

No. 748,516.

PATENTED DEC. 29, 1903.

J. McFARLANE & C. P. PUSHAW.

OIL BURNER.

APPLICATION FILED NOV. 11, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

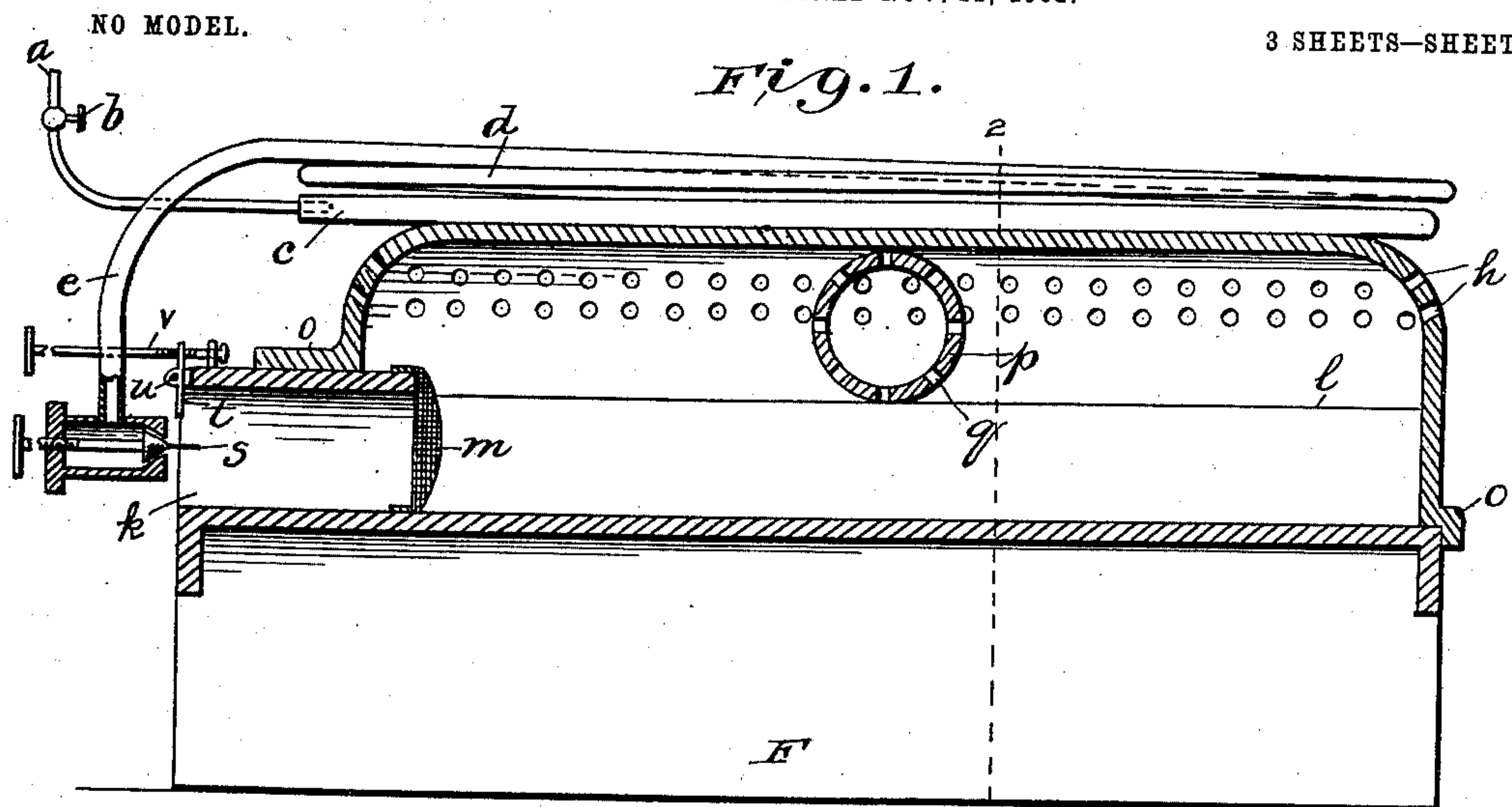


Fig. 3.

