

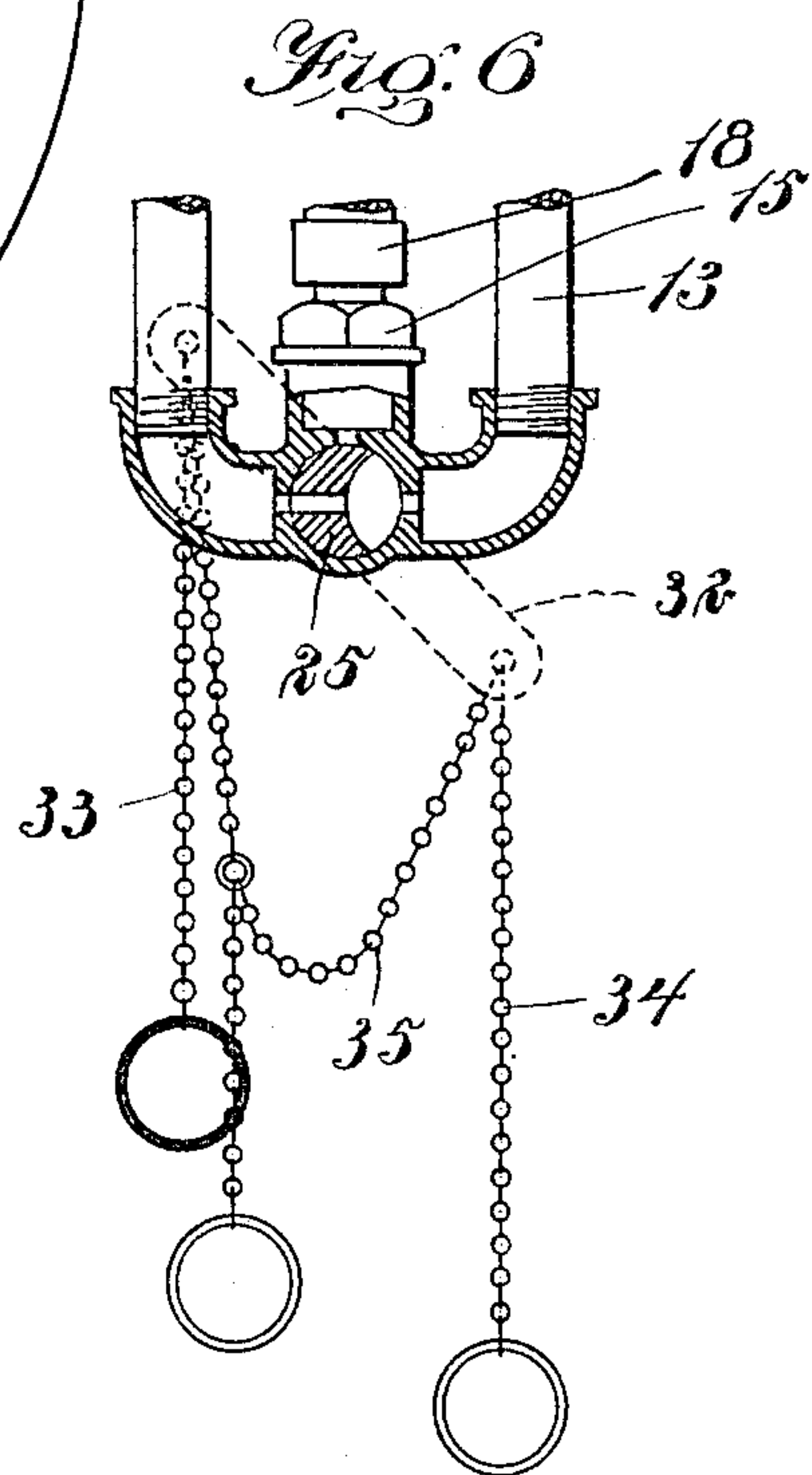
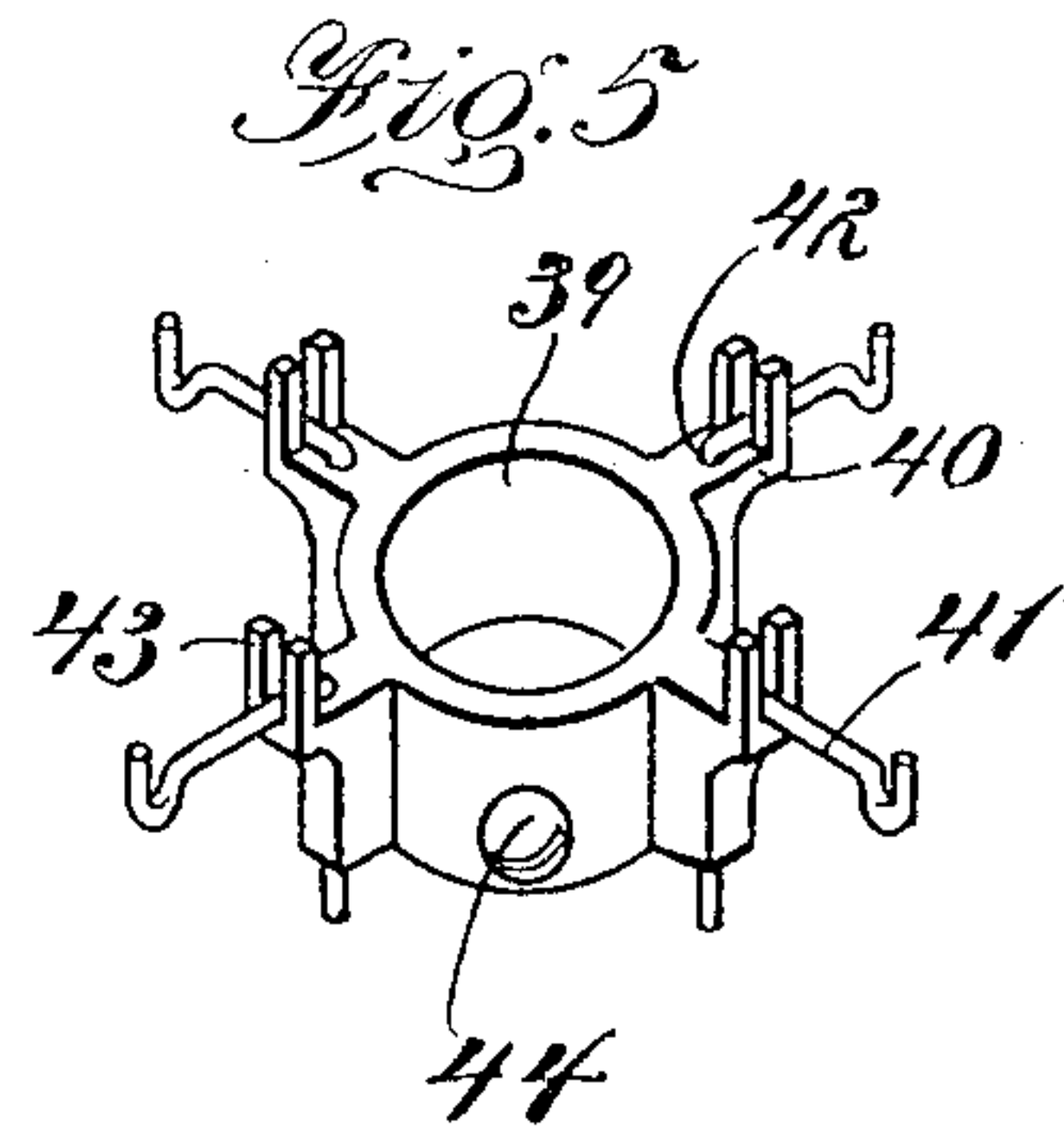
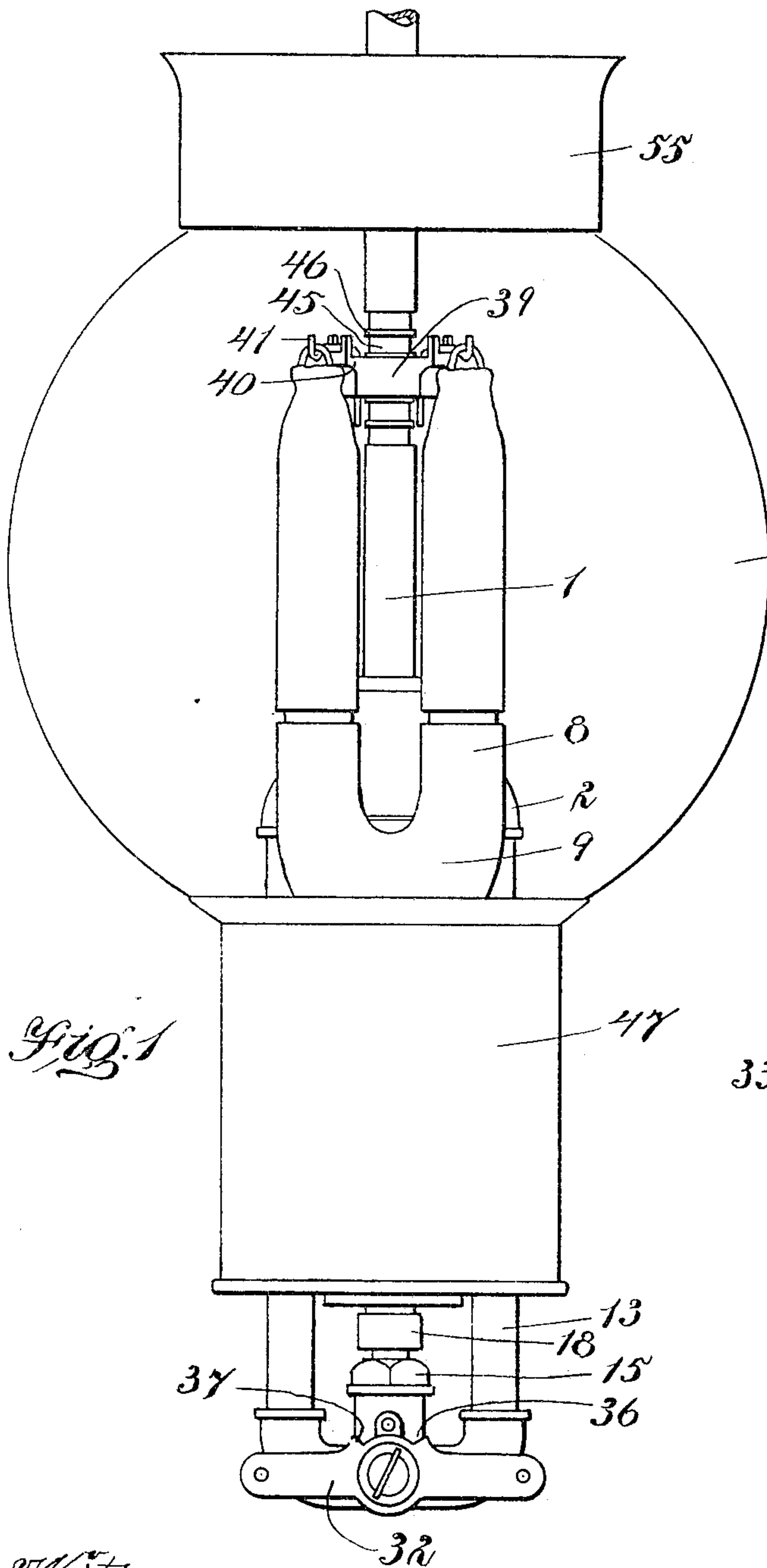
No. 818,789.

