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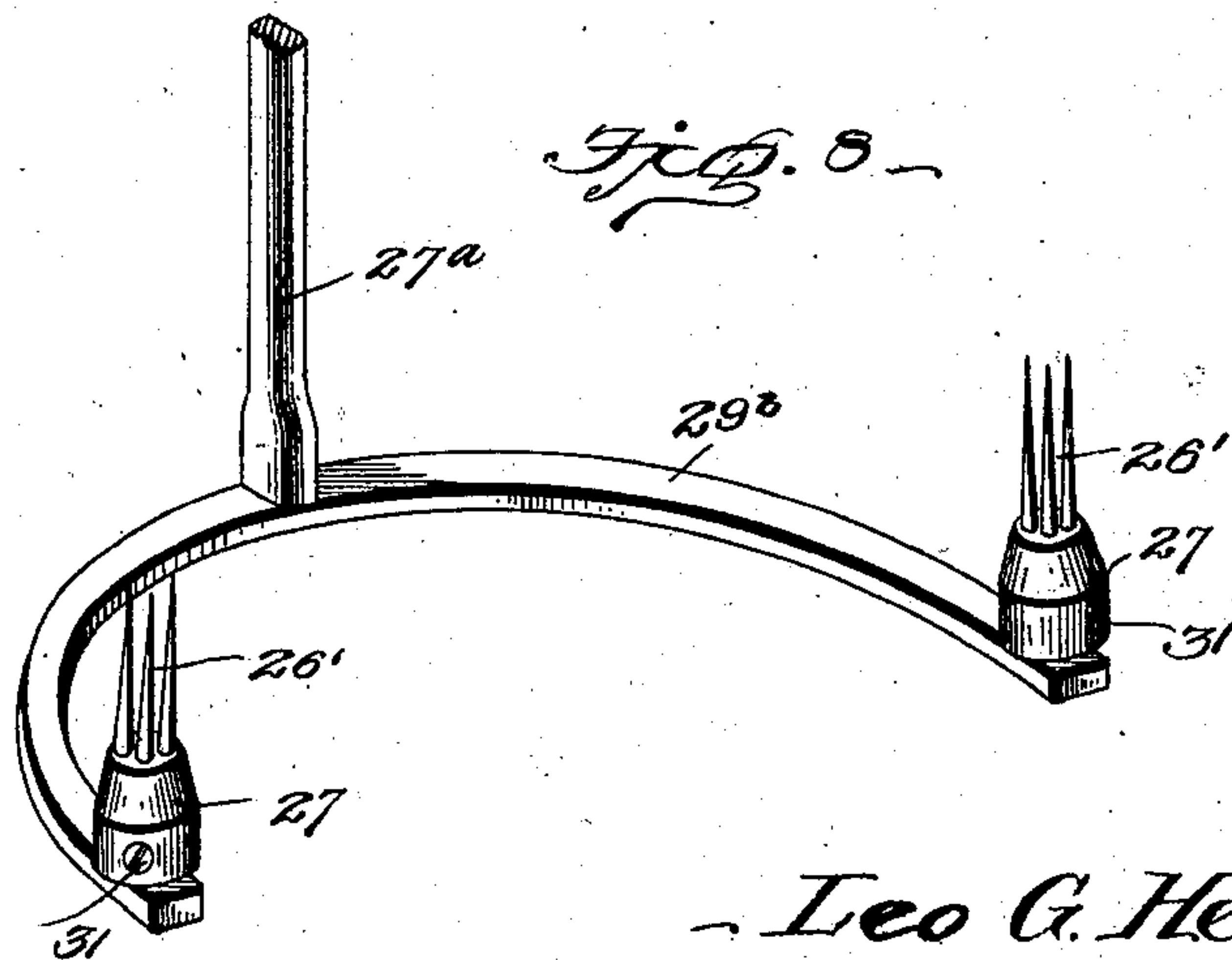