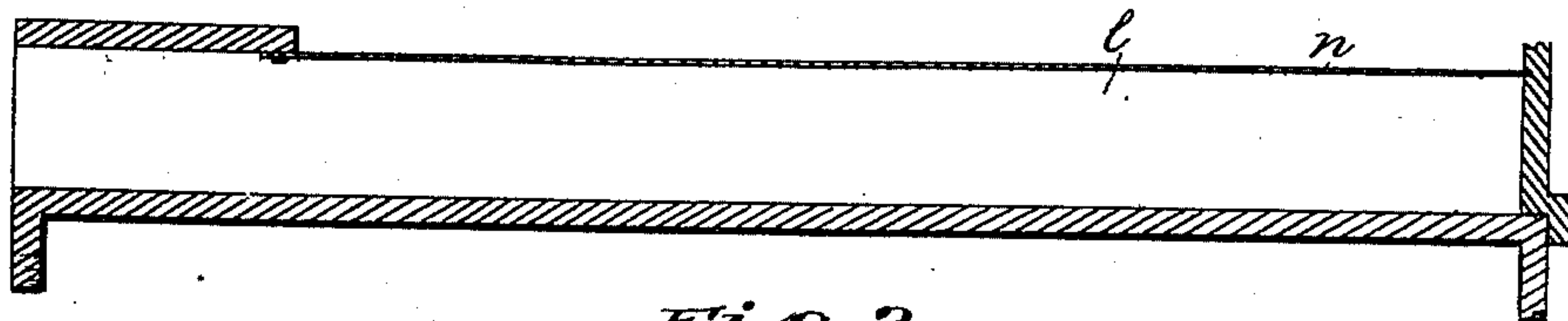
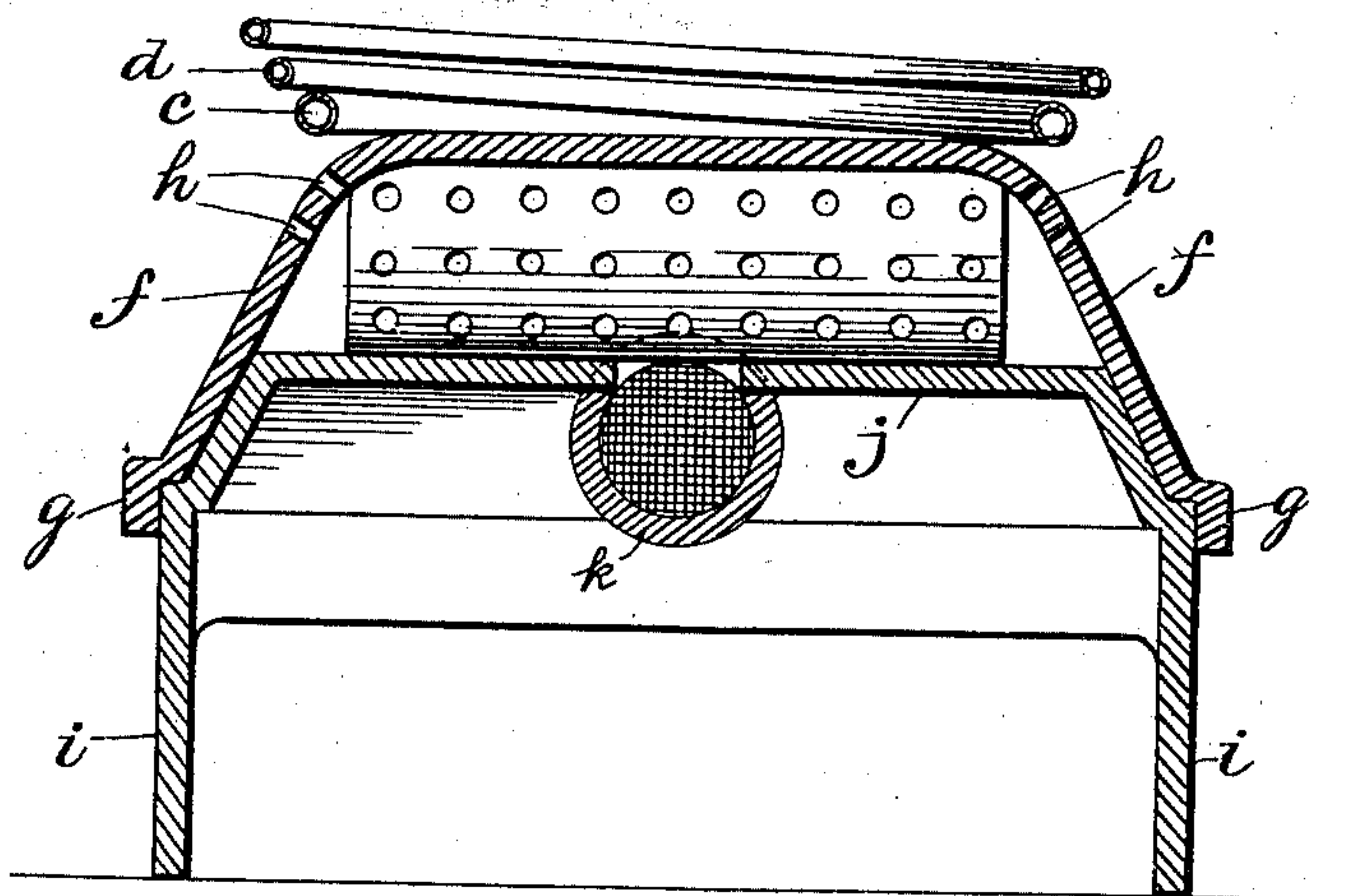


Fig. 2.