PATENTED APR. 24, 1906.

F. A. RAY.
GAS LAMP.

APPLICATION FILED DEC. 31, 1904.

3 SHEETS—SHEET 1.



Witnesses:
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L. C. Kennedy.

Inventor:
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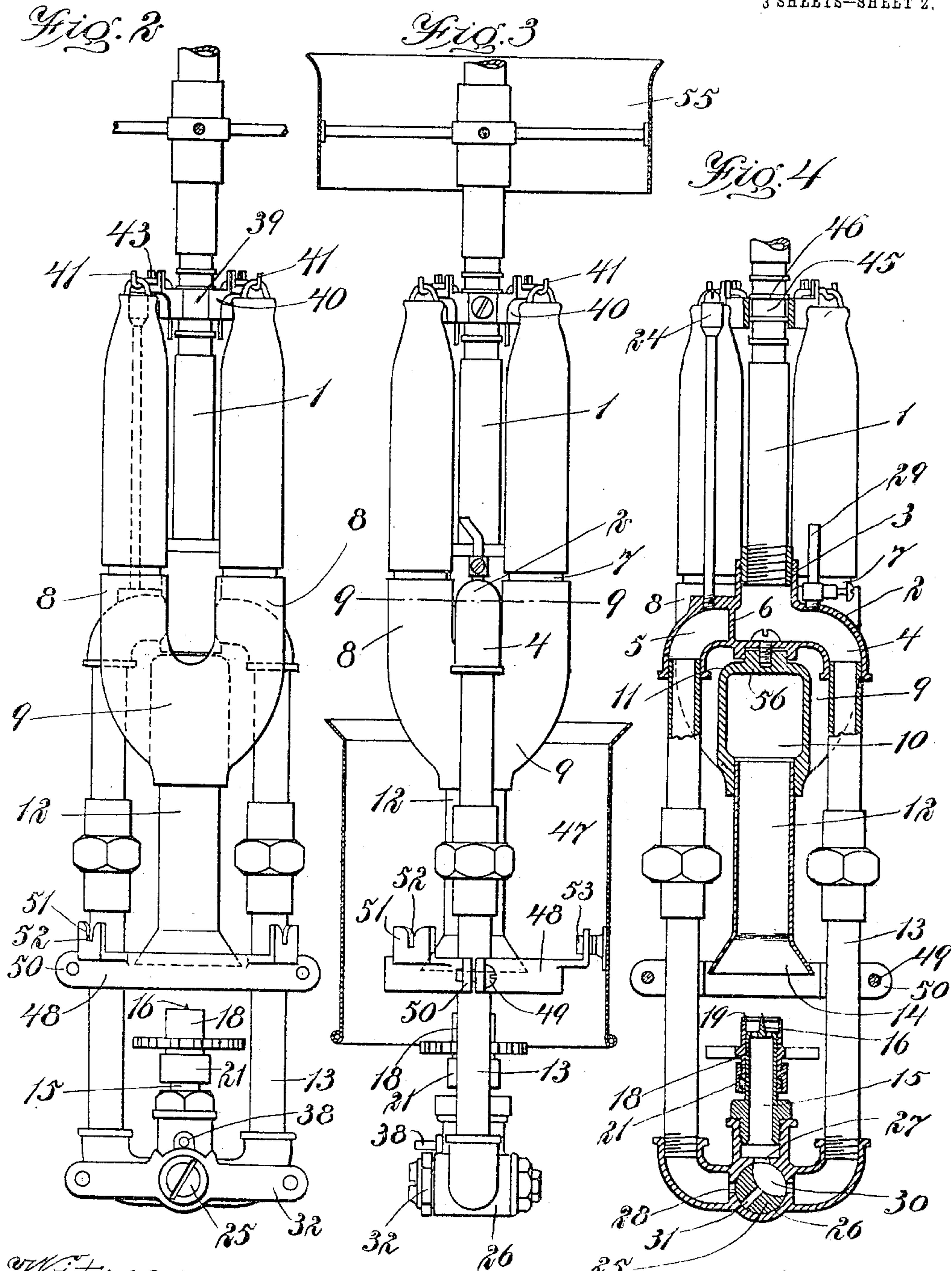
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3 SHEETS—SHEET 2.



