(No Model.) 3 Sheets—Sheet 1.

G. ROSE.

SPRAY LAMP.

No. 453,131. Patented May 26, 1891.

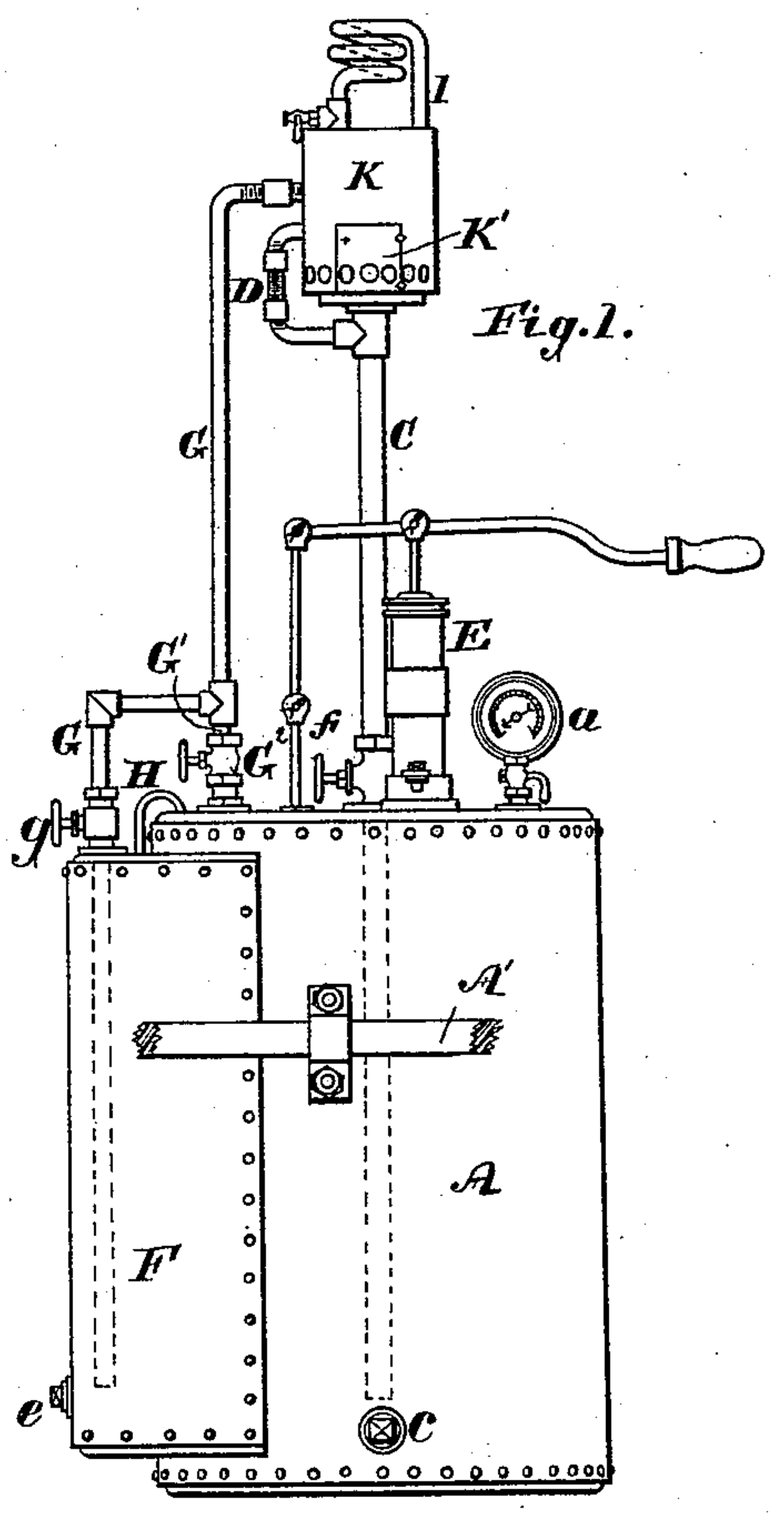

Fig. 1.

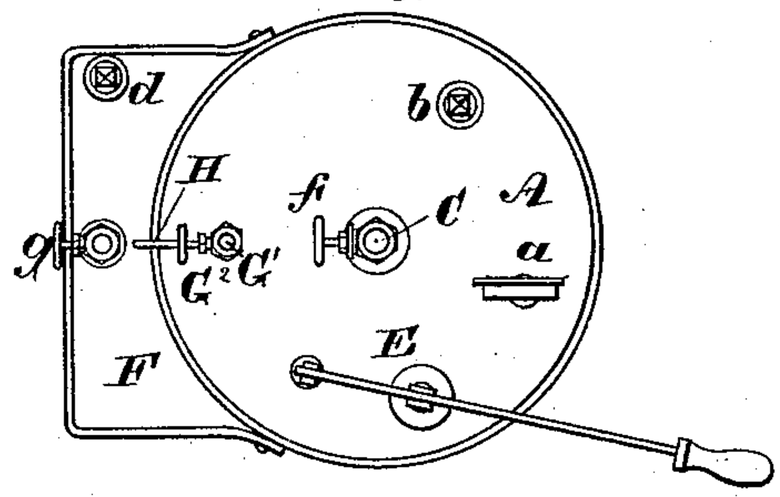

Fig. 2.