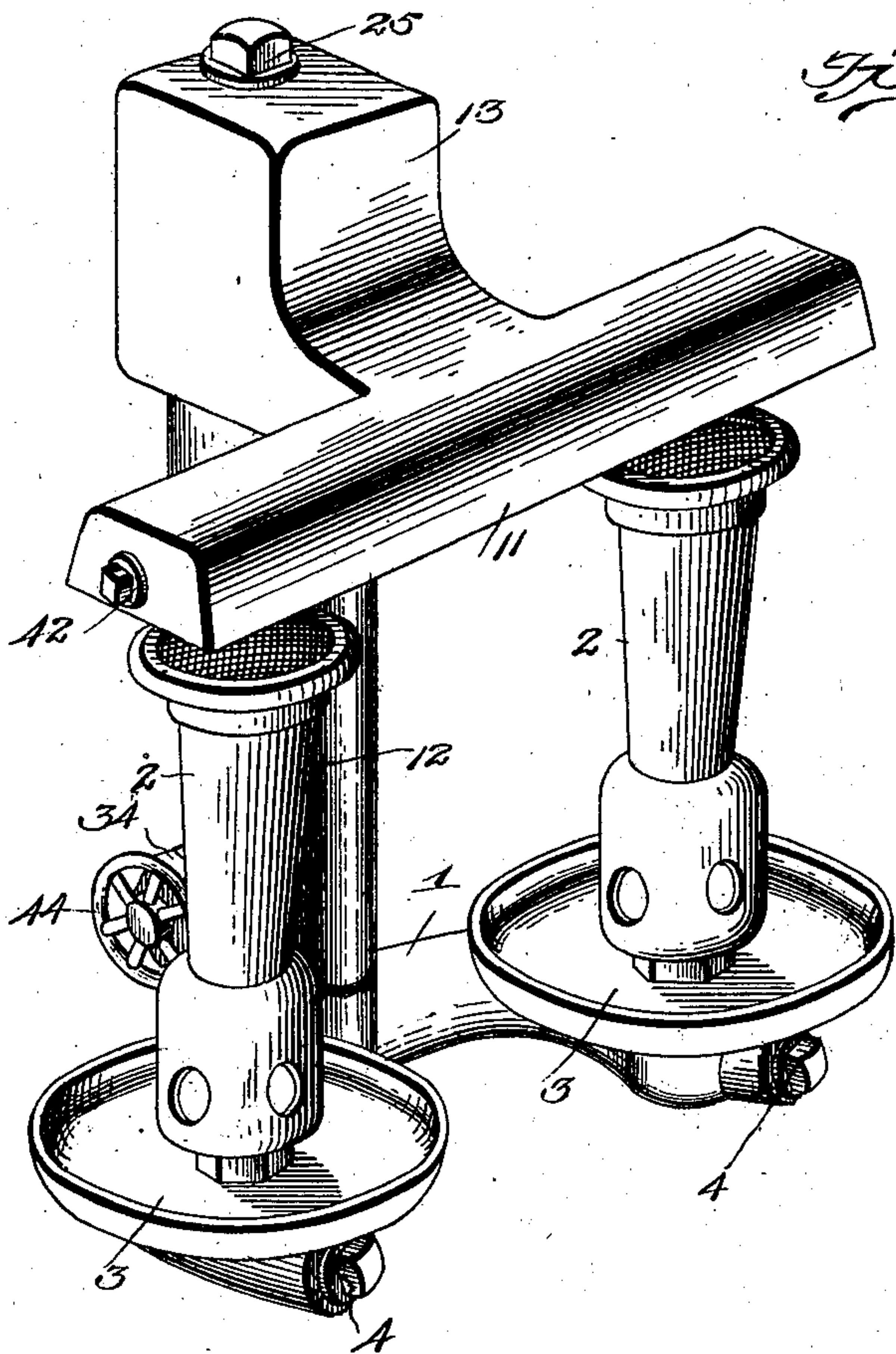
Patented June 17, 1902.