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No. 818,789.

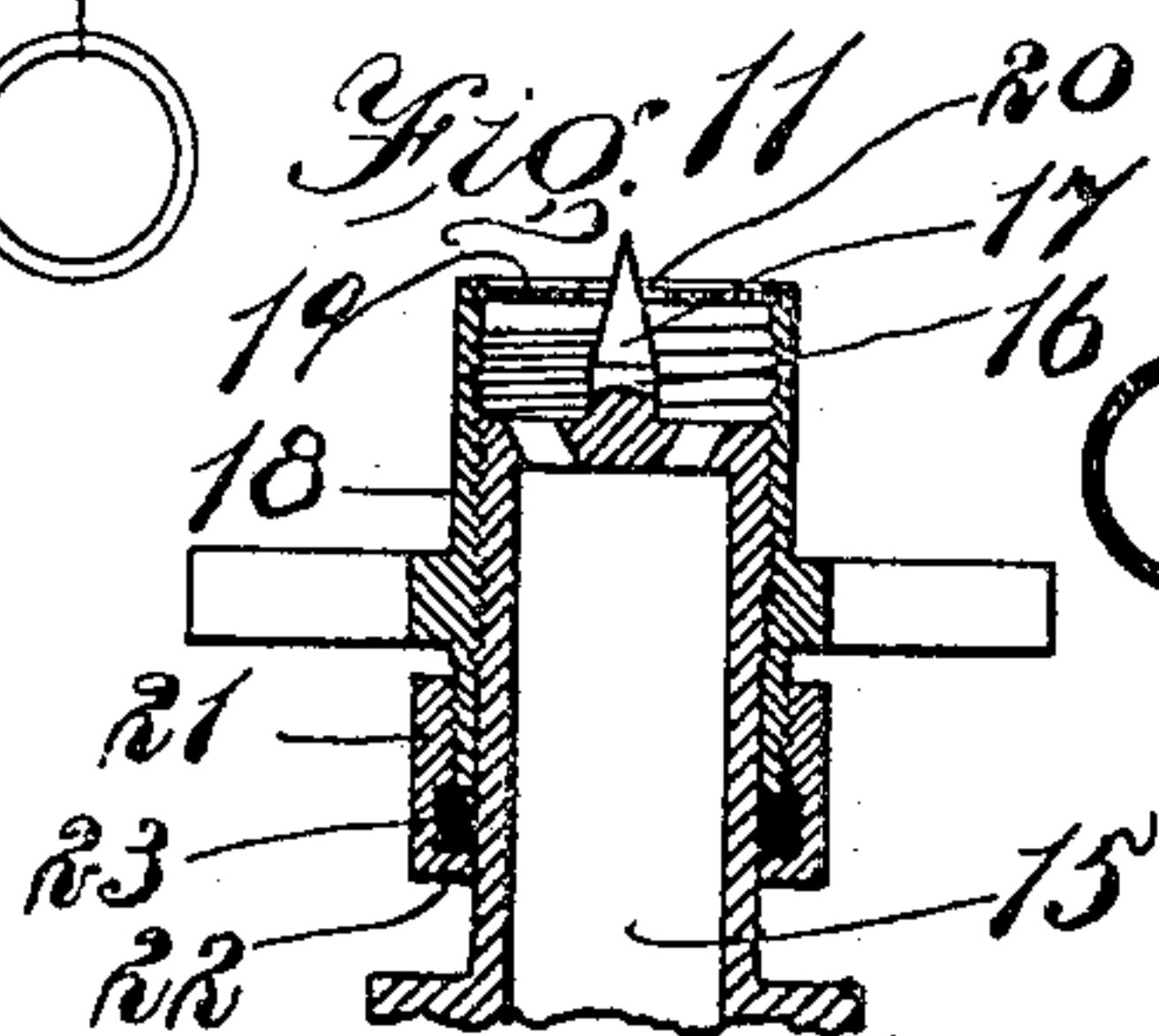