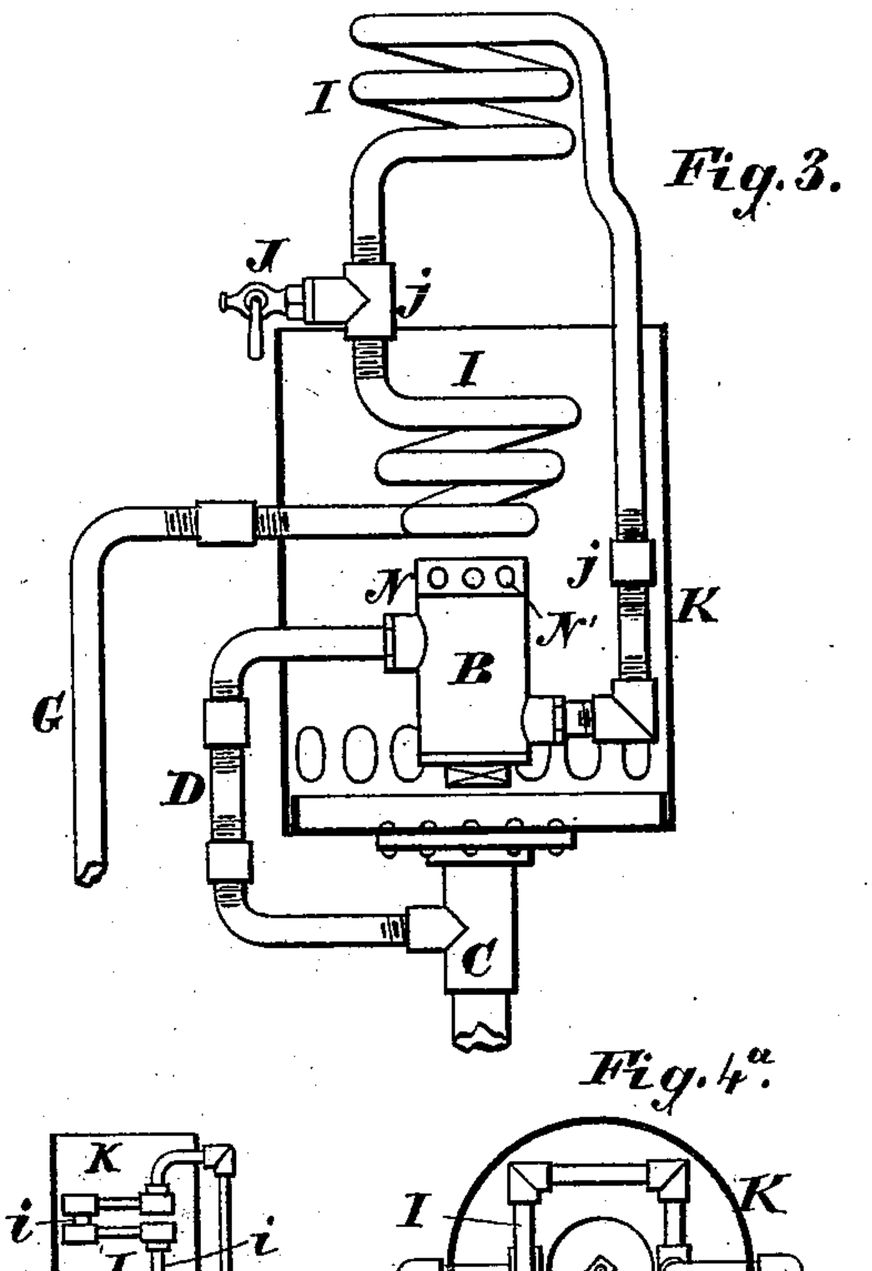

Fig. 3.

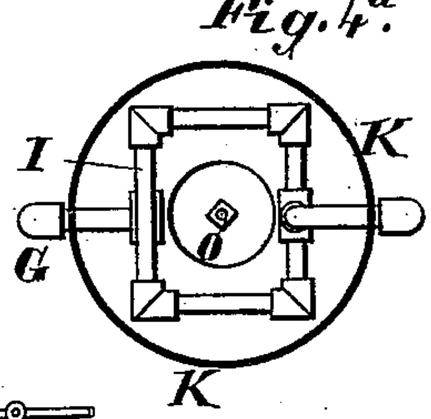

Fig. 4ª.