Witnesses

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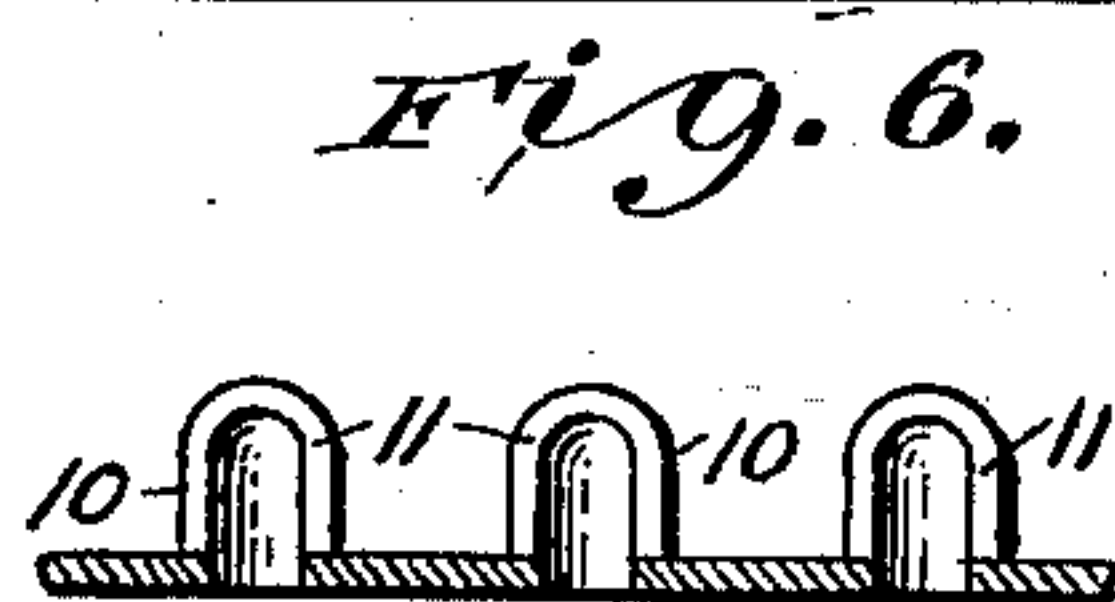
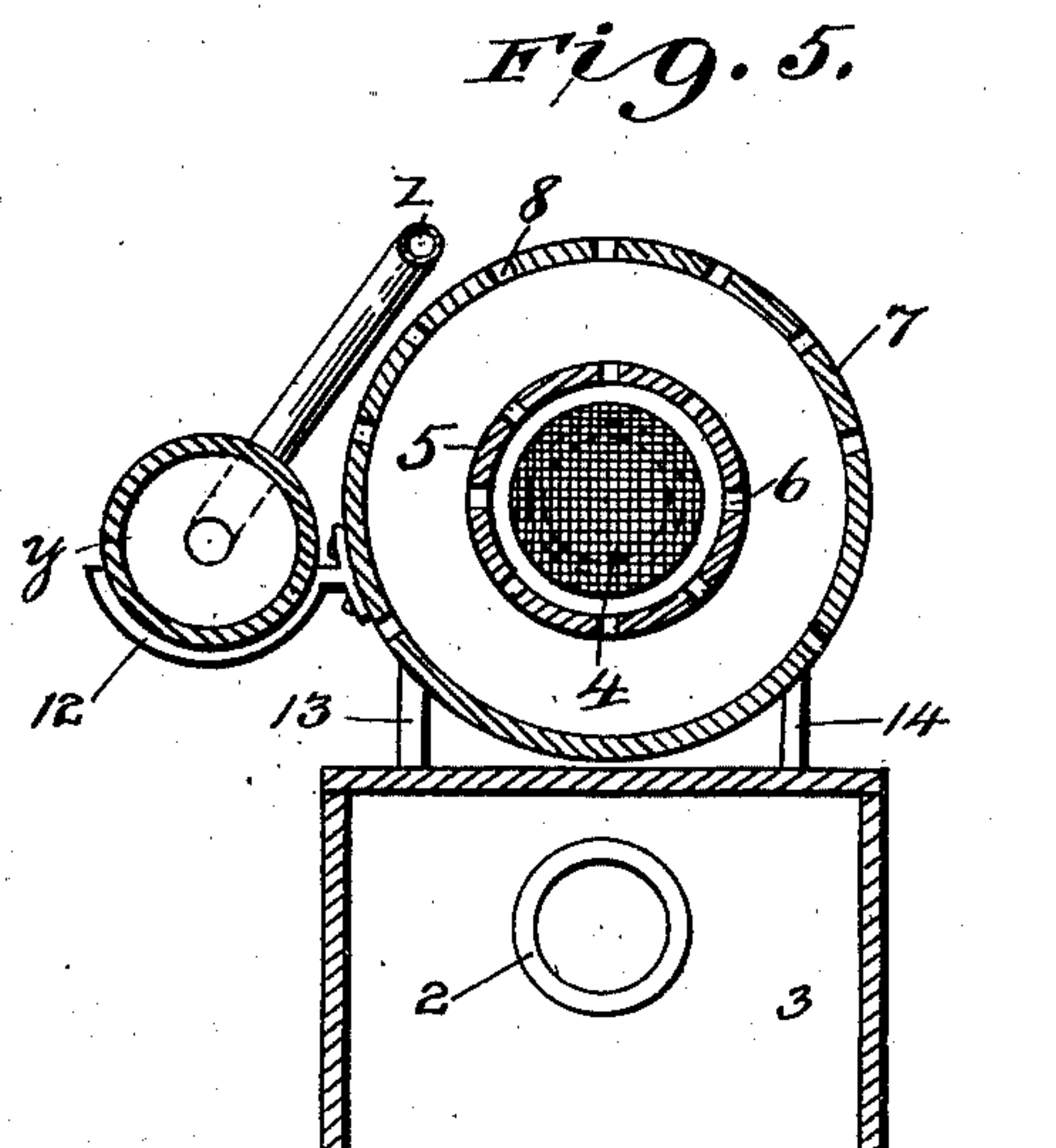
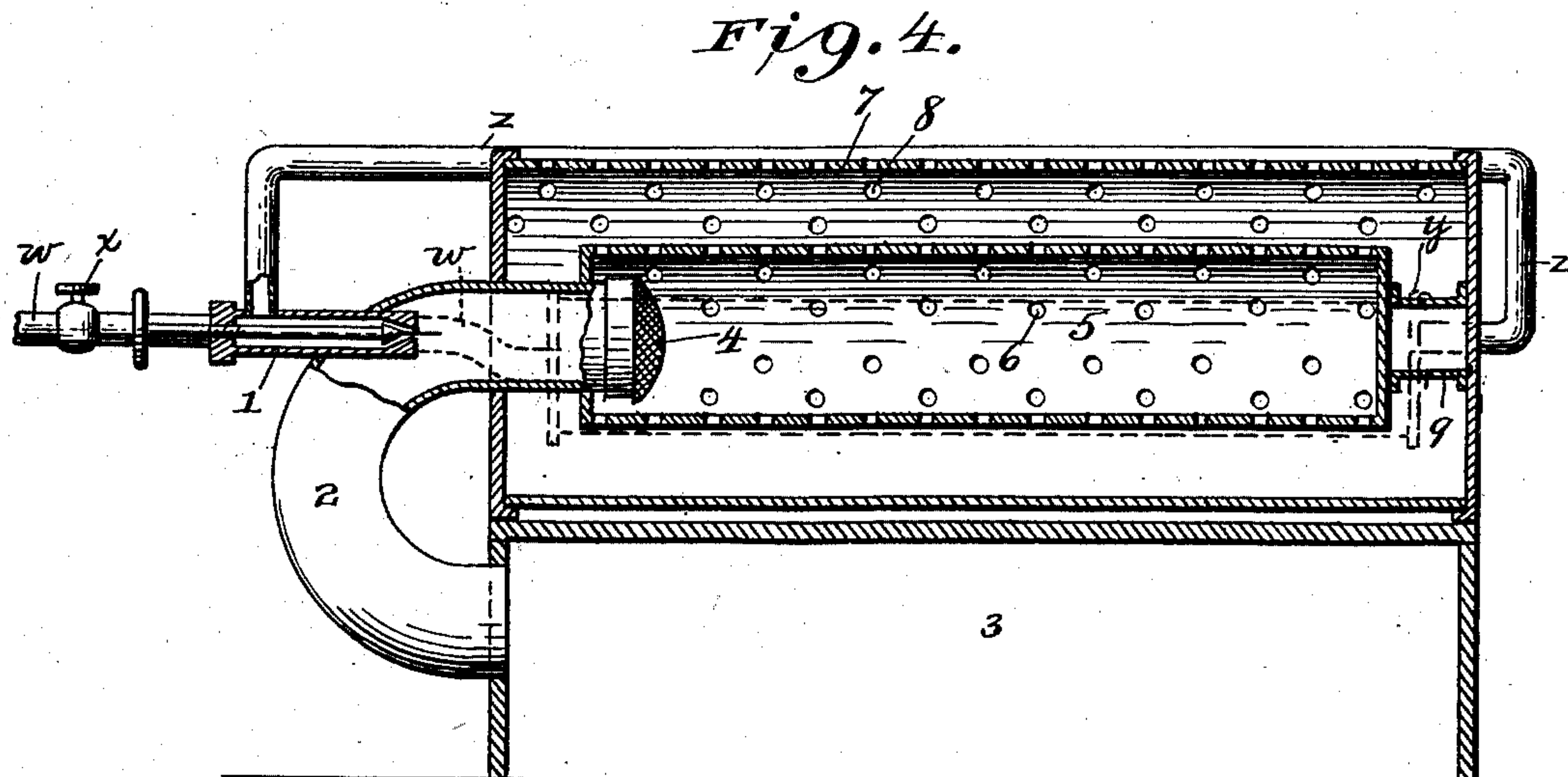
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3 SHEETS—SHEET 2.