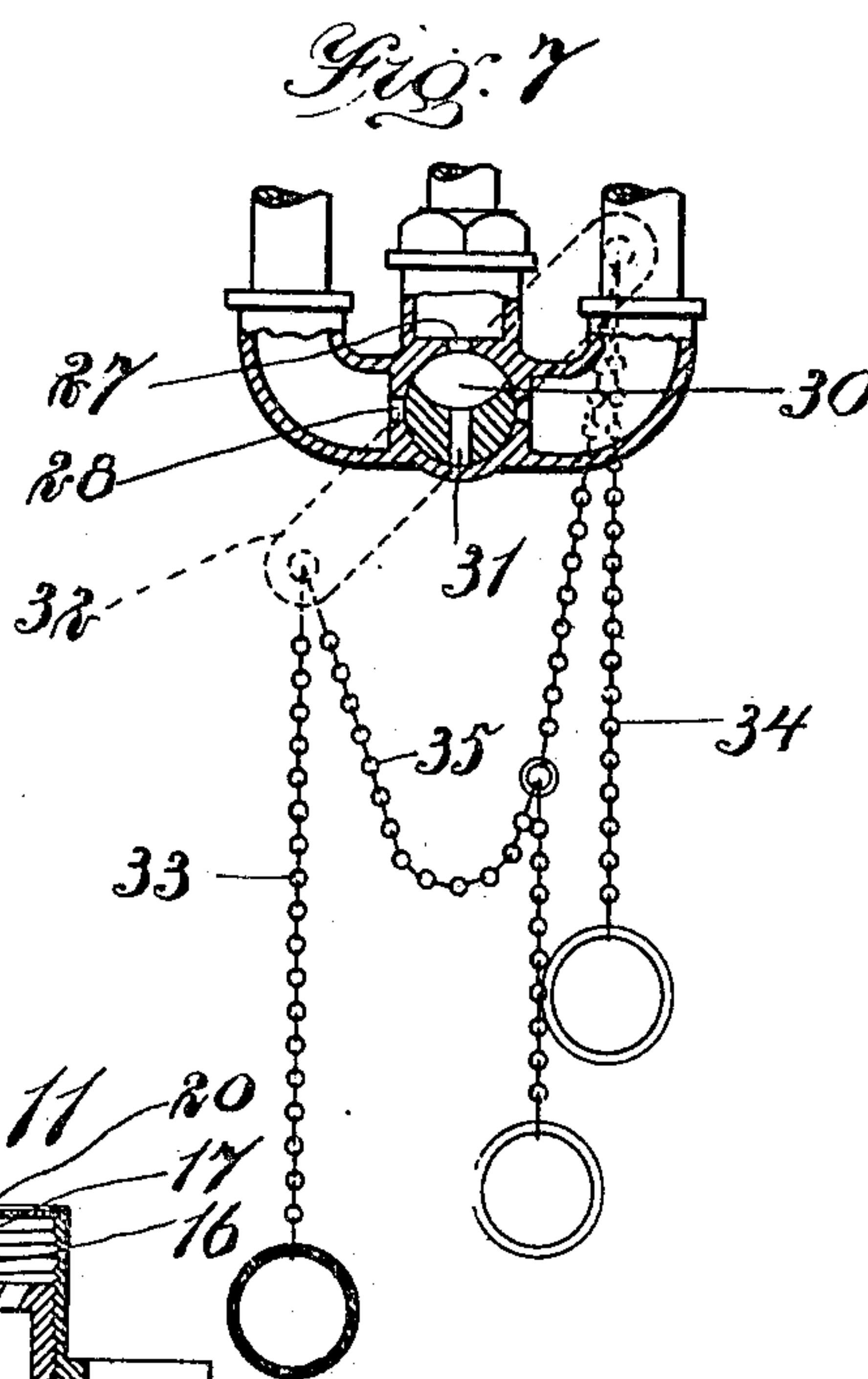
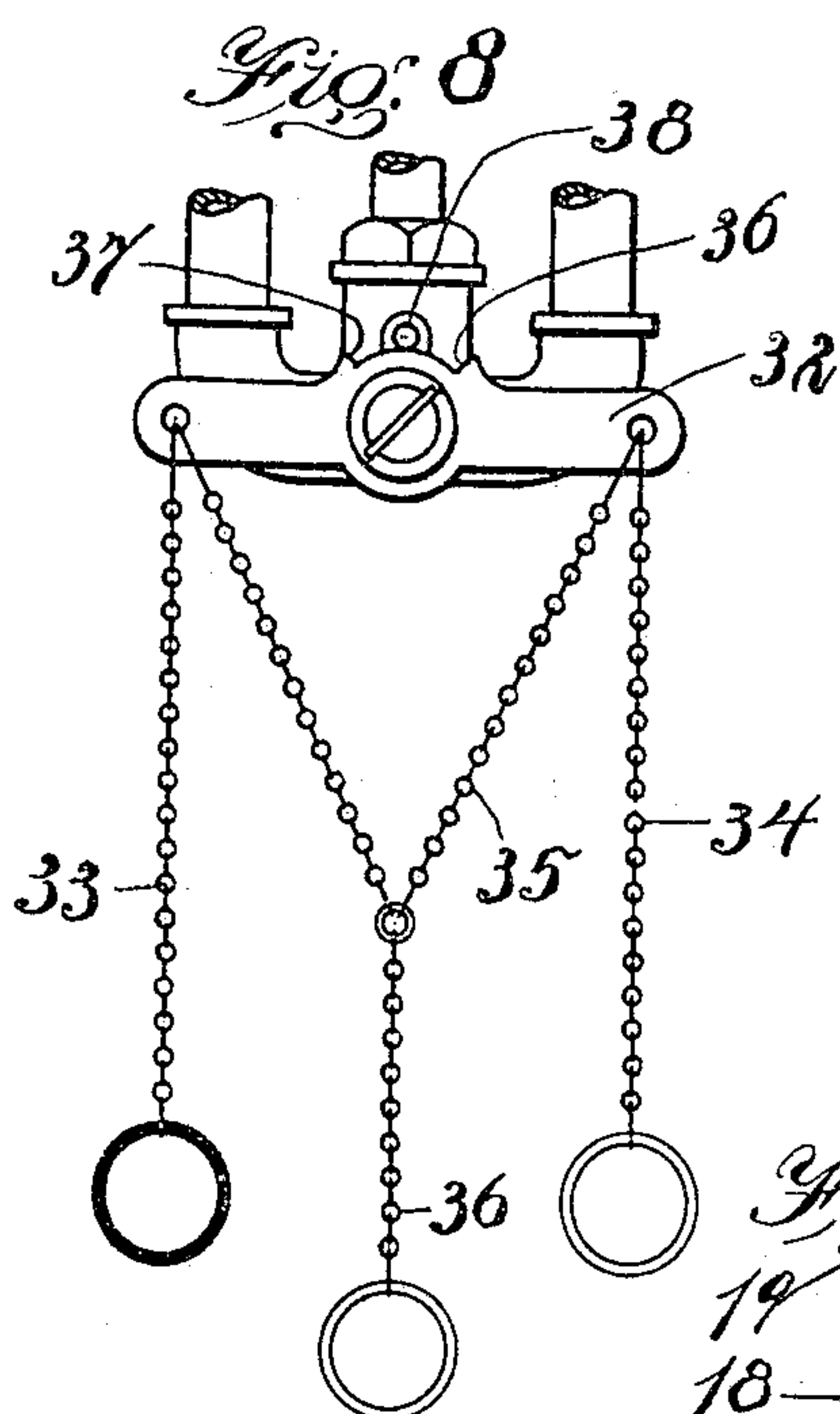
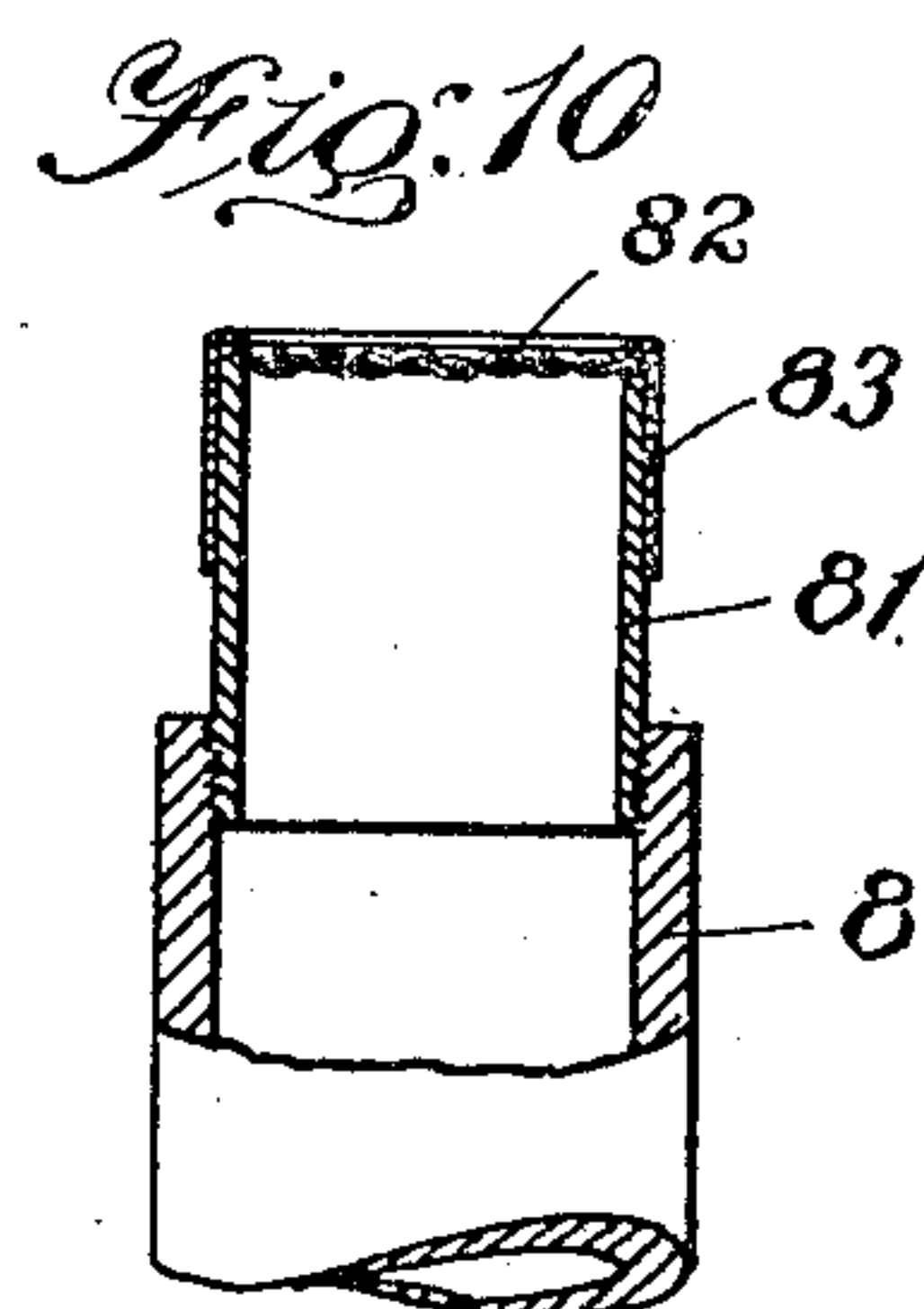