L. G. HEIST.
HYDROCARBON VAPOR BURNER.

(Application filed Oct. 21, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses
Edmund J. Wilson

By *A. B. Wilson & Co.*
Attorneys

Inventor
Leo G. Heist

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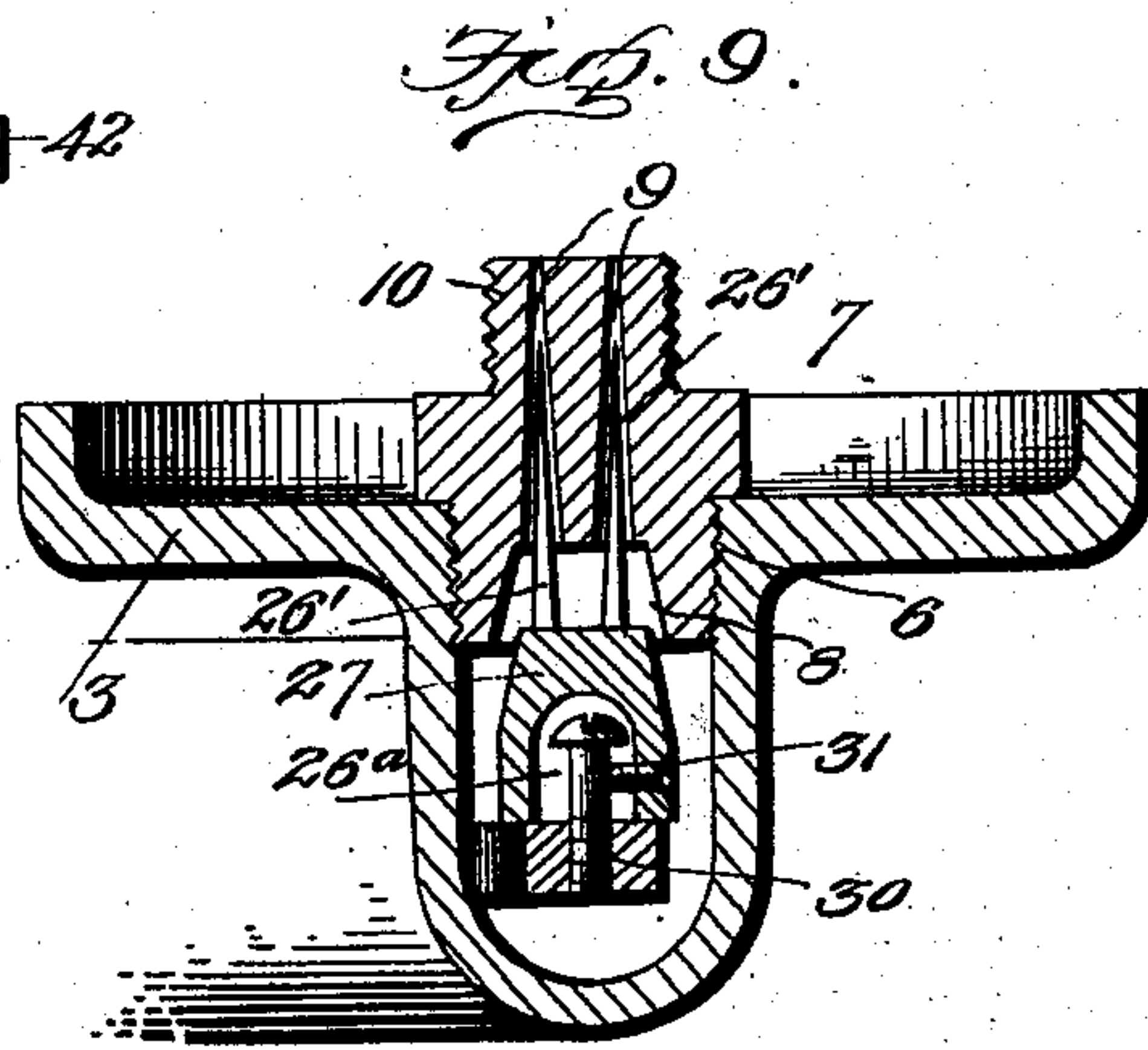
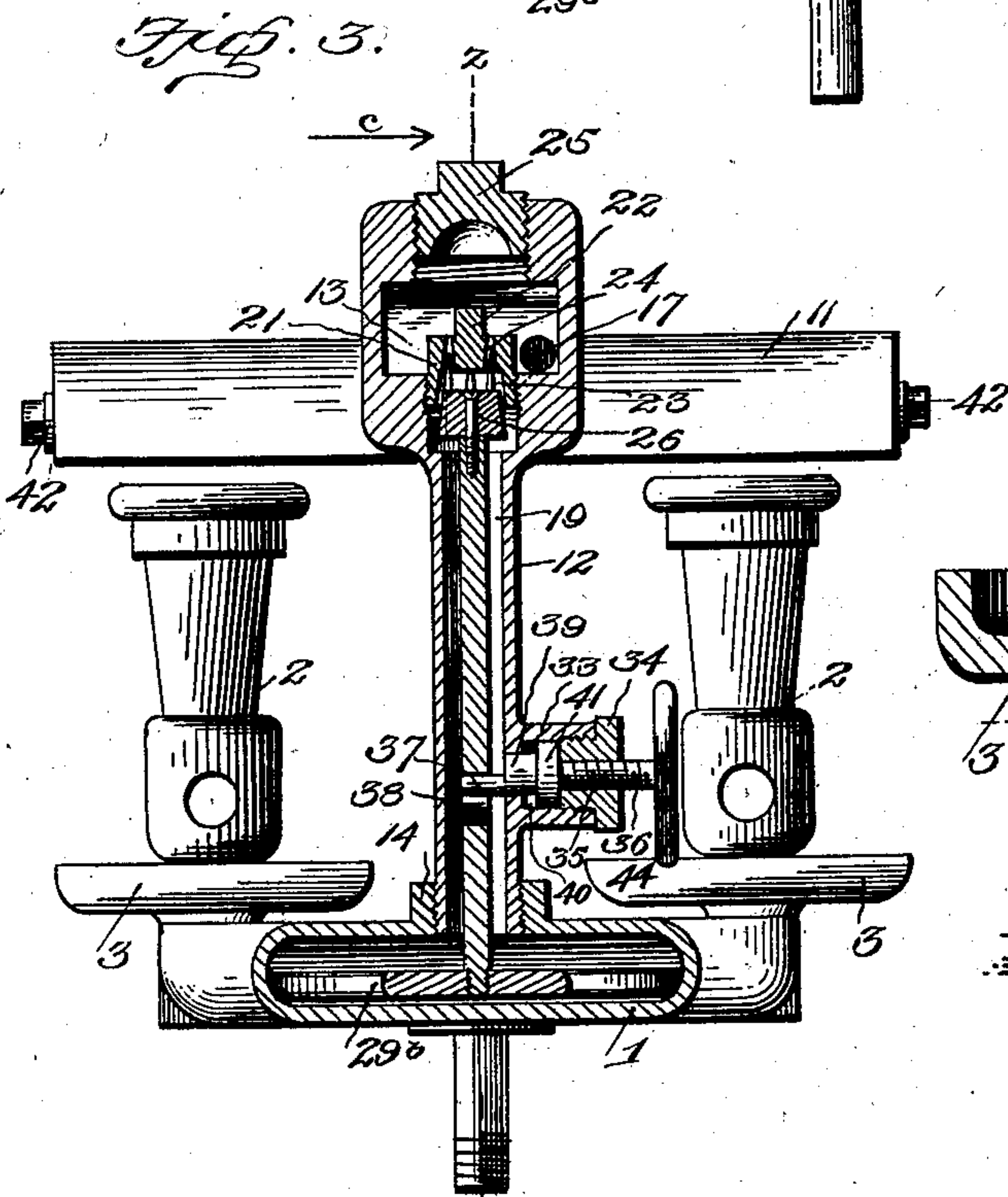
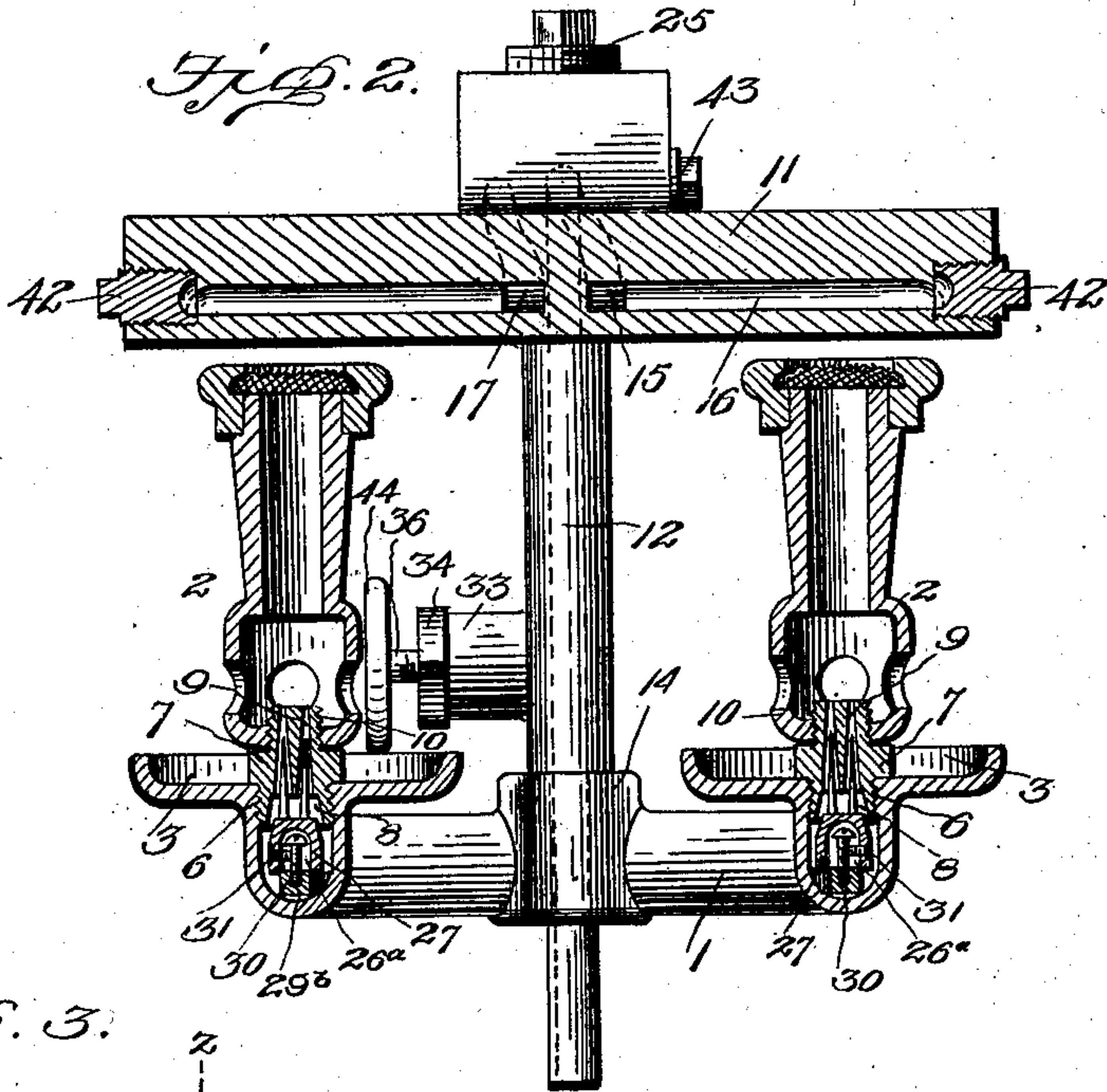
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3 Sheets—Sheet 2.