Witnesses

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Fig. 7.

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3 SHEETS—SHEET 3.

Fig. 8.

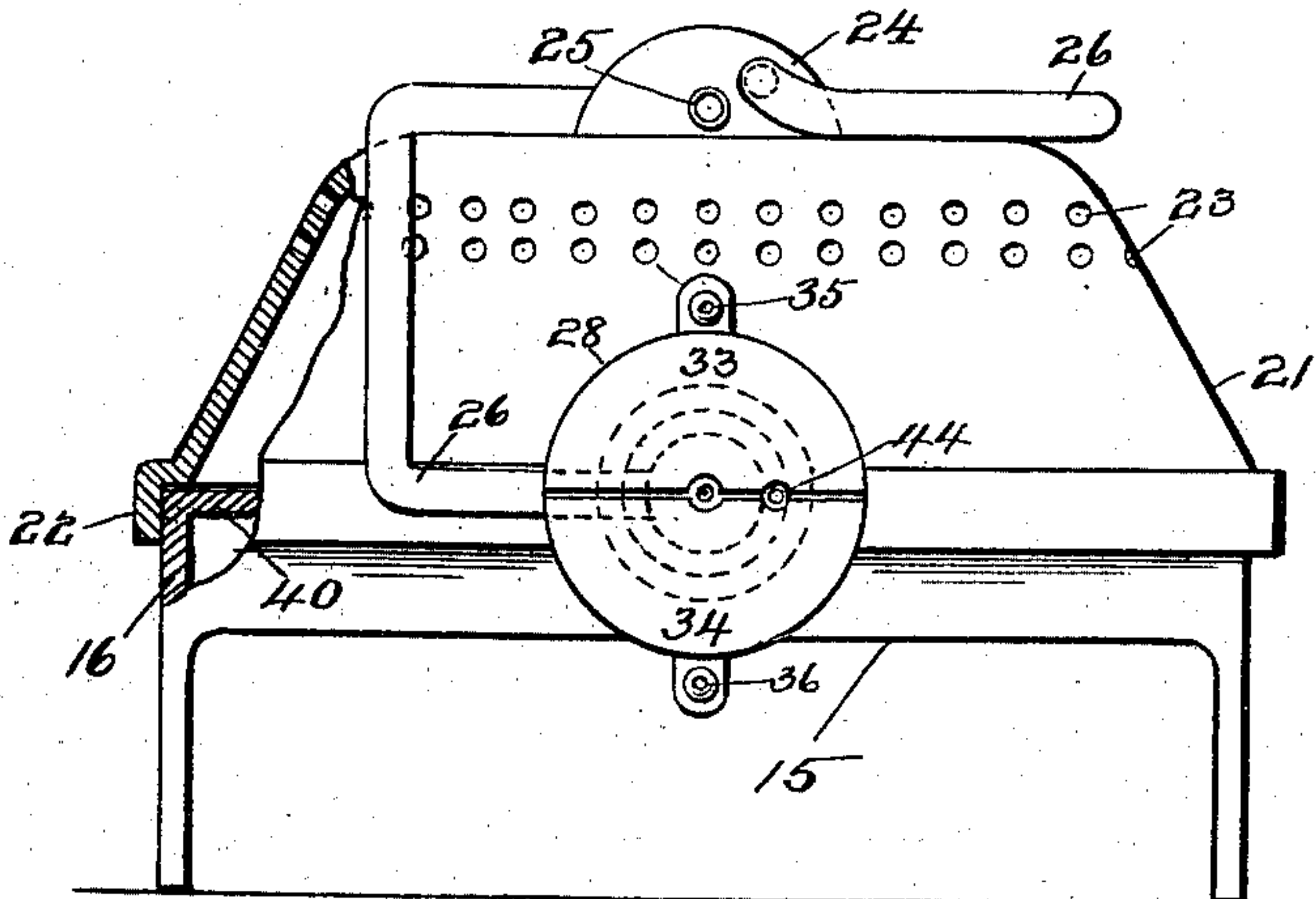


Fig. 10.

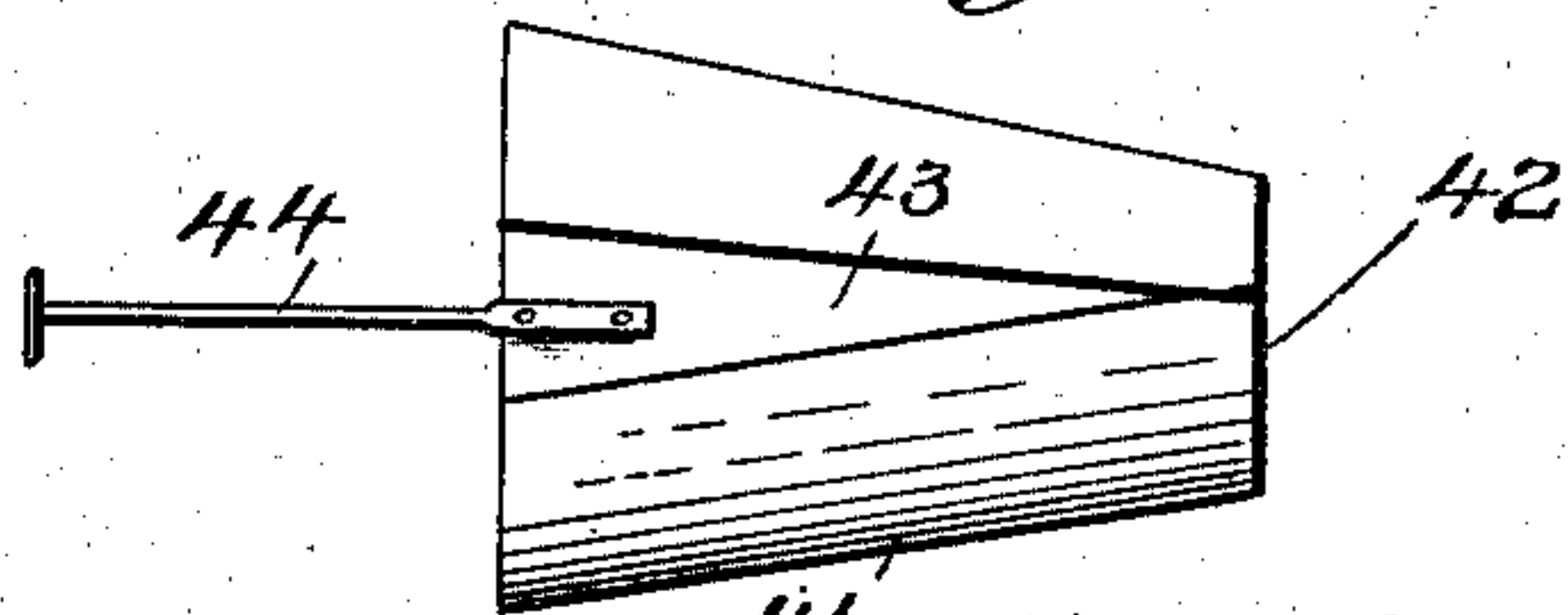
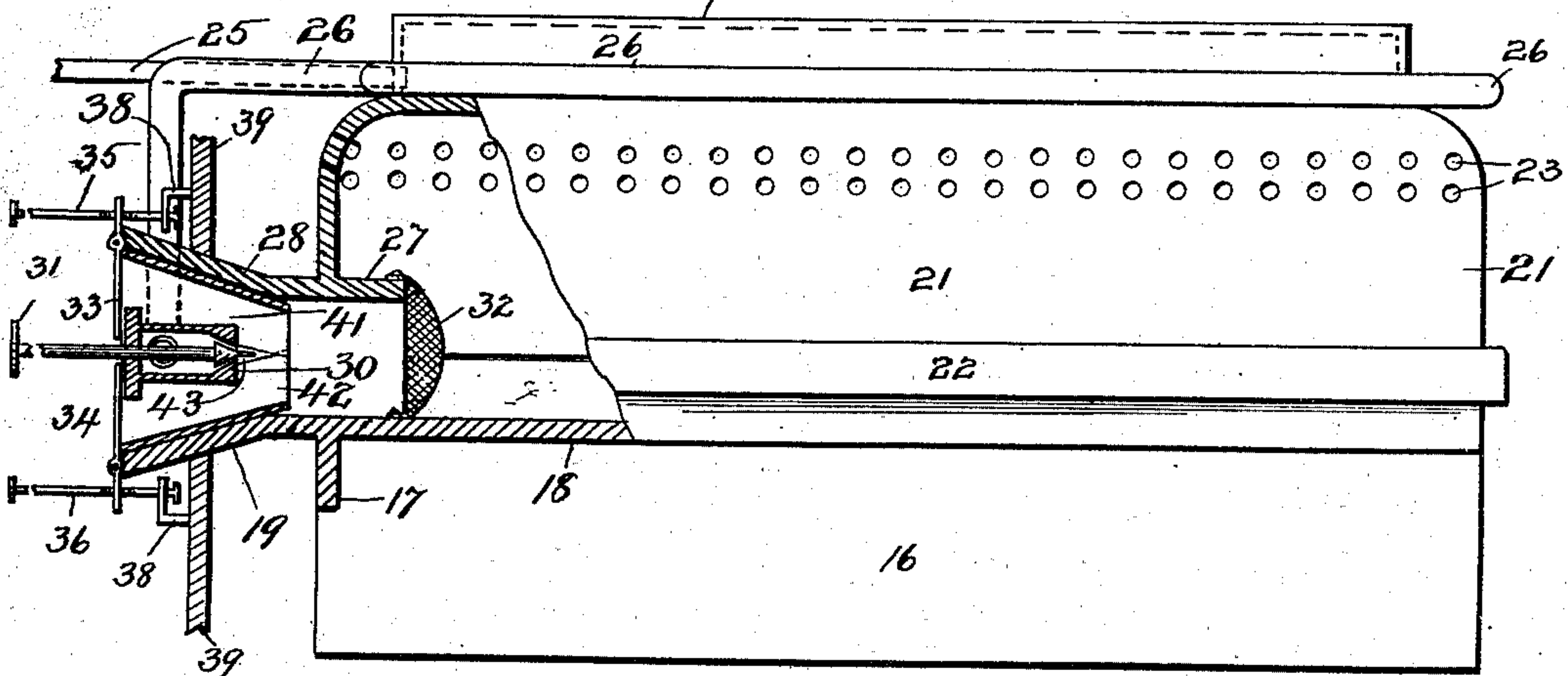