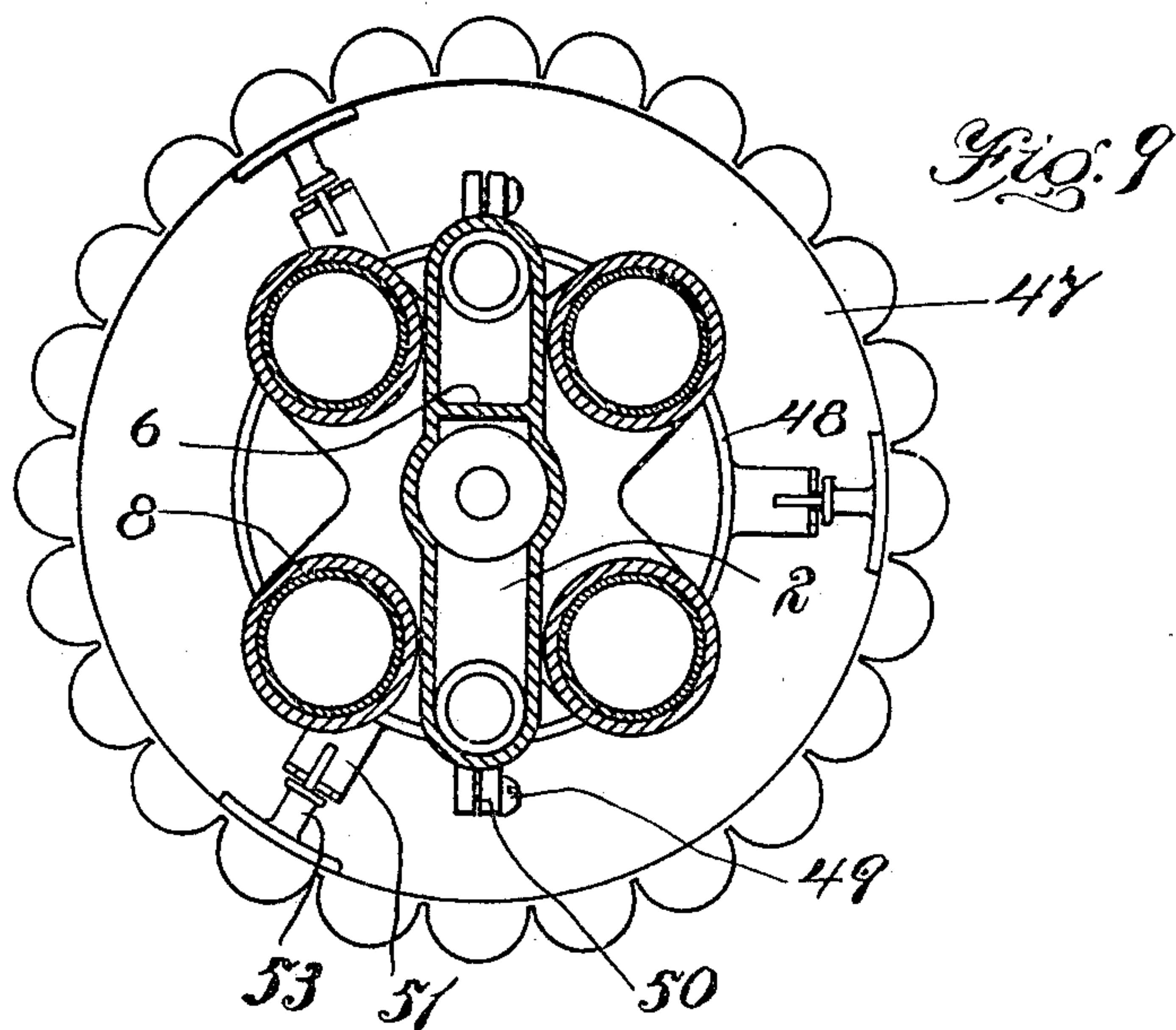
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F. A. RAY.