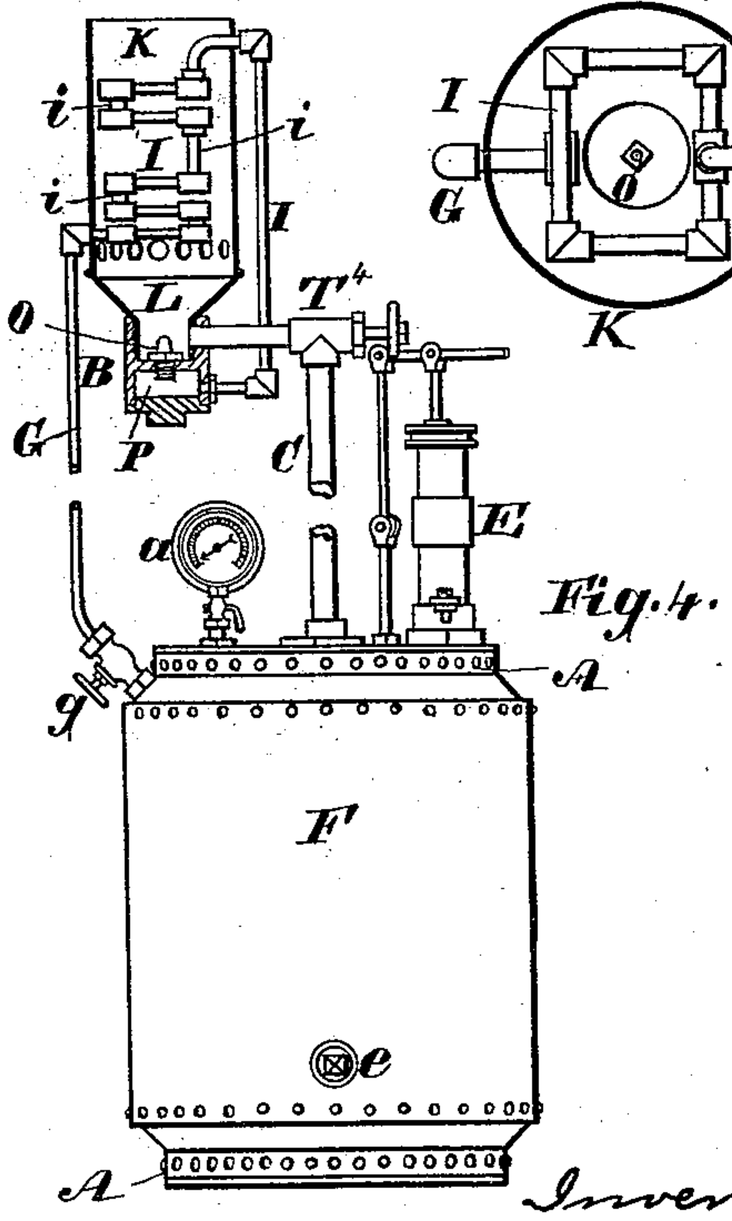

Fig. 4.

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(No Model.) 3 Sheets—Sheet 2.

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SPRAY LAMP.

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Fig. 5.