Fig. 9.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN MCFARLANE AND CHARLES P. PUSHAW, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNORS TO BRILLIANT HYDROCARBON BURNER COMPANY, OF CAMDEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 748,516, dated December 29, 1903.

Application filed November 11, 1902. Serial No. 130,901. (No model.)

To all whom it may concern:

Be it known that we, JOHN MCFARLANE and CHARLES P. PUSHAW, citizens of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Oil-Burners; and we do hereby 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.

Our invention relates to improvements in oil-burners which are especially adapted to be placed within the fire-box of an ordinary kitchen-range or other stove, although of course it is not restricted to such use.

The objects of our invention are to provide a simple and efficient oil-burner, one that can be easily made of cheap material, such as cast metal, and one that will use any variety of petroleum, whether crude or refined, or any of the derivatives of petroleum, and special means of preventing the flashing back or ignition of the oil or gas formed from said oil before it emerges from the retort.

With these objects in view our invention consists of the construction and combinations of parts, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a longitudinal central section of our improved burner. Fig. 2 is a cross-section thereof on the line 2 2 of Fig. 1 looking in the direction of the arrow. Fig. 3 is a longitudinal section of the partially-open tube, showing a different way of applying the wire-gauze. Fig. 4 is a longitudinal section of a modification of our invention. Fig. 5 is a cross-section of the same. Figs. 6 and 7 show details of a modification. Figs. 8 and 9 are end and side views respectively of a modification, and Fig. 10 is an enlarged perspective view of the sheet-iron regulator.

a represents a supply-pipe, preferably a small copper tube, so that it may be easily bent. It is connected to the ordinary tank (not shown) mounted on an elevated shelf. The tube *a* is provided with a valve *b*, located outside the range. This tube *a* delivers into a larger tube *c*, located above the mixing-chamber. This tube *c* practically encircles the en-

tire mixing-chamber and delivers into another smaller tube *d*, which is located a little above and to the outside of the tube *c* and which also practically encircles the top of the mixing-chamber. The tube *d* is connected by a branch *e* to an elbow needle-valve, which delivers the oil or gas into the mixing-chamber. The mixing-chamber is composed of a top, preferably cast in a single piece, and its general outline on the top is rectangular, although of course this shape may be varied, if desired. If used in an ordinary kitchen-range, however, the rectangular form is desirable. It is cast in a single piece and is provided with extensions *g*, which fit over the lower part of the mixing-chamber. The upper part of the top *f* is not perforated, but a double row of perforations *h* is provided in the sides thereof near the top. The lower part or base of the mixing-chamber is also cast in a single piece. It is provided with side pieces *i*, which act to support the same, and a top *j*, which serves as the floor of the mixing-chamber.

k represents a tube of considerable diameter cast integral with the lower part of the mixing-chamber and having its top rear portion cut away, as shown at *l*, thus making a cylindrical channel in the floor of the mixing-chamber. Wire-gauze *m* is fastened across said tube at the point where its top is cut away, as shown at Fig. 1. If desired, however, this wire-gauze *m* may be extended over the cut-away portion of the top of the tube *k*, as shown in Fig. 3. The lower part or base of the mixing-chamber is open at the front and rear ends. The upper part *f* of the mixing-chamber is provided with extensions *o* at the front and rear, which rest upon the lower part of the mixing-chamber. Thus the main reservoir is composed of two castings, one of which fits directly upon the other, making a very cheap construction and one that can be easily taken to pieces, if desired.

Located about the middle of the mixing-chamber—that is to say, in the space between the top *f* and the floor *j*—is a transverse pipe *p*, provided with perforations *q*. This is for the purpose of dividing up and

mixing the oil and gas which flow in through the end of the pipe *k*. The pipe *p* is of such a size as to practically fill the space between the top *f* and the floor *j*.

