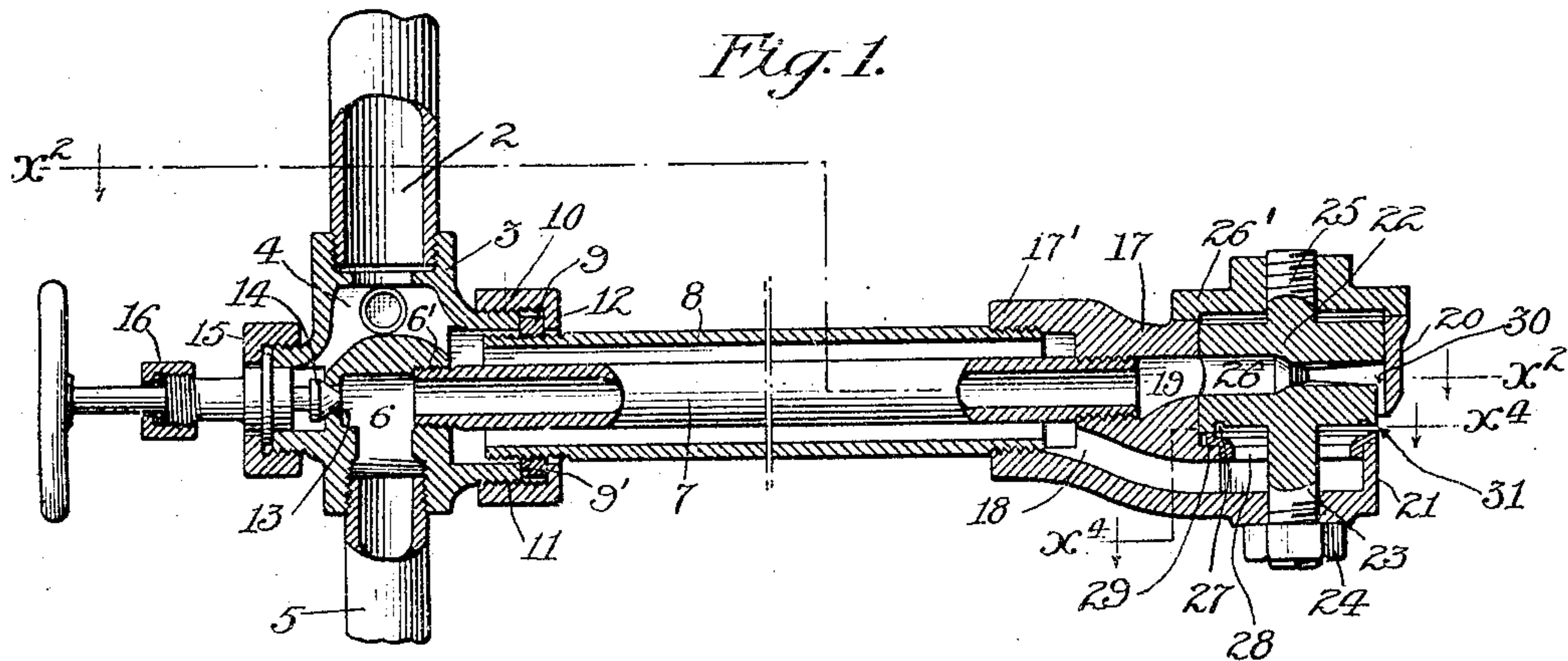


No. 845,241.

PATENTED FEB. 26, 1907.

L. K. LEAHY.  
HYDROCARBON BURNING APPARATUS.  
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# UNITED STATES PATENT OFFICE.

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## HYDROCARBON-BURNING APPARATUS.

No. 845,241.

Specification of Letters Patent.

Patented Feb. 26, 1907.

Application filed October 4, 1905. Serial No. 281,251.

*To all whom it may concern:*

Be it known that I, LOUIS K. LEAHY, a citizen of the United States of America, residing at Los Angeles, in the county of Los Angeles, State of California, have invented certain new and useful Improvements in Hydrocarbon-Burning Apparatus, of which the following is a specification.