Inventor

Leo G. Heist

Witnesses

E. D. Hunt
J. H. Wilson

By

A. B. Wilson & Co.

Attorneys

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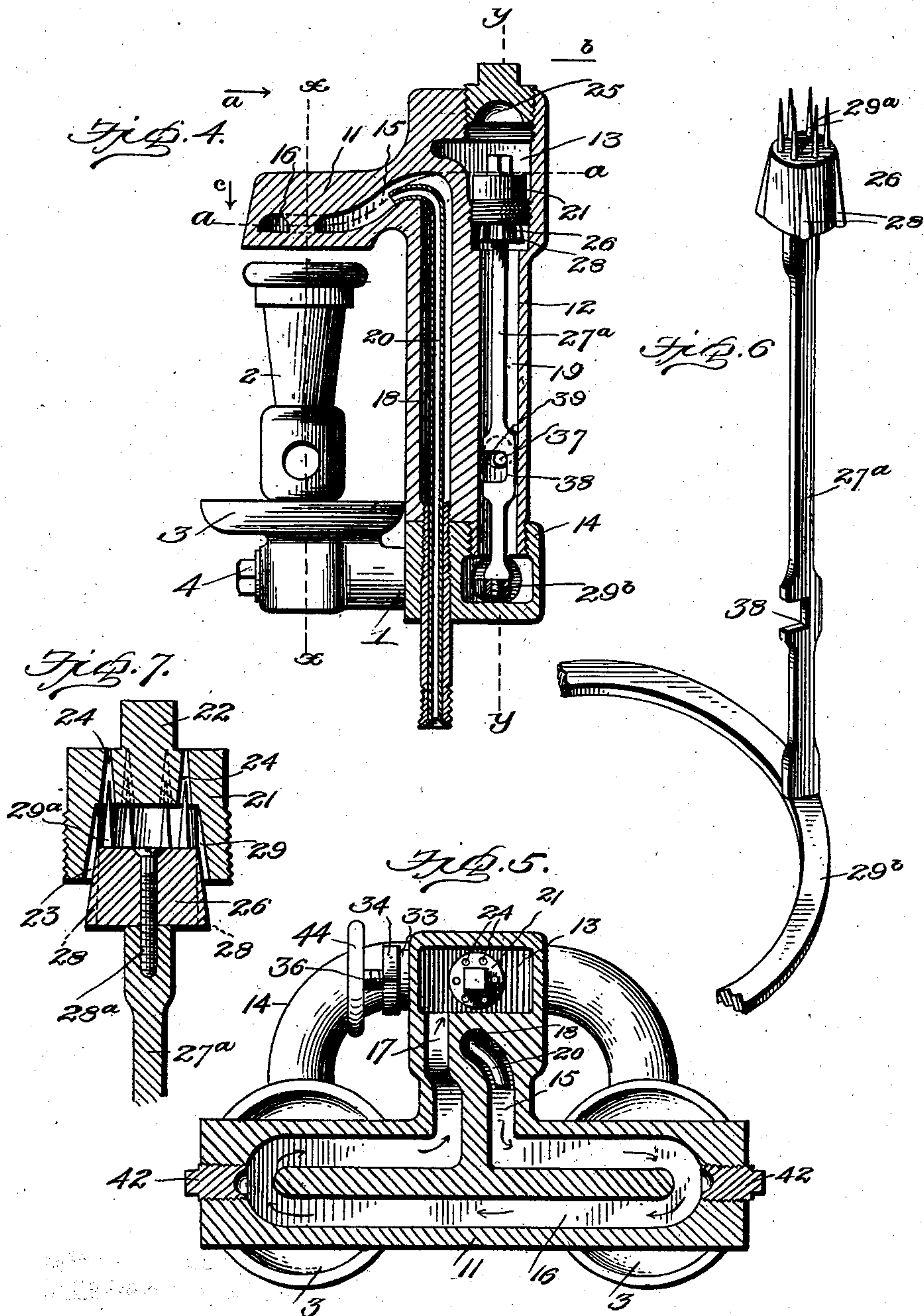
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3 Sheets—Sheet 3.