5 The needle-valve is of the ordinary construction with the exception that the point *s* thereof extends a considerable distance beyond the casing, making it possible to easily and effectually clear the orifice if for any
10 reason it should become stopped up. This needle-valve is located just outside of the outer end of the pipe *k*, so that the stream of gas passing into the pipe *k* will entrain along with it sufficient air to furnish oxygen for the
15 combustion of the gas. To control the amount of air flowing into the tube *k*, we provide a swinging door *t*, pivoted at *u* on the outer end of the tube *k*, which door may be moved by the screw *v* to vary the opening above the
20 needle-valve. If desired, a similar door may be used below the needle-valve.

In Figs. 4 and 5 a modification is shown. In the burner shown in these figures means are provided for heating the air before it is
25 mixed with the gas. In this modification *w* represents the oil-inlet pipe provided with a valve *x*, which pipe delivers into an oil-heater *y*, which in turn delivers into a gas-pipe *z*, which is bent around and passes above the
30 burners, delivering the gas into the casing 1 of a needle-valve similar to the one already described. The casing 1 delivers into a pipe 2, which leads from a hot-air box 3 into the burner-casing, the delivery end of the pipe
35 2 being preferably covered by a screen 4. The hot-air box is simply an ordinary iron box without any bottom and is designed to rest upon the grate of a range. The burner-casing consists of two substantially concentric cylinders, the inner one, 5, being provided with perforations 6 and the outer one, numbered 7, provided with perforations 8. The perforations in the cylinder 5 are spaced at regular intervals over the entire periphery
45 thereof. This cylinder is supported at one end on the pipe 2 and at the other end by brackets 9 on the outer cylinder 7. The perforations 8 in the outer cylinder 7 do not extend entirely around the same. There are
50 seven rows of perforations in the top of the cylinder and two rows in the bottom thereof. The two rows in the bottom of the cylinder deliver jets of gas, which when ignited are directed toward the hot-air box 3, near the corners thereof. On the left of Fig. 5 the lower row of perforations serve also to heat the oil-heater *y*, which, together with the gas-pipe *z*, is heated by the gas from the upper row of perforations.

60 Instead of using ordinary perforated cylinders a preferable form is shown in Figs. 6 and 7 in which these cylinders are shown as provided with projecting knobs 10, which are cast integrally therewith. Afterward each
65 of these knobs or projections is cut with a saw to form a narrow slit 11, as shown in Fig.

7, the whole structure closely resembling an ordinary gas-tip.

The top *f* (shown in Figs. 1 and 2) instead of the perforations *h*, as shown, may be constructed in the manner shown in Figs. 6 and 7. 70

The retort or gas-heater *y* is supported by curved brackets 12, screwed to the cylinder 7. This cylinder is in turn supported by the legs 13 14 upon the hot-air box 3. 75

In the modification shown in Figs. 8 and 9 15 represents the base of the burner, provided with sides 16 and a floor 40. Cast integral with this base is the part 18, which is simply the half of a tube which runs the full length 80 of the base. This tube is extended some distance outside of the front plate 17 of the base and terminates in a downwardly-flaring portion 19. The top 21 is provided with an extension 22, which fits around the sides and 85 rear end of the base. It is provided with a double row of perforations 23; but these perforations are preferably made in the form shown in Figs. 6 and 7. In this modification we have replaced the large pipe in which the 90 oil is heated by a retort 24, which rests upon the top 21 of the mixing-chamber. 25 represents an oil-inlet pipe which delivers into the lower part of the retort 24, and 26 represents a gas-pipe which passes around the top of the 95 mixing-chamber and is then bent downwardly, delivering into the needle-valve casing 30. Centrally on the front end of the top 21 is cast the upper half of a tube 27, which half, together with the half-tube 18, forms a complete tube. The upper part 27 of this tube, however, does not extend the whole length of the mixing-chamber, but is cut off a short distance behind the wall 17. The front end of this half-tube 27 is flared upward, as shown 105 at 28, and through this flared opening formed by the half-tubes 28 and 19 the air enters. The needle-valve 30 is of the ordinary type, except that the needle is a little longer than usual and is provided with a hand-wheel 31. 110 A screen 32 closes the tube just behind the short tube-section 27. If desired, however, the screen in this modification may be arranged as shown in Fig. 3. 33 and 34 represent adjustable dampers or doors pivoted on the flaring portions 28 and 19, respectively. 115 These are operated by the screw-threaded handles 35 and 36, which engage with the brackets 37 and 38, shown in this instance as secured to the part 39, which represents the 120 door of an ordinary range or stove. It is obvious of course that these brackets 37 and 38 could be secured to the parts 28 and 19, respectively, if desired. An asbestos or other suitable packing may be used, if desired, between the base and top of the mixing-chamber. 125

We have also devised an additional means for regulating the flow of the mixed air and gas, especially of the air, into the interior of the gas-mixing chamber, which means at the 130 same time serves to prevent the flame flashing back.

The screen 32 (shown in Fig. 9) if made of very fine mesh obstructs the free passage of the mixed air and gas into the gas-reservoir, although it acts as an effectual means for preventing the flame from flashing back to the needle-valve—a thing, however, which would rarely happen in our burner even if the screen were omitted. We have found, however, that an additional means is desirable, which means also serves to prevent the flame from flashing back, and this means is shown in perspective in Fig. 10. It consists simply of a piece of sheet-iron 41, which is bent on itself to form a cone. This sheet is held in position within the flaring walls 19 and 28. It is made of such dimensions that the lower end thereof 42 fits closely within the walls 19 and 28 when in its normal position, while at the larger end of the cone the edges do not meet, but leave an open portion 43, through which the pipe 26 passes. This sheet-iron regulator fits within the conical portion formed by the parts 28 and 19 and is held there by reason of its elasticity against the doors 33 and 34 and the flaring parts 28 and 19. When this regulator is pushed in, the small end 42 is contracted, because the portions 28 and 19 reduce the size of the cone, and therefore the size of the orifice. It follows that this is an efficient regulator for the amount of air which passes into the gas-reservoir, and it also prevents the flame from flashing back by reason of the strong current of air and gas passing through the regulating-opening 42, which may be contracted until it is as small as desired. The regulator 41 may be adjusted in the flaring portions 28 and 19 by hand by opening the doors 33 and 34; but we prefer to use a handle 44, projecting through similarly-shaped but oppositely-disposed cut-away portions in the edges of the doors 33 and 34, which doors, as shown in Fig. 9, are arranged to fit rather closely around the stem of the needle-valve and around the handle 44.