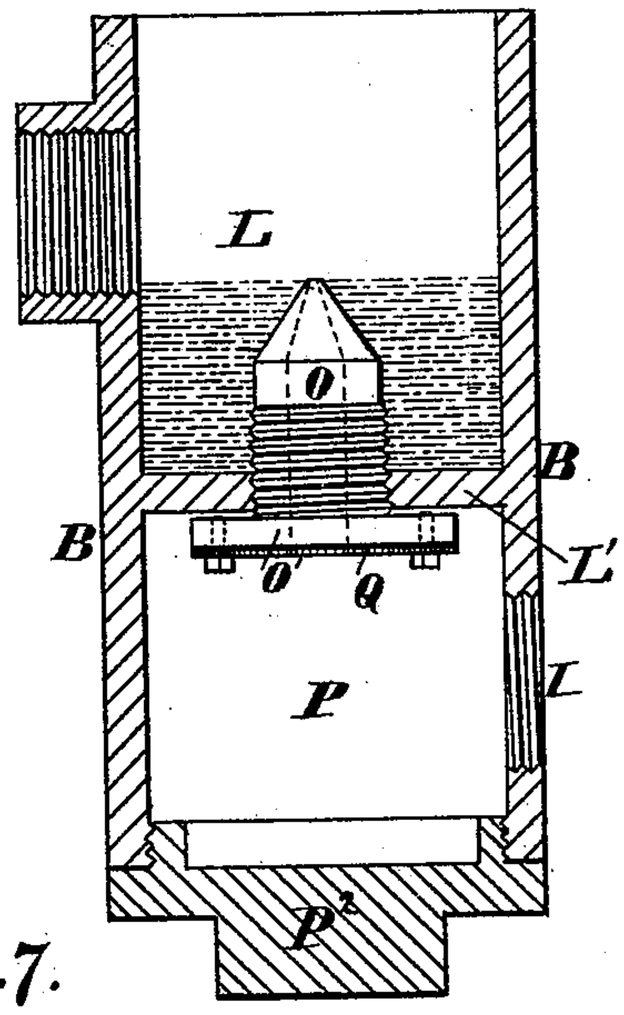


Fig. 6a

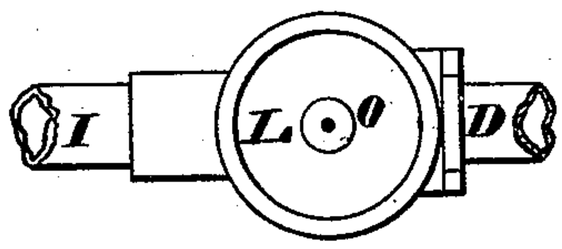


Fig. 6.

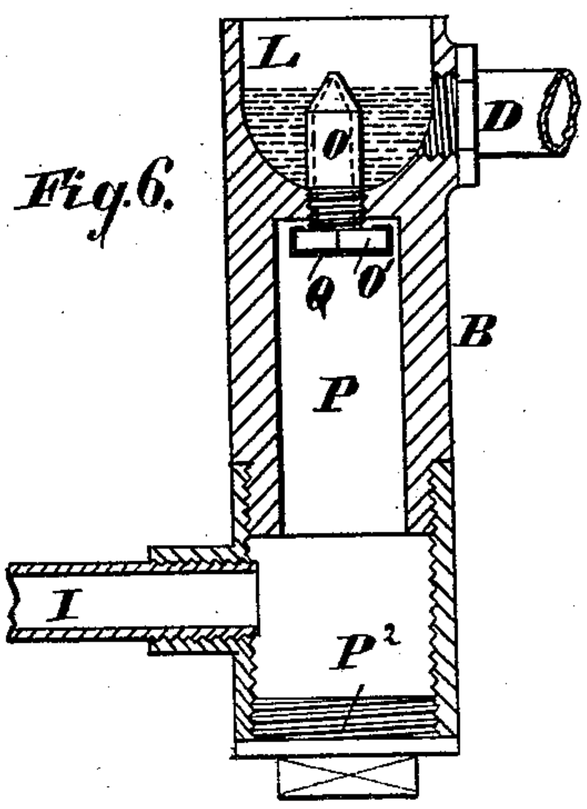


Fig. 7.

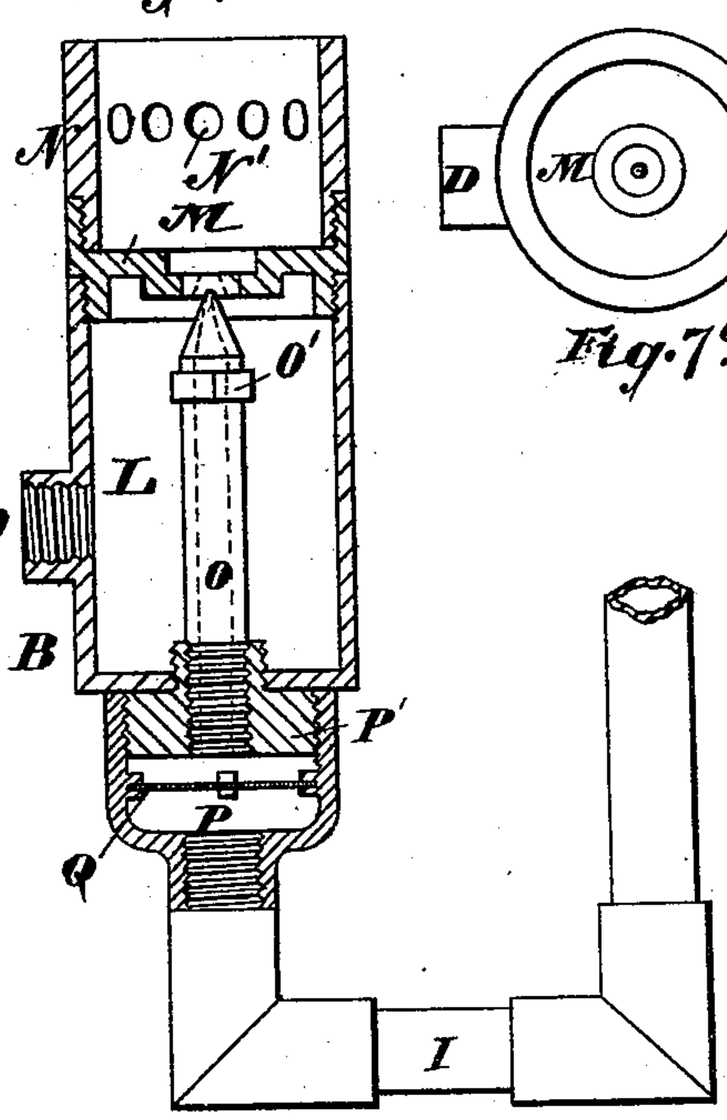
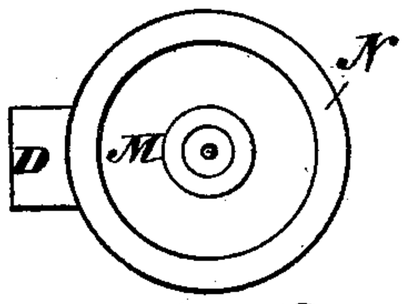