This invention relates to means for atomizing and burning hydrocarbon oils, and particularly to apparatus for utilizing as fuel the heavy asphaltum oils of California, and has for its object the provision of exceedingly simple, durable, positive, and efficient means for atomizing the heavy oils with a blast of steam or compressed air and in the provision of means for readily coupling the atomizing head or tip with the steam and oil supply-pipes and providing means whereby steam may be turned into the oil-pipe to thoroughly clean the same, as well as the oilways and discharge-slots of the atomizing head or tip.

The invention consists in the constructions and combinations of parts hereinafter described, and particularly set forth in the claims, and will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of an apparatus embodying my invention, portions being broken away to more clearly show the construction. Fig. 2 is a sectional plan view taken on the line  $x^2 x^2$  of Fig. 1. Fig. 3 is a side elevation of the atomizing head or tip. Fig. 4 is a sectional plan view on the line  $x^4 x^4$  of Fig. 1.

As shown in the drawings, 2 represents the steam-supply pipe, and 3 a casing or coupling head into which the end of the pipe 2 is screwed. The pipe 2 communicates into the chamber 4 of this coupling, as shown. Into the opposite side of the coupling 3 is screwed the oil-supply pipe 5, communicating with the oilway 6 of the coupling. This way 6 is open into the oil-pipe 7, screwed into the wall 6' of the coupling 3, as shown, the pipe 7 being within a steam-pipe 8, which is inserted into the opening of the way 4. A collar 9 is provided with a suitable thread, so that it may be turned up against the end wall 9' of the way 4, and a locking-collar 10 is provided of a suitable diameter to engage the external threads 11, and this locking-collar 10 is provided with a flange 12, adapted to bear against edge of the collar 9, the center of the flange 12 being cut away to allow the

collar 10 to be slipped over the pipe 8. It is thus seen that the collar 9 engages the thread of the pipe 8, and by turning this collar up against the ends of the wall of the way 4 and then slipping into place the locking-collar 10 and turning the same up tightly on the thread 11 a steam-tight connection is made and the pipe 8 suitably supported in the coupling 3 without carrying any of the weight on the oil-pipe 7. A port 13 is provided, leading from the way 4 into the way 6, thus forming a by-pass for the steam, so that the steam may be turned into the oilway to clear the same. This port 13 is controlled by a suitable valve 14, the stem of the valve passing through stuffing-boxes 15 16, as shown.

17 represents the tip-casing, provided with a shank 17', adapted to receive the end of the pipe 8, as shown, a steamway 18 being formed in the lower portion of the casing 17 and in communication with the pipe 8. The central portion of the tip or casing 17 is provided with a threaded opening adapted to receive the end of the oil-pipe 8 and with an oilway 19 leading into the hollow chamber of the casing. As shown, this casing 17 is provided with a hollow central chamber open at its upper end. This chamber is preferably cylindrical in form and has a closed bottom, as shown.

The front wall of the casing 17 is formed in two portions or sections 20 21, terminating some distance from one another and forming a wide slot between the edges of the sections 20 21. As shown, the inner surface of the section 20 is arranged outside the outer surface of the section 21, being so spaced to form a downwardly-extending way external of the outer surface of the lower portion of the tip.

22 represents a hollow plug which is adapted to be inserted into the cylindrical chamber of the casing 17. This plug is preferably provided with a threaded shank 23, adapted to screw through a threaded opening in the bottom of the casing 17 and preferably of sufficient length to project below the outer surface of the bottom to receive a lock or jam nut 24. Preferably the plug is also provided with a second shank 25, which is threaded to receive the cap 26'. The plug 22 has a central oil way or chamber 26 leading diametrically therethrough and adapted to register with the way 19. Preferably the under side or lower face of the plug 22 is recessed, as shown, to form a steam-expansion chamber and an annular channel 27 formed



therein, and, as shown best in Fig. 4, a segment of the flange 27' is cut away.