Inventor

Leo G. Heist

Witnesses

C. E. Hunt,
J. H. Nelson

By

H. R. Wilson & Co.
Attorneys

UNITED STATES PATENT OFFICE.

LEO G. HEIST, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF
TO CHARLES J. WILSON, OF NEW YORK, N. Y.

HYDROCARBON-VAPOR BURNER.

SPECIFICATION forming part of Letters Patent No. 702,553, dated June 17, 1902.

Application filed October 21, 1901. Serial No. 79,370. (No model.)

To all whom it may concern:

Be it known that I, LEO G. HEIST, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Hydrocarbon-Vapor Burners; and I do 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.

The invention relates to hydrocarbon-vapor burners.

The object of the invention is to provide a burner of this character which shall be simple of construction, durable in use, comparatively inexpensive of production, efficient in action, and one which will generate a maximum amount of heat at the expenditure of a minimum amount of fuel.

With these and other objects in view the invention consists of certain novel features of construction, combination, and arrangement of parts, which will be hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a perspective view of my improved burner. Fig. 2 is a vertical sectional view through the burner-heads, the tubular base, and the generating-chamber on the line *xx* of Fig. 4 and looking in the direction of the arrow *a*. Fig. 3 is a similar view through the gas-outlet duct, the valve controlling the escape of gas therethrough, and the means for actuating said valve, said view being taken on line *yy* of Fig. 4 looking in the direction of the arrow *b*. Fig. 4 is a transverse vertical section through the generating-chamber and the oil-inlet duct and gas-outlet duct, said view being taken on line *zz* of Fig. 3 looking in the direction of the arrow *c*. Fig. 5 is a horizontal section through the generating-chamber on the dotted line *aa* of Fig. 4 looking in the direction of the arrow *c*. Fig. 6 is a detail perspective view of the valve located in the trap-chamber with which the generating-chamber communicates. Fig. 7 is a vertical sectional view through said valve and its valve-seat, showing the relation of parts. Fig. 8 is a detail perspective view of the

valves for controlling the supply of gas to the burner-heads; and Fig. 9 is a vertical sectional view through said valve, its seat, and the starting-cup.

Referring to the drawings, 1 denotes the tubular base of the burner, preferably semi-circular in form and provided with burner-heads 2 and with starting-cups 3. If desired, the ends of the base may be provided with removable plugs 4, which when removed will permit of the attachment to the ends of said base of an indefinite number of burner-heads 5 (shown in dotted lines in Fig. 1) to increase the heating capacity of the burner. The starting-cups 3 are preferably cast integral with the base and are provided with central apertures 6, into which are screwed plugs 7, having tapered valve-seats 8 and tapering jet-orifices and formed with screw-threaded necks or extensions 10 to receive the burner-heads, thus forming a convenient means of attachment of said heads to the tubular base and permitting them to be readily removed, as well as the plug, for repair or other purposes.