Fig. 7a



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3 Sheets—Sheet 3.

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SPRAY LAMP.

No. 453,131.

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Fig. 8.

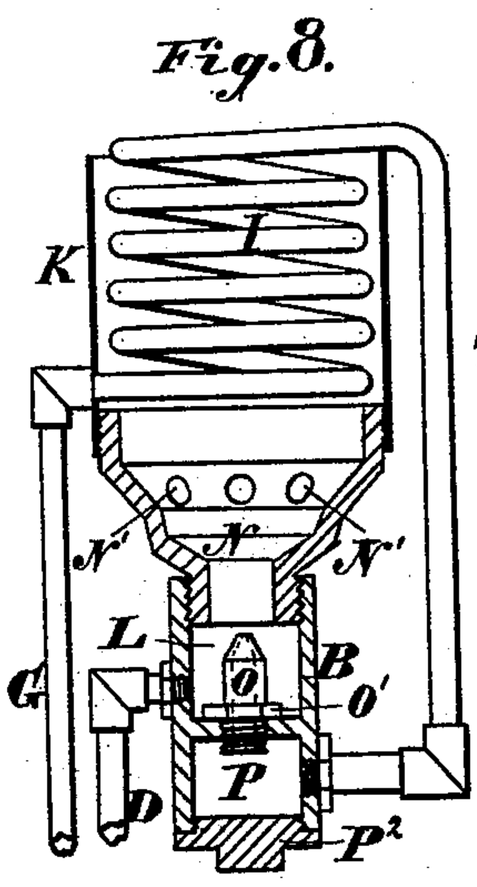


Fig. 9.

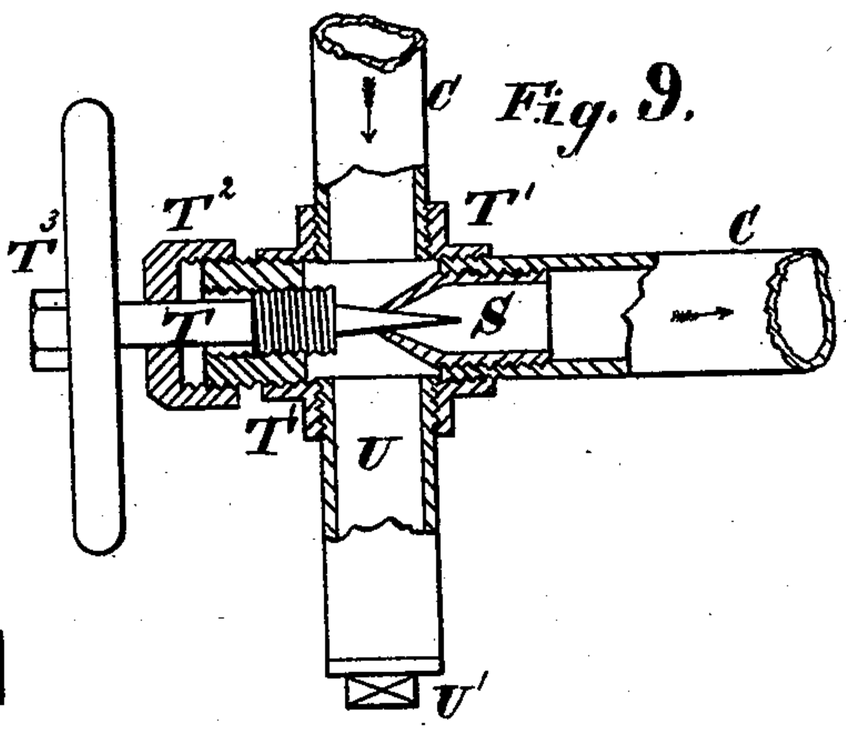


Fig. 10.