GAS LAMP.

APPLICATION FILED DEC. 31, 1904.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

FOREST A. RAY, OF BOSTON, MASSACHUSETTS.

GAS-LAMP.

No. 818,789.

Specification of Letters Patent.

Patented April 24, 1906.

Application filed December 31, 1904. Serial No. 239,090.

To all whom it may concern:

Be it known that I, FOREST A. RAY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Gas-Lamps, of which the following is a specification.

The present invention relates to lamps of the incandescent-mantle type having a plurality of burners and mantles and provisions for supplying a mixture of gas and air to the burners for the purpose of producing incandescence in the mantles.

The object of the invention is to produce a cluster-light having the various improvements and novel features which I will now proceed to describe and claim, by which a more effective regulation of the gas-supply and a more brilliant incandescence of the mantles may be produced than is possible with other devices of this character now in use.

Of the accompanying drawings, Figure 1 represents an elevation of a lamp constructed in accordance with my invention. Fig. 2 represents a similar view with the glass globe and wind-shield removed. Fig. 3 represents an elevation of the device as seen from the right of Fig. 2. Fig. 4 represents a sectional view. Fig. 5 represents a perspective view of the mantle-support. Figs. 6 and 7 represent fragmentary views similar to Fig. 4, showing the gas-regulating valve in different positions. Fig. 8 represents an elevation of the lower part of the lamp similar to Fig. 2, showing the valve-regulating chains and the controller-bar in a horizontal position. Fig. 9 represents a cross-sectional view on line 9 9 of Fig. 3. Fig. 10 represents an axial section of one of the burners. Fig. 11 represents a detail sectional view, on an enlarged scale, of the gas-regulator for the burners.

The same reference characters indicate the same parts in all the figures.

1 is a pipe which constitutes the main conduit for the gas-supply and is also the support for the other parts of the lamp. In its upper portion the pipe may be provided with a fitting for attaching it to a gas-main or with any other suitable holder for supporting it, and its lower end is connected to a fitting 2, which may conveniently be called a "yoke."

The attachment of the pipe 1 to the yoke 2 is at the central part of the latter, and the ends of the yoke extend preferably radially from the center of the pipe 1 and are curved downwardly. A passage leads from the inlet 3 of

the yoke where the pipe 1 is attached to one of the ends 4, which constitutes the outlet of the yoke, and a passage is formed in the other end of the yoke, but separated from the inlet by a partition 6. Gas-burners 7 are mounted upon the branches 8 of a central fitting 9, which may be called a "burner-supporting member" or "burner-support." This member has a single inlet 10 at its lower and preferably in its central portion, from which passages lead to the branches 8, of which there may be any number, although the number here shown, which is four, is preferred. The member 10 is connected to and supported by the yoke 2 by a connection consisting of a set-screw 11, the connection being such that while the member is securely held by the yoke there is still no opportunity for gas to flow directly from the yoke into the said member. Burners consisting each of a tubular sleeve 81, across the end of which is secured a sheet of gauze 82 by an annular cap 83, are mounted in the branches or arms 8.

The branches 8 of the burner-support and the burners mounted therein are arranged symmetrically about the axis of the pipe 1 as a center, so that the said supply-pipe is located in the midst of and surrounded by the burners. In the inlet 10 of the burner-support is secured one end of a tube 12, which is provided for the purpose of supplying a mixture of gas and air to the burners, the tube being extended downwardly and its lower end being open to the atmosphere and preferably formed with a flaring or bell-shaped flange.

Pipes or tubes 13 are connected to the opposite ends of the yoke 2 to form a loop, which extends parallel with the tube 12 on opposite sides thereof and extends across the open end of the tube, the portion of the loop which is directly below the said tube having an outlet arranged to project a jet of gas into the open end 14 of the tube. The outlet consists of a tubular fitting or nozzle 15, securely attached to the loop, extending toward the tube 12 and having in its end passages to permit the outflow of gas and also having centrally arranged and extending in the direction of the axis a projection 16, the base of which is cylindrical, while its outer portion is tapered to form a conical point 17. A check or regulator for the valve is provided and consists of a sleeve 18, mounted exteriorly on the nozzle 15 and in screw-threaded engagement therewith, so that rotation of

the sleeve will move it axially upon the nozzle. The end of the sleeve 18 is closed by a diaphragm 19, in which there is formed a central aperture 20 in line with the projection 16.

5 The aperture 20 is the only outlet permitting flow of gas from the nozzle, and it will therefore be evident that as the sleeve is adjusted to cause more or less of the tapered part of the projection 16 to extend through the aper-
10 ture the flow of gas will be correspondingly diminished or increased. Preferably the diameter of the aperture 20 is approximately the same as that of the cylindrical part of the projection 16, so that the sleeve may be
15 screwed down far enough to permit the whole of the projection to extend through the aperture. This is provided so that the aperture may be kept clean from dirt, grit, &c., and thereby prevented from stopping up. There
20 is another advantage also in this construction in that thereby all danger of the sleeve being screwed down too suddenly and with too much force, so as to cause the projection to break the diaphragm 19, is avoided, for
25 since the projection 16 does not positively engage the diaphragm at any point there can be no possibility of its tearing or breaking the latter.

Hitherto it has been difficult in gas-regu-
30 lators to prevent leakage of gas while at the same time permitting easy movement of the regulator; but I have overcome this difficulty by providing novel means for preventing flow of gas between the engaging sur-
35 faces of the tube 15 and sleeve 18. This means consists of a ring or annulus 21, mounted upon the outside of the sleeve 18 adjacent its lower end and having a flange or shoulder 22 extending toward the tube 15 in
40 line with and below the lower end of tube 18. Into the space between this shoulder and the end of the sleeve is inserted packing 23, which can be compressed to any desired extent by screwing up the ring 21 on the sleeve.

45 In the extension 5 of yoke 2 is mounted an auxiliary burner 24, which may be of the fish-tail type and can be used as a policeman's or watchman's light when the main burners are extinguished. As the part of the yoke to
50 which this burner is connected is separated from the inlet to the yoke by the partition 6, it is evident that the gas to supply said burner must travel about the loop 13 and past the outlet member 15. For the purpose
55 of governing the supply of gas to the main burner and the auxiliary burner there is provided a three-way valve 25, seated in a chamber 26, to which gas is admitted from the main supply and which has a passage 27 lead-
60 ing to the nozzle 15 and another outlet 28 to the part of the loop which supplies the auxiliary burner. By properly setting the valve all of the gas may be caused to flow into the nozzle 15 to supply the main burners or the
65 main burners may be shut off and the supply

directed exclusively to the auxiliary burner, or it may be shut off entirely from both the main and auxiliary burners. In order that the main burners may be again readily ig-
nited after they have once been extinguished, 70 I provide a pilot-light burner 29, which is connected to the passage in the yoke leading from the supply-pipe 1 and is located to direct a flame adjacent one of the main burners.