The operation is as follows: When it is desired to start the burner, the inlet-valve is opened, and the oil is allowed to flow down into the tube *k* in the modification shown in Fig. 1 or the tube 2. (Shown in Fig. 4.) The oil is then ignited, and the flame passes out through the perforations *h* in Fig. 1, or 8 in Fig. 4. This soon heats up the pipes *c* and *d* in Fig. 1 or the heater and pipes *y* and *z* in Fig. 4, generating a gas, which gas as it is delivered into the burner draws in air with it—cold air in Fig. 1 and hot air in Fig. 4. This air is thoroughly mixed with the gas by means of the screen *n* and pipe *p* in Fig. 1 and by means of the screen 4 and perforated cylinder 5 in Fig. 4, after which the operation of making the gas from the oil and supplying it to the burner goes on continuously.

The operation of the modification shown in Fig. 8 and Fig. 9 is similar to that of the form shown in Figs. 1 and 2, already described.

We do not limit ourselves to the exact de-

tails shown and described, as it is obvious that many changes might be made without departing from the spirit of our invention; but

What we claim, and desire to secure by Letters Patent of the United States, is—

1. In an oil-burner, the combination of means for supplying oil, means for vaporizing the oil supplied, means for delivering the vaporized oil to the body of the burner, means for causing said vaporized oil to draw with it into the burner a current of air, an open-ended tube within said burner, said tube being located transversely to the main axis of said burner and having a plurality of perforations extending around it, and separate means for preventing the flame from flashing back, substantially as described.

2. In an oil-burner, a top therefor made of a single piece of cast metal and substantially rectangular in outline, having an imperforate top and open bottom, a retort or oil-heater forming the highest part of said top and made integral therewith, said top being provided with exit-holes in the side thereof and also having extensions whereby it may be fitted over the base of the burner, the forward end of said top being provided with a short half-tube having a flaring outer end, substantially as described.

3. In an oil-burner, the combination of a mixing-chamber having a perforated top, means for supplying vaporized oil thereto, said means consisting of a supply-pipe and a retort or heater located in proximity to said mixing-chamber, said mixing-chamber being provided with a central tube and said oil-heater delivering vaporized oil into said tube, means for governing the supply of gas delivered from the vaporizing means, a screen over the delivery end of said tube, and an open-ended perforated tube for subdividing and mixing the mixture of air and vaporized oil delivered through said screen, said tube being located wholly within said burner and at right angles to the main axis thereof, substantially as described.

4. In an oil-burner, the combination of a mixing-chamber composed of two parts, the upper one resting upon the other, said upper part being provided with perforations for the delivery of the mixed air and gas, said mixing-chamber being provided with a centrally-located tube, a screen closing the delivery opening from said tube into the main portion of the mixing-chamber, means for delivering air and vaporized oil through said tube into said mixing-chamber, a needle-valve for governing the amount of air and vaporized oil supplied to said tube, and an open-ended tube located wholly within said mixing-chamber and arranged transversely to its main axis, said tube being provided with a plurality of perforations on its periphery, substantially as described.

5. In an oil-burner, the combination of a mixing-chamber, composed of two parts, the

- upper part resting upon the lower part and being provided with gas-delivery openings and with extensions whereby the upper part is supported upon the lower part, the lower
 5 part being provided with a central trough and a projecting half-tube having a flaring end, and the upper part being provided with a similarly-shaped but shorter half-tube, a retort located above said mixing-chamber
 10 means for supplying oil to said retort, means for varying the supply of oil, connections whereby the heated or vaporized oil is delivered from said retort into said mixing-chamber, means for varying the air-supply to said
 15 mixing-chamber, and means for mixing the air and vaporized oil delivered into the interior of said mixing-chamber and for preventing the flame from flashing back, substantially as described.
- 20 6. In an oil-burner, the combination of means for supplying oil, means for vaporizing the oil-supply, means for delivering the vaporized oil to the body of the burner, means for causing said vaporized oil to draw with it
 25 into the burner a current of air, a plurality of means for regulating the amount of air supplied, and a plurality of means for preventing the flame from flashing back, substantially as described.
- 30 7. In an oil-burner, the combination of means for supplying oil, means for vaporizing the oil-supply, means for delivering the

vaporized oil to the body of the burner, means for causing said vaporized oil to draw with it into the burner a current of air, means for
 35 subdividing and mixing the vaporized oil and air, a plurality of means for regulating the air-supply, and a plurality of means for preventing the flame from flashing back, substantially as described.

40 8. In an oil-burner, the combination of means for supplying oil, means for vaporizing the oil-supply, means for delivering the vaporized oil into the body of the burner including a pipe and a needle-valve, a screen
 45 located between said needle-valve and the main portion of the body of the burner, an adjustable air-regulator outside of said screen, movable doors or dampers outside of said needle-valve, and means for adjusting said doors,
 50 substantially as described.

9. In an oil-burner, an adjustable regulator consisting of a piece of elastic sheet metal bent upon itself to form a cone but having the edges near its larger end separated from
 55 each other, said regulator being provided with a handle, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN MCFARLANE.
 CHARLES P. PUSHAW.

Witnesses:

JOS. H. BLACKWOOD,
 J. STEPHEN GIUSTA.