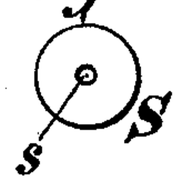
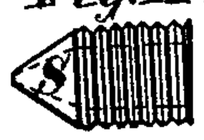


Fig. 11.



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UNITED STATES PATENT OFFICE.

GEORGE ROSE, OF GLASGOW, SCOTLAND, ASSIGNOR OF TWO-THIRDS TO ARCHIBALD BAIRD AND MATTHEW BARR BAIRD, BOTH OF SAME PLACE.

SPRAY-LAMP.

SPECIFICATION forming part of Letters Patent No. 453,131, dated May 26, 1891.

Application filed July 19, 1889. Serial No. 317,981. (No model.) Patented in England August 20, 1888, No. 11,517.

To all whom it may concern:

Be it known that I, GEORGE ROSE, a subject of the Queen of Great Britain, and a resident of the city of Glasgow, Scotland, have invented certain new and useful Improvements in and Connected with Spray-Lamps for Lighting and Heating Purposes, of which the following is a specification.

This invention relates to spray-lamps for lighting and heating purposes; and it has for its object to construct a cheap and efficient lamp of this class. Instead of spraying the oil by steam conducted from a steam-boiler or by compressed air supplied from a compressed-air receiver, as is usually done, I prefer to spray the oil by a self-generated superheated steam-jet obtained by passing water through a highly-heated coil-pipe, which is made to surround the flame issuing from the burner of the lamp.

My improved lamp may be made either portable or fixed.

In order that my said invention may be properly understood, I have hereunto appended three explanatory sheets of drawings.

In the drawings the reference-letters wherever repeated indicate similar or like parts.

Figure 1, Sheet 1, of the drawings represents in side elevation, Fig. 2 in plan, and Fig. 3 in detail to an enlarged scale, one form of my improved spray-lamp for lighting or heating purposes. As shown in these figures, Fig. 4 is a side elevation, partly in vertical section, of another form, and Fig. 4ª is an enlarged plan of one of its details. Fig. 5 is an enlarged detail sectional view hereinafter described. Figs. 6 and 7 and 6ª and 7ª are respectively vertical sections and plans of modifications hereinafter described. Figs. 8, 9, 10, and 11 are enlarged detail views hereinafter described, Figs. 8 and 9 being vertical sections and Figs. 10 and 11 elevations.

Referring to Figs. 1, 2, and 3, the lamp as constructed under this invention has a tank or reservoir A, containing mineral or other oil, which is or may be forced up to the burner B (see Fig. 3) through a stand-pipe C and connection D by the action of compressed air forced into the tank by the air-pump E. The tank A is fitted with a pressure-gage *a*, filling-plug *b*, and cleaning-plug *c*, and may be provided with a handle A′ on each side for its easy removal from place to place.

Water to be converted into superheated steam to spray the oil is contained within a pocket-tank F, riveted or otherwise fitted to the oil-tank A. The water-tank F is provided with a filling-plug *d* and a cleaning-plug *e*. The water is forced up piping G to the steam generating and superheating coil I, which surrounds the flame of the lamp, by the action of compressed air supplied from the oil-tank A through the small tube H. The steam generating and superheating coil-pipe I may be an ordinary coil-pipe, as shown at Fig. 8, Sheet 3; but I prefer to use a coil-pipe formed at its lower end in a number of close coils or turns, (see Fig. 3,) which taper toward their base and surround the flame issuing from the burner B. From the upper turn of this coil the pipe I extends straight up to the top or other part of the flame, where it is again coiled in one or more turns, and is then led downward in a straight piece to the under side of the burner B. The coil-pipe I is preferably made in two parts jointed with couplings *j j* at the straight portions, so that the top and highly-heated part may be renewed when necessary. With this construction of coil-pipe I the lower turns of the pipe serve as a boiler, while the upper turns serve as a steam-superheating chamber, and as the flame is free to play upon the straight piece between the upper and lower turns of the coil-pipe it becomes so highly heated that the tendency of the coil to flood with cold water is greatly minimized. A blow-off cock J may be provided, if desired. To retain the heat the coil is by preference surrounded or partly surrounded by a casing K, which may have air-holes in it and be provided with a door K′.

My improved burner is shown in vertical section at Fig. 5, Sheet 2, and under modified constructions at Figs. 6, 6ª, 7, and 7ª, Sheet 2. The burner consists by preference of a cylindrical-shaped chamber L, as shown in section at Figs. 5, 7, and 8, or the chamber may be cup-shaped, as shown in section at Fig. 6 and

in plan at Fig. 6ª. The chamber may have a cover M (shown in section at Fig. 7 and in plan at 7ª) screwed on its upper end, and on the cover a mixing-chamber N, Figs. 3, 7, 7ª, and 8, which may be provided with a number of air-inlet holes N′, may be screwed. The mixing-chamber may be cylindrical in shape, as shown in side elevation at Fig. 3, in section at Fig. 7, and in plan at 7ª, or it may be stepped or rabbeted, as shown in section at Fig. 8.