The three-way valve 25 has two passages 75 30 and 31, of which the former is arranged to permit gas to flow to the main burners, and the latter is radial, so that when moved into register with the outlet 28 it will permit flow of gas to the auxiliary burner, and to the 80 valve externally of the chamber 26 is connected a controller-bar 32 for operating it. The arrangement of the controller-bar and valve is such that when the bar is horizontal, as shown in Figs. 1, 2, and 8, the valve is in 85 the position to admit gas to the nozzle 15 for supplying the main burners, this position of the valve being shown in Fig. 4. When the bar is inclined with its left-hand end upward, the valve is in the position shown in Fig. 6. 90 When the gas is permitted to flow to the auxiliary burner, the passage 27, by which it may go to the main burners, is cut off, and when these parts are in the position shown in Fig. 7, with the right-hand end of the controller- 95 bar elevated, the supply to all the burners is cut off.

The controller-bar may be operated by means of chains or cords connected to its ends, there being two freely-depending chains 100 33 34, one of which hangs from each end of the bar, and a bridle 35 connected to both ends of the controller and having an operating part 36 between the chains 33 and 34. When a downward pull is brought on the 105 part 36, the controller-bar is moved into a horizontal position and the outlet 27 uncovered, permitting gas to flow to the tube 12 and so to the main burners, the flame at the pilot-burner 29 serving to ignite these burn- 110 ers. On the other hand, when the chain 34 is pulled the supply to the outlet 27 is shut off and that to the auxiliary burner 24 opened, so that the main burners are extinguished and the auxiliary burner allowed to ignite, 115 the valve being so arranged that the mixture is turned into the auxiliary burner immediately before being shut off from the main burners. Again, when the chain 33 is pulled the entire gas-supply is shut off. The con- 120 troller-bar is provided with shoulders 36 and 37, which are adapted to abut against a fixed stop 38 when the bar is inclined to stop its motion at the proper point. The chains are provided at their ends with hand-engaging 125 portions, which may be suitably colored to distinguish them, the one by which all the burners are cut off being dark and the others light.

The supply-pipe 1 and loop 13 constitute 130

both the main gas-supply and the principal support upon which all the other parts of the lamp are mounted. The mantles are held by a mantle-support 39, which has the form of a collar adapted to surround the pipe 1 and having radial arms 40, one for each mantle, adapted to extend outwardly over the burners. The arms 40 support mantle-holders, which are short lengths of wire 41, formed as hooks at their outer ends and having their inner ends set in vertical holes 42, made in the arms, the intermediate portions of the supports extending horizontally radially outward from the upper surfaces of the arms and retained in position by projections 43, mounted at the end of each arm, one of the said projections being arranged on each side of a holder 41. The entire lengths of the wire mantle-holders between their hooks and their vertical portions are therefore horizontal and perpendicular to the direction of flow of the heated gas rising from the burners. Thus only the extreme ends of the wires are subject to injury from the heat, and they resist the action of the heat for a greater length of time than any other form which may be used besides requiring the employment of the minimum amount of wire.

Provision is made by which the mantle-support may be adjusted vertically to accommodate mantles of different lengths and be set in adjusted position. The holding means consists of a set-screw 44, mounted on the support 39 and arranged to cooperate with grooves 45 between the shoulders 46, formed upon the pipe 1.

47 is a combined wind-shield and globe-support, which surrounds the tube 12 and the space between the latter and the gas-supplying outlet 15 to prevent drafts of air deflecting the jet of gas before it enters the tube 12. The shield 47 is supported by a split ring 48, which is clamped upon the members of the loop 13 by clamping-screws 49, mounted in ears 50. The split ring has lugs 51, each of which is formed with a notch 52, into which a radial projection 53 on the shield 47 projects and with which it engages for detachable connection with the shield of the ring. The shield may be adjusted at different heights by loosening the ring, moving it to position, and again tightening the clamps. The shield 47 also serves to support the usual glass globe 54, which surrounds and guards the burners, the upper portion of the globe being held by a collar 55, mounted on the upper portion of the supply-pipe 1.

The arrangement hereinbefore described, whereby a single supply-tube for furnishing the air and gas mixture to the burners and a single gas-jet for the same are provided, and also the arrangement by which the gas-supplying conduit is located amid the main burners result in important advantages. In the first place the gas before it is delivered at

the jet becomes greatly heated, and consequently very much expanded and rarefied, so that to permit the flow of the same actual quantity of gas a larger opening must be used, producing a larger jet, which causes a greater volume of air to be entrained and results in a hotter burning mixture being supplied to the burners than is the case when the gas supplied is cold—that is, a given volume of gas at the normal temperature being supplied to the lamp becomes when heated of greater volume, which being thrown out in a jet with the same velocity as that at which cold gas would be supplied draws in more air in proportion to the actual weight of gas than is done where there is no preliminary heating of the supply. This results in a hotter flame and a more brilliant incandescence of the mantle, together with a saving in the amount of gas burned. Furthermore, a saving is effected by having a single open tube and gas-jet supply all of the burners, for by this means the area of the supply-tube 12 may be made equal to the combined areas of all the tubes which would be necessary to supply the burners if separate tubes were used. In a form of lamp where there are, for instance, four burners the cross-sectional area of the tube 12 is equal to the combined cross-sectional areas of the four separate tubes which would be necessary if there were a separate supply for each or four times the area of any one tube; but the internal superficial cylindrical area of the large tube is only one-half that of the combined four small tubes. Therefore the frictional resistance to the passage of the moving mixture through the large tube offered by its sides is only one-half as great as would be such resistance in the four small tubes, thus delivering a supply of the mixture at the burners with a greater pressure for the same initial pressure in the conduit, which drives the flame up into the mantle more effectively than can be done where there is a separate supply for each burner. In other words, the loss of dynamic energy in the jet, due to friction, is much less in the tube 12 than it would be in the case where each burner or mantle is supplied by a separate Bunsen tube. Moreover, the structure of the burner-supporting member 9 is such that the top wall 56 of the latter between the branches 8 acts as a baffle-plate which causes eddying of the jet and thorough mixing of the gas and air. Moreover, by having a single gas-supplying nozzle and check-valve the orifice in the valve may be made larger than would be possible where a separate one had to be supplied for each burner, and this results in diminishing the danger of the orifice becoming clogged with dirt and permitting a freer flow of the gas.

I claim—

1. A gas-lamp having a plurality of primary burners, a tube open to the atmosphere

communicating with said burners, a gas-conduit surrounding said tube, an outlet-valve in said conduit arranged to direct a jet of gas into the tube, an auxiliary burner connected with said conduit, and a valve mounted in said conduit having capabilities of adjustment whereby the supply of gas may be directed exclusively to said outlet-valve or to said auxiliary burner, or excluded from both.

2. A gas-lamp having a member provided with a single inlet and a plurality of outlets, each outlet leading to a burner, a tube connected at one end to the inlet of said member and open at its other end to the atmosphere, a gas-supplying conduit having a portion thereof formed as a loop with straight sides parallel to the tube extending on opposite sides of the tube and an intermediate portion perpendicular thereto extending over the open end of said tube, an outlet member connected to said supplying-conduit arranged to project a jet of gas into said tube, and an auxiliary burner connected with said supply-conduit.