11 denotes a gas-generating or vaporizing chamber.

12 denotes a stem, and 13 a trap-chamber, the latter establishing communication between the generating-chamber and the stem. The stem is externally screw-threaded at its lower end to engage an interiorly-screw-threaded boss 14, by means of which the stem is connected to the tubular base and the communication between the two parts established.

The generating-chamber is arranged immediately over the burner-heads and is provided with an inlet-duct 15, which communicates with a tortuous passage 16, which in turn communicates through the outlet-duct 17 with the trap-chamber 13. The stem is provided with two vertically-disposed passages 18 and 19, through the former of which extends an oil-inlet tube 20 of much less diameter than the passage 18, and has its end bent over and projecting into the duct 15 at a point above the base of the tortuous passage 16, as clearly shown in Figs. 4 and 5. The passages 18 and 19 may be properly termed, respectively, the "inlet-passage" to and the "out-

at-passage" from the generating-chamber, in that the oil is carried through the passage 18 to the generating-chamber and escapes from the generating-chamber through the passage 9. It is not absolutely necessary that the tube 20 be employed; but the same is preferred in that it serves to discharge the oil into the generating-chamber under pressure in the form of a jet, and thereby render it more susceptible of vaporization.

The trap-chamber is provided with a screw-threaded plug 21, which has a screw-threaded engagement with said chamber and is provided with a head 22, by means of which it may be screwed in place. This plug is provided with a tapering valve-seat 23 and with tapering jet-orifices 24. 25 denotes a cap or plug screw-threaded at the top of the trap-chamber directly above the plug 21 and by means of which said plug 21 may be removed when desired. It will be noticed that the upper end of the plug 21 projects above the bottom of the chamber and that the outlet-duct 17 from the generating-chamber is below the upper end of said plug. Thus a trap is formed whereby any sediment or grit leaving the generating-chamber is caught and prevented from escaping through the jet-orifices 24 with the gas. This foreign matter may be removed from the trap by unscrewing the plug 25, thus affording access to said trap-chamber.

26 denotes a valve for controlling the flow of gas from the trap-chamber, and 27 denotes the valves for controlling the supply of gas to the burner-heads. The valve 26 is tapered in form to correspond to the tapered valve-seat 23 and is preferably provided with ribs 28 to correspond to guide-grooves 29, formed in the side walls of the valve-seat. The valve has projecting from its upper end what I shall term "clearance needles or points" 29^a, which are adapted to free the jet-orifices 24 from carbon, grit, or any other foreign deposit, and thus keep the same in proper condition for the free flow of gas therethrough. The valves 27 are tapered in form to correspond to the valve-seats 8 and are provided with clearance-needles or points 27^a for keeping the jet-orifices 9 free of grit, carbon, or other foreign matter. These valves have chambers 26^a, forming bases, for a purpose hereinafter to appear. The valve 26 is connected to a valve-stem 27^a by a screw 28^a or other suitable means, and this stem 27^a has connected to it a bar 29^b, which is curved to correspond with the tubular base 1. The valve-stem 27^a is located within the passage 1, and the bar 29^b is located within the tubular base and supports the valves 27 and is connected thereto in the following manner: the ends of the bar 29^b are provided with screws 30, the heads of which project upwardly within the chambers 26^a. A screw 31 extends through the side wall of each chamber within the path of movement of the

head of the screw 30, so that when the bar 29^b is elevated to close the flow of gas through the jet-orifices by the needles or points 26^a should said valve adhere to its seat or the needles in the walls of the jet-orifices in the downward movement of the valve the head of the screw 30 will strike the inner end of the screw 31 and will draw said valve from its seat and the needles from engagement with the walls of the jet-orifices. These valves are directly opposite the plugs 4 of the base, so that when said plugs are removed the screw 31 may be applied to connect said valves to the bar. 80

33 denotes a tubular extension projecting from the side of the stem 12, and 34 denotes a plug screwed into said extension and provided with a screw-threaded aperture 35. 36 denotes a screw-shaft integral with said plug and provided with a crank or eccentric pin 37, which projects into a slot 38, formed in the edge of the stem 27^a. This shaft has a smooth enlarged portion 39, which rotates in a bearing 40 and is formed with a disk 41, which alternately engages the end of the plug 34 and the base of the tubular extension 33 in the opening and closing of the valves, and thus forms a gas-tight joint and prevents the escape of gas at these points. The outer end of the shaft may be provided with a hand-wheel 44 or other suitable means for rotating it. 90