When the cover M is used, as shown at Figs. 7 and 7ª, the air necessary to support combustion passes from the inlet-holes N′ to the burner-nipple O through a central hole made in the cover. The hole, which may be rabbeted or tapered inward, as shown, is so made as to surround the point of the nipple O, which is screwed into the bottom of the casing or chamber L.

In Figs. 5 and 6 the nipple O is shown as screwed into the bottom of the chamber L from underneath, although it may be screwed in from above, as shown at Figs. 7 and 8. The nipple O is preferably made with a flange O′ to enable it to be easily screwed into position or taken out for cleaning. The superheated steam from the coil-pipe I is led to a chamber P at the underside of the burner B. This chamber P, which serves as an expansion-chamber, may be made in one piece with the burner B, as shown at Figs. 5, 6, and 8, the chambers L and P being separated by the web L′, or it may be separate therefrom, the chamber being screwed onto the lower end of the burner B either directly or by means of a reducing-coupling P′, as shown at Fig. 7, Sheet 2. A plug P² may be screwed into the bottom of the chamber P for the purpose of easy access to screw or unscrew the burner-nipple O and to clean the chamber, as shown at Figs. 5 and 8, or the plug may be screwed into the lower branch of a T-piece, forming the base of the burner, as at Fig. 6. A piece of wire-gauze or perforated metal Q may be inserted in the chamber, as shown at Fig. 7, or be screwed or otherwise attached to the under side of the nipple O, as shown at Figs. 5 and 6, for the purpose of preventing scale or dirt entering and choking up the steam-outlet channel in the nipple. The oil from the tank A is led through the pipes C and D to the chamber L, which constitutes a small oil well or reservoir, into which the oil is allowed to flow constantly. The oil fills the chamber to such a height that the steam led from the steam-generating coil I and issuing from the nipple O will spray it.

The oil-supply to the burner is controlled by a valve *f*, Fig. 1, and the water-supply to the coil by the valve *g*.

In Fig. 4 a modified construction of lamp is shown. In this case the oil-tank A is surrounded by a water-jacket F, riveted to the tank A, and the coil-pipe I, instead of being a circular coil, as at Figs. 1 and 3, is rectangular in plan, as shown to an enlarged scale at Fig. 4ª. The square rings or coils of the pipe are connected together by short vertical tubes or straight parts *i*. The casing is or may be made tapered at its lower end and is inserted into the chamber L of the burner.

In Figs. 9, 10, and 11, Sheet 3, a contrivance is shown for preventing or aiding in the prevention of any grit or dirt which may be in the oil entering the oil-chamber L of the burner. Fig. 9 represents a section of an oil-supply pipe C with my contrivance fitted therein. The contrivance consists, essentially, of a small conical piece S, which is shown in longitudinal section at Fig. 9, in front view at Fig. 10, and in side elevation at Fig. 11. This cone, which has a small oil-admission hole *s*, Fig. 10, cut or bored in its apex, is so screwed or otherwise inserted in the oil-supply pipe that the apex or point is against the inflowing stream of oil. In Fig. 9 the direction of the oil-flow is indicated by the arrows. By inserting a cone having a small hole *s* in its apex in the oil-supply pipe, as described, any large particles of grit or dirt which may be in the oil are prevented from passing on to the burner of the lamp, and, further, the hole *s* can also be made of just sufficient size as shall allow a proper quantity of oil to be supplied to the burner to give a clear and steady light. In conjunction with the cone S there may also be used a small spindle, needle-valve, or wire T, which may have a wheel T³ or handle at its outer end, and is or may be fitted in a cross-piece T′ at the junction of the two parts of the oil-supply pipe C. The spindle or wire T, which is directly in line with and works into the hole *s* of the cone, passes through an oil-tight stuffing-box T², fitted in the outer end of the cross-piece T′. By turning or pushing the spindle T forward the point will penetrate the hole in the cone and so clear away any obstruction which may, if very dirty oils are used, occasionally lodge therein. The lower branch of the cross-piece may have a chamber formed by a short piece of tubing U, with a screw-plug U′ inserted in its lower end for the collection of sediment or dirt from the oil-supply tube. By unscrewing the plug U′ the sediment can be cleaned out. Instead of having a cross-piece at the junction of the two parts of the oil-supply pipe C, a T-piece T⁴ may be used, as shown at Fig. 4.

The regulating-cone S may be used with any class of lamps burning heavy mineral oils, and in that class of lamps wherein the oil is ejected from a nipple it enables the hole in such nipple to be made larger than heretofore, thus preventing the liability to clog arising from a small hole. The cone may be used with or without the cleaning-spindle T, and it may be fitted in any convenient part of the oil-supply pipe.