3. A gas-lamp having a member provided with a single inlet and a plurality of outlets, each outlet leading to a burner, a tube connected at one end to the inlet of said member and open at its other end to the atmosphere, a gas-supplying conduit having a portion thereof formed as a loop with straight sides parallel to the tube extending on opposite sides of the tube and an intermediate portion perpendicular thereto extending over the open end of said tube, and an outlet member connected to said supplying-conduit arranged to project a jet of gas into said tube.

4. A gas-lamp having a member provided with a single inlet and a plurality of outlets, each outlet leading to a burner, a tube connected at one end to the inlet of said member and open at its other end to the atmosphere, a gas-supplying conduit having a portion thereof formed as a loop extending on opposite sides and over the open end of said tube, an outlet member connected to said supplying-conduit arranged to project a jet of gas into said tube, an auxiliary burner connected with said supply-conduit, and a valve located in said conduit between the outlet member and the auxiliary burner and adapted either to direct the gas exclusively to the outlet member or to the auxiliary burner, or to cut off the supply to both.

5. A gas-lamp having a burner-support provided with a single inlet and a plurality of outlets each outlet leading to a burner, a downwardly-extending open-ended tube connected to the inlet to said support, a yoke connected to said burner-support having an inlet centrally arranged with respect to said burners, an auxiliary burner connected to said yoke, a partition in said yoke between the inlet thereto and the point of attachment of the auxiliary burner, a loop of piping con-

nected to the ends of said yoke and arranged to extend around and over the end of the tube, a gas-supply pipe connected to the inlet to said yoke, an outlet member connected to the loop in line with the tube arranged to direct a stream of gas into the open end thereof, and a three-way valve located in the loop between the outlet member and the auxiliary burner.

6. A gas-lamp having a gas-supplying conduit, a yoke connected thereto having a passage leading from one of its ends to the said conduit and a partition separating its other end from the conduit, a pilot-burner supported by said yoke communicating with said passage, an auxiliary burner connected with said yoke or the other side of the partition from the conduit, a main burner member supported by the yoke having a single inlet and a plurality of burners surrounding the conduit, an open-ended tube connected to the inlet to said burner member, a loop of piping connected to said yoke and extending over the open end of said tube, and an outlet connected to said loop and arranged to direct a jet of gas into the open end of said tube.

7. A gas-lamp having a gas-supplying conduit, a yoke connected thereto having a passage leading from one of its ends to the said conduit and a partition separating its other end from the conduit, a pilot-burner supported by said yoke communicating with said passage, an auxiliary burner connected with said yoke or the other side of the partition from the conduit, a main burner member supported by the yoke having a single inlet and a plurality of burners surrounding the conduit, an open-ended tube connected to the inlet to said burner member, a loop of piping connected to said yoke and extending over the open end of said tube, an outlet connected to said loop and arranged to direct a jet of gas into the open end of said tube, and a three-way valve located in the loop adjacent said outlet and adapted to admit gas exclusively to either the auxiliary burner or the outlet, or to cut off the supply from both, the supply to the pilot-burner being continuous regardless of the adjustment of the valve.

8. A gas-lamp having a central gas-conduit, a plurality of burners arranged about said conduit in close proximity thereto, a single tube having connections with each of said burners and being open at its lower end mounted below the burners extending downwardly therefrom, a continuation of the gas-conduit extending below the burner beside and parallel to the said tube, being separated therefrom throughout its entire extent, and across the open end of the tube, and an outlet member connected to the conduit below and in an axial line with the tube and arranged to direct a jet of gas into the open end thereof.

9. A gas-lamp having a gas-conduit, a

burner supported thereby closely adjacent thereto, a tube open at its lower end connected to the burner and extending downwardly therefrom, the conduit extending below the burner and formed in its lower portion as a loop having parallel sides located beside the tube and an intermediate portion extending across the open end of the tube beneath the same, an outlet located in said intermediate portion in an axial line with the tube, a shield-support adjustably mounted on side portions of the loop, and a shield surrounding the tube and loop mounted on the said support.

10. A gas-lamp having a gas-conduit, a burner supported thereby, a tube connected to the burner extending downwardly therefrom and open at its lower end, the conduit being extended downward on opposite sides of the tube and across the open end thereof, a jet-valve connected to said conduit in line with the tube arranged to direct a jet of gas into the open end thereof, a shield-support mounted on the conduit, and a shield mounted on the support in position to surround the tube and extend below its open end.

11. A gas-lamp having a gas-conduit, a burner supported thereby, a tube connected to the burner extending downwardly therefrom and open at its lower end, the conduit being extended downward and across the open end of the tube, a jet-valve connected to said conduit in line with the tube arranged to direct a jet of gas into the open end thereof, a shield-support mounted on the conduit consisting of a ring clamped on said conduit, and a shield mounted on the support in position to surround the tube and extend below its open end.

12. A gas-lamp having a gas-conduit, a burner supported thereby, a tube connected to the burner extending downwardly therefrom and open at its lower end, the conduit being extended downward and across the open end of the tube, a jet-valve connected to said conduit in line with the tube arranged to direct a jet of gas into the open end thereof, a shield-support mounted on the conduit consisting of a split ring and means for clamping the ring to the conduit, and a shield mounted on the support in position to surround the tube and extend below its open end.

13. A gas-lamp having a main burner, an auxiliary burner, a single gas-supply for furnishing gas to both the main and auxiliary burners, a three-way valve for governing the flow of gas to said burners, a controller-bar for said valve, separate freely depending

members connected to the ends of the bar, and an intermediate, independent, articulated member connected to the bar between said members for manually operating the same.

14. In a lamp having a main support and a burner, a mantle-support consisting of a collar mounted on the main support, a radial arm, and a holder of wire having a vertical portion held in an orifice in the arm and a portion extending throughout its entire length perpendicularly to the heated column of gases rising from the burner and terminating in a hook directly over the burner.

15. In a lamp having a main support and a burner, a mantle-support consisting of a collar mounted on the main support, a radial arm, a holder of wire having a vertical portion held in an orifice in the arm and a portion extending throughout its entire length perpendicularly to the heated column of gases rising from the burner and terminating in a hook directly over the burner, and up-standing projections on the arm on each side of the holder arranged to retain the latter in proper lateral relation to the burner.

16. A gas-lamp having a burner, a tube open at one end to the atmosphere connected to the burner, a gas-supply conduit having an outlet in line with the tube arranged to direct a stream of gas into the open end thereof, a shield adjustably mounted on the supply-conduit arranged normally to surround and guard the open end of the tube and the gas-outlet, and a globe or chimney supported by the shield and inclosing the burner.

17. A gas-lamp having a burner, a tube open at one end to the atmosphere connected to the burner, a gas-supply conduit having an outlet in line with the tube arranged to direct a stream of gas into the open end thereof, a support adjustably clamped to the supply-conduit provided with lateral arms having upward, centrally-notched projections, a shield provided with internal projections detachably engaged with the notches of the projections on said arms and supported thereby, the shield being arranged normally to surround and guard the open end of the tube and the gas-outlet, and a globe or chimney supported by the shield and inclosing the burner.

In testimony whereof I have affixed my signature in presence of two witnesses.

FOREST A. RAY.

Witnesses:

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