28 represents a removable wearing-ring adapted to seat on the wall of the section 21 and upon a ledge 29, which forms a continuation of the surface of the wall 21.

As shown best in Fig. 3, the ends of the flange 27' are recessed, so that the blast of steam projected will be of greater width than the width of the oil-sheet. It is thus seen that the oil-discharge duct 30, formed between the inner surface of the wall or section 20 and the outer surface of the plug 22, discharges downwardly and right angularly to the plane of discharge of the steam-discharge slot 31 formed between the upper edge of the ring 28 and the under side of the plug 22, so that the oil is projected into the sheet of steam, which expanding upwardly commingles with the oil, thoroughly atomizing it. By providing an annular channel or groove 27 in the under side or lower face of the plug 22, and thus forming an abutment for the steam to strike against, the steam is prevented from rushing directly out the discharge-slot 31; the steam cushioning against the abutment, breaking up the steam, and effectuating a more thorough atomization of the oil.

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

1. A burner comprising a casing having a cylindrical chamber provided with a slot in its side wall, said chamber open at one end, a plug adapted to be inserted into said chamber and being of such size as to fit tightly therein, said plug provided with a diametric passage and having a portion of its peripheral surface cut away to form an oil-discharge, leading to the mouth of said slot from one end of said passage between such cut-away portion and the wall of said chamber, said casing having an opening or oil-inlet registering with and opening into the other end of said passage, a steamway formed at the lower end of said plug and within said casing and discharging through said slot, and oil and steam pipes connected with said oil-inlet and steamway respectively.

2. A burner-tip comprising a casing having a cylindrical chamber with a peripheral outlet from said chamber, a cylindrical plug fitting within and inclosed by the walls of said chamber and forming between its outer surface and the inner surface of said casing a downwardly-extending oilway, terminating at said peripheral outlet, and below said plug a steam-chamber communicating to said peripheral outlet, said plug having a diametric oil-passage opening into said oilway in combination with an oil-supply pipe connected with said diametric oil-passage and a steam-supply pipe connected with said steam-chamber.

3. A burner-tip comprising a hollow casing having a lateral slot and a plug inserted therein, being of such size as to fit tightly in said casing and having a portion of its surface cut away to form an oil way or passage between said surface and the wall of said casing, said oilway terminating at said slot, said plug having passage transversely through it registering with said oil-passage, and a steamway formed below said oilway and opening to said slot.

4. A burner-tip comprising a hollow casing having a lateral discharge-slot, the upper wall of the slot lying beyond the plane of the lower wall thereof, and a plug removably held in the chamber of said casing, said plug having transverse oil-passage, and a portion of outer surface of its wall cut away to form an oilway between such cut-away portion and the wall of said casing, said oilway leading from said transverse passage and terminating at said slot a portion of the periphery of the plug above said transverse slot snugly fitting the walls of said casing, and a steamway formed below said oilway and communicating with the discharge-slot in combination with means for supplying oil to said oilway and means for supplying steam to said steamway.

5. A burner-tip comprising a casing having a cylindrical chamber open at one end and having an oil-inlet at one side, a steam-inlet near the bottom and a peripheral discharge-slot, and a cylindrical plug adapted to be slipped into said chamber through the open end thereof and removably held therein and fitting tightly within said chamber, said plug having a transverse oilway registering with said oil-inlet and having a portion of the outer surface of its front wall cut away and forming between its wall and the inner wall of the casing an oil-duct leading from said oilway to said discharge-slot, and said casing and plug forming a steamway leading from said steam-inlet to said discharge-slot, and means for holding said plug in place.