When starting the lamp, a piece of oil-sat-

urated waste may be placed in the casing K of the lamp through the door K′ (see Fig. 1) and ignited. The heat thus generated is sufficient to raise steam within the coil I and to start the lamp. Instead, however, of using oil-saturated waste for the preliminary heating, I by preference at first allow a blast of air from the oil-tank A to pass through the short pipe connection G′, Fig. 1, which may have a stop-cock G^2 on it, and to circulate up the water-pipe G, through the coil I, and so to the burner-nipple. This air-blast sprays the oil contained within the chamber L and so enables the lamp to be lighted instantly. After the air-blast has been in operation for a sufficient length of time to thoroughly heat up the coil-pipe I it is cut off by the cock G^2 and the water is gradually turned on by the cock *g*. The water on rising to the heated coil I throws off sufficient steam to spray the oil and maintain the flame.

With my improved construction of burner having an open oil chamber or well L, as shown at Figs. 5, 6, and 8, the oil becomes highly heated and catches fire. When so fired, it is almost impossible for a sudden gust of wind to blow out the flame, and, further, there is no danger of the lamp going out when the flame is turned down or up to its full height by means of the cocks or valves *g* and *f*. When the cover M is fitted on the burner, as shown at Fig. 7, the burner can be fitted in a horizontal position and the flame directed into a furnace.

Under a modification the tank hereinbefore described as the "oil-tank" may be used as a water-reservoir and the water-tank be used for oil.

The several structural details of my improved lamp may be slightly altered without departing from my invention.

In my application, Serial No. 341,651, filed February 25, 1890, for improvements in spray-lamps, I have claimed the oil-chamber, nipple, &c., with the strainer arranged before the inlet of the nipple, as also shown, but not claimed in this case.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a spray-lamp for lighting and heating purposes, a burner divided by a partition into upper and lower compartments, the upper compartment being open and serving as an oil-well and the lower one being closed by a removable screw-plug and serving as a steam-expansion chamber, and having a removable steam-nipple projecting up through said partition for spraying the oil in the oil-well, substantially as hereinbefore described.

2. In spray-lamps for lighting and heating purposes, the combination, with a burner divided by a partition into upper and lower compartments, the upper compartment being open and serving as an oil-well and the lower one being closed by a removable screw-plug and serving as a steam-expansion chamber, of a removable spraying-nipple fitted in said partition, and a coil-pipe for converting water into steam, fitted above and being heated by the flame issuing from said burner, substantially as described.

3. The combination, with the oil-supply pipe, of a hollow cone having a perforation in its apex, fitted within said pipe with its apex toward or against the current of oil, substantially as and for the purposes set forth.

4. The combination of the hollow cone having a small hole in its apex, said hole constituting the inlet to said cone, and a needle-valve fitted within the oil-supply pipe and arranged to be projected into said hole, substantially as set forth.

5. The combination, with the oil-supply pipe, of a hollow cone having a perforation in its apex, fitted within said pipe with said apex toward or against the current of oil, and a chamber arranged under said cone, substantially as and for the purposes set forth.

6. The combination, with the oil-supply pipe, of a hollow cone having a perforation in its apex, fitted within said pipe with said apex toward or against the current of oil, and a needle-valve arranged at the apex of the cone and adapted to be projected into said perforation toward the base or larger end of the said cone, substantially as set forth.

7. The combination, with the oil-tank A, water-tank F, and a pipe connecting said tanks together, of an air-blast pipe G′, having controlling-valve G^2, the water-pipe extending down into tank F and connected with pipe G′ and having a valve between said pipe G′ and tank F, and the burner connected with the oil-tank A and said air-pipe, substantially as set forth.

8. The combination, with the portable oil-tank A, forming the base of the lamp, and the water-tank F, fitted to the oil-tank and having communication with the upper part thereof, of the stand-pipe C, dipping into tank A, a burner mounted on said stand-pipe and having communication therewith, a steam-generating coil mounted above said burner and connected therewith, a pipe connected with said coil and dipping into the water-tank and having connection with the upper part of tank A, and the cocks *g* G^2 for controlling the discharge from said tanks respectively into said pipe, substantially as set forth.

9. In a spray-lamp, the combination of the burner divided by a partition into upper and lower compartments, the upper compartment being open and serving as an oil-well and the lower compartment being closed and serving as a steam-expansion chamber and having a steam-nipple projecting up through

said partition, and a steam-pipe formed into two coils, one above the other, connected by a pipe *j* and in communication with the said steam-expansion chamber, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 15th day of May, 1889.

GEORGE ROSE.

Witnesses:
HUGH FITZPATRICK,
WILLIAM FLEMING.
Both of 70 Wellington Street, Glasgow.