42 denotes plugs for closing the ends of the generating-chamber after the core has been removed, and 43 denotes a plug for closing the hole through which a tool is adapted to be inserted to bend down the end of the tube or pipe 20. 100

The operation of the burner is as follows: The starting-cups are first filled with oil in any suitable manner and from any suitable source of supply and the oil ignited. The flame from this oil will heat the generating-chamber and vaporize or cremate the oil therein, so that when the valves are open the vapor will be supplied to the burner-heads in a steady uniform manner. It will be observed that the oil will be quickly cremated, due to the fact that the generating-chamber is immediately over the upper ends of and located a short distance above the burner-heads, and that the vapor thus generated is freed from foreign matter before it enters the passage 19 by reason of the fact that it must first pass through the trap-chamber, so that when the vapor is furnished to the burner-head it is in the best possible condition for consumption. It will also be observed that in the act of closing the valves the jet-orifices are automatically cleaned of any accumulated foreign matter, so that when said valves are opened they are in proper condition to perform their functions. 110 115 120 125

From the foregoing description, taken in connection with the accompanying drawings, the construction, mode of operation, and ad- 130

vantages of my invention will be readily understood without requiring an extended explanation.

5 Various changes in the form, proportion, and the minor details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

10 Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a burner of the character described, the combination with the tubular base, and burner-heads communicating therewith, of a
15 generating-chamber located above the burner-heads, a stem provided with inlet and outlet passages, the latter of which communicates with the tubular base, a trap-chamber establishing communication between the outlet-
20 passage of said stem and the generating-chamber, said inlet-passage communicating with the generating-chamber, and means for controlling the flow of vapor from the generating-chamber to the burner-heads, said means com-
25 prising valves, one located in the trap-chamber and the others at the burner-heads and means for simultaneously operating said valves, substantially as set forth.

2. In a burner of the character described,
30 the combination with a semicircular tubular base, provided with burner-heads, of a generating-chamber, a trap-chamber communicating therewith, a stem connecting the generating-chamber and the trap-chamber to the
35 base and provided with inlet and outlet passages, the latter of which establishes communication between the generating-chamber, the trap-chamber and tubular base, said inlet com-
40 municating with the generating-chamber, valves arranged to regulate the supply of gas at the burner-heads, a valve arranged to regulate the supply of gas from the trap-chamber, connections between said valves, and means
45 for simultaneously operating said valves, substantially as set forth.

3. In a burner of the character described, the combination with the tubular base provided with a burner-head and with a valve-seat, means for supplying gas to said tubular
50 base, a bar mounted to move vertically in said tubular base, a valve loosely seated on said bar and provided with a chamber in its side, a head-

ed stud projecting upwardly from said bar into said chamber, and a stud projecting laterally through the side wall of the valve within the
55 path of movement of the head of the first-named stud so that in the downward movement of said bar, the first-named stud will engage the second-named stud and pull the valve from engagement with its seat, substan-
60 tially as set forth.

4. In a burner of the character described, the combination with the tubular base provided with a valve-seat and with jet-orifices, means for supplying gas to the tubular base,
65 a bar mounted to move vertically in said tubular base, a valve loosely supported upon said bar to engage said valve-seat and provided with points or needles to engage the jet-orifices, and having formed on its under
70 side a chamber, a headed stud projecting vertically from said bar into said chamber, and a stud projecting laterally through the side wall of said valve within the path of move-
75 ment of the head of the first-named stud, substantially as set forth.

5. In a burner of the character described, the combination with the semicircular tubular base, burner-heads communicating there-
80 with, of a generating-chamber located above said burner-heads, a trap-chamber communicating with the generating-chamber, a shank having a passage communicating between the trap-chamber and the tubular base, a verti-
85 cally-movable valve-stem located in the vertical passage, a curved bar secured to the lower end of the vertically-movable stem and located in the semicircular base, a valve-seat within said trap-chamber, valve-seats at the
90 burner-heads, valves, one supported above the upper end of the vertically-movable stem, and the others above the curved bar, and a shaft provided with an eccentric-pin adapted to work in a slot in the valve-stem to raise
95 and lower said stem to open and close said valves, substantially as set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LEO G. HEIST.

Witnesses:

H. B. WILLSON,
BENJ. G. COWL.