6. A burner-tip comprising a casing having a cylindrical chamber open at one end and having an oil-inlet at one side and a peripheral discharge-slot, and a cylindrical plug adapted to be slipped into said chamber through the open end thereof and removably held therein, said plug having a transverse oilway registering with said oil-inlet and having the lower portion of the outer surface of its front wall cut away and forming between its wall and the inner wall of the casing an oil-duct leading from said oilway to said discharge-slot said plug fitting tightly within said casing, and a steamway formed through said casing and plug to said discharge-slot.

7. A burner-tip comprising a casing having a cylindrical chamber open at one end and having a peripheral discharge-slot and an opening in its opposite side above the



plane of such slot, a cylindrical plug adapted to insertion into and snug fit within said chamber and removably held therein, said plug having a closed end forming a closure for the open end of said chamber and a transverse passage registering with said opening in said casing and forming an oilway leading diametrically through said plug, said plug having a portion of its front wall below said passage cut away to form an oil-duct between such cut-away portion and the wall of said casing, leading from said transverse opening right angularly to said discharge-slot, a steam-duct leading to said discharge-slot, and means for supplying steam and oil to said respective steam and oil ducts.

8. A burner-tip comprising a casing having a chamber open at one end and having an oil-inlet at one side and a peripheral discharge-slot at the other side, and a plug removably mounted in said chamber and closing the same, said plug having a transverse oilway or chamber registering with said oil-inlet and forming a duct, between the lower portion of its surface and the wall of the casing, said duct being in communication with said transverse oilway or chamber and leading downwardly to the mouth of said discharge-slot, a portion of the periphery of the plug above said transverse slot snugly fitting the walls of the casing, and a steamway-discharge through said discharge-slot transverse the plane of said duct.

9. A burner-tip comprising a casing having a cylindrical chamber open at one end and having an oil-inlet at one side and a peripheral discharge-slot, and a cylindrical plug removably mounted in said chamber and fitting snugly within and closing the same, said plug having a transverse oilway registering with said oil-inlet and forming between the surface of the lower portion of its front wall and the inner wall of the casing an oil-duct leading from said oilway to said discharge-slot, a steamway formed through said casing and plug to said discharge-slot and an abutment in said steamway forming a steam-cushion at the mouth of the steamway.

10. A burner-tip comprising a hollow casing having a lateral discharge-slot, the upper wall of the slot lying beyond the plane of the lower wall thereof, and a plug removably

held in the chamber of the casing and fitting snugly therein, said plug having a portion of the lower and front portion of its wall cut away to form an oilway between such cut-away portions and the wall of said casing, said oilway terminating at said slot, said casing provided with a steam-inlet, said plug and casing forming a steamway or chamber below said plug, and said plug having a channel forming a cushioning abutment at the mouth of said steamway.

11. A burner-tip comprising a casing having a cylindrical chamber open at its top and having a lateral oil-inlet and a peripheral discharge-slot, and a cylindrical plug mounted in said chamber and closing the top thereof, said plug provided with an oilway registering with said oil-inlet and extending diametrically through said plug, a portion of the surface of the plug cut away opposite said oil-inlet and forming with the wall of said casing an oil-duct leading downwardly to said discharge-slot, said plug fitting snugly within said chamber, a steam-chamber formed between the bottom of said plug and casing, said steam-chamber opening to said discharge-slot, in combination with means for supplying oil to said oilway and steam to said steam-chamber.

12. A burner-tip comprising a casing, having a cylindrical chamber and having a lateral oil-inlet and a peripheral discharge-slot, and a steam-inlet, and a plug removably mounted in said chamber and provided with a transverse oilway registering with said oil-inlet and having the lower portion of its front surface cut away to form with the wall of the casing a downwardly-extending oilway leading to the mouth of said discharge-slot, a steam chamber or way formed between the bottom of the plug and casing and opening to said discharge-slot, and said discharge-slot being somewhat wider than the downward oilway so as to discharge a wider sheet of steam than oil.

In testimony whereof I have hereunto set my hand, at Los Angeles, California, this 28th day of September, 1905.

LOUIS K. LEAHY.

In presence of—

FREDERICK S. LYON,  
VERNA A. TALBERT.