(No Model.) 2 Sheets—Sheet 1.

A. S. UPSON & F. A. SMITH.

OIL BURNER.

No. 451,784. Patented May 5, 1891.

Fig. 1.

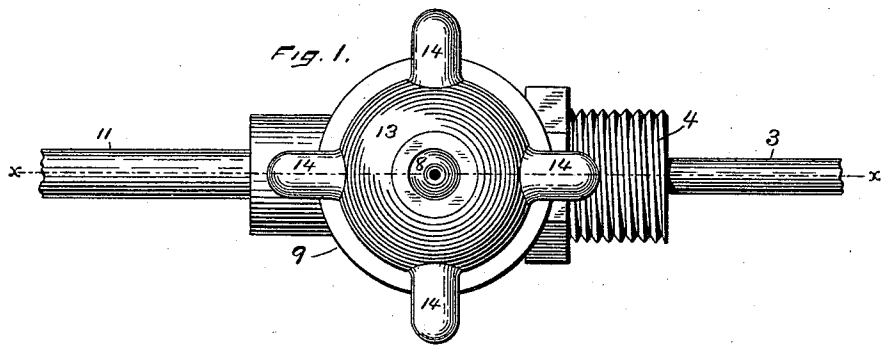
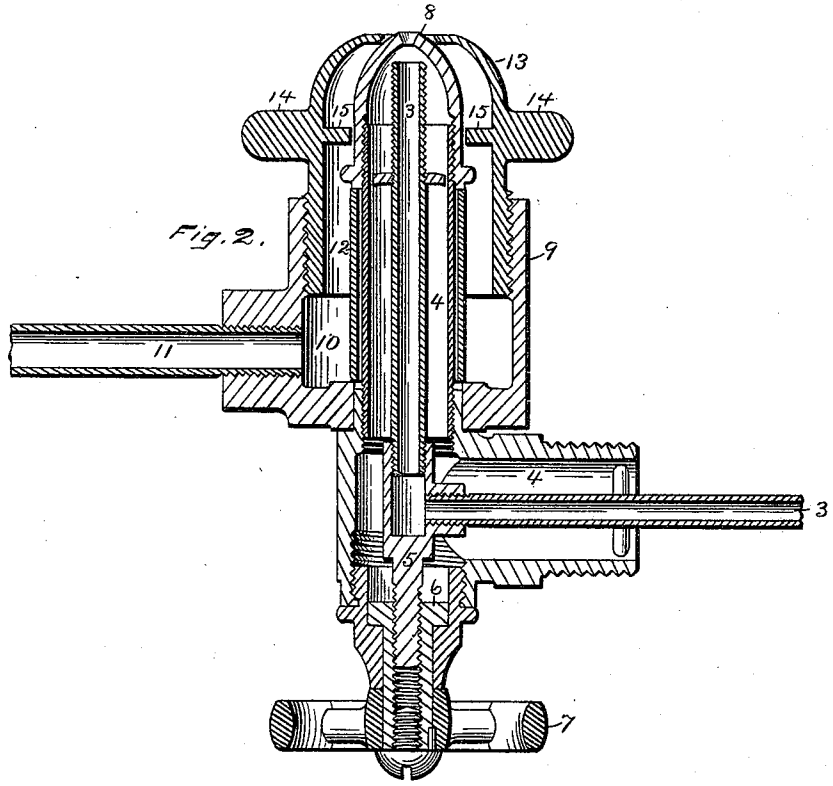


Fig. 2.



Witnesses.
John Edwards Jr.
W. J. Dewing.

Inventors.
Andrew S. Upson 3rd
Frederick A. Smith.
By James Shepard
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

A. S. UPSON & F. A. SMITH.

OIL BURNER.

No. 451,784. Patented May 5, 1891.

Fig. 3.

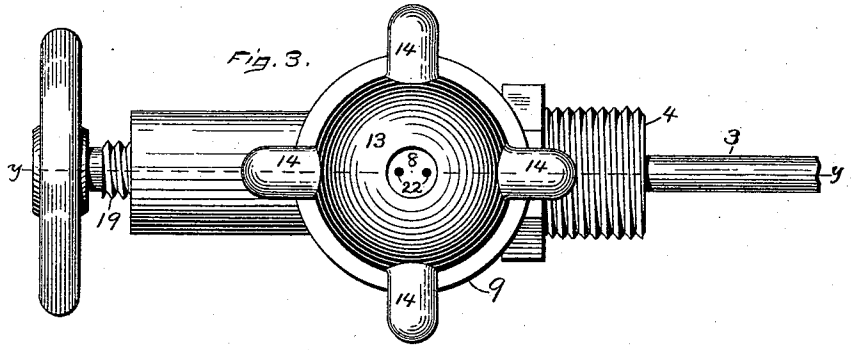
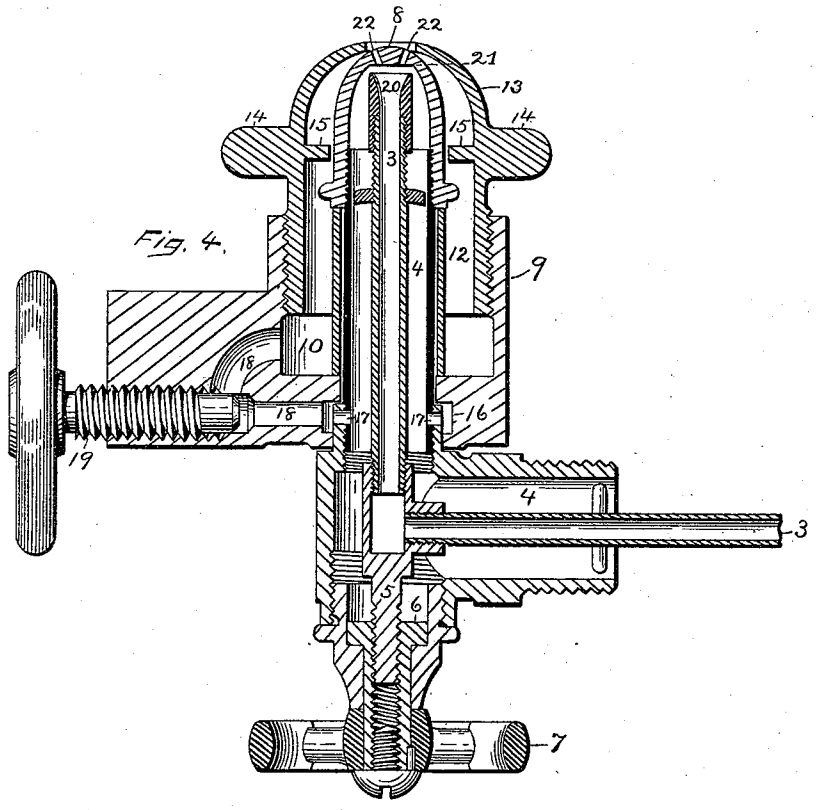


Fig. 4.



Witnesses.
John Edwards Jr.
Jo Drinning

Inventors.
Andrew S. Upson 3d
Frederick A. Smith.
By James Shepard
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ANDREW S. UPSON, OF UNIONVILLE, CONNECTICUT, AND FREDERICK A. SMITH, OF CLEVELAND, OHIO, ASSIGNORS TO THE UPSON NUT COMPANY, OF FARMINGTON, CONNECTICUT.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 451,784, dated May 5, 1891.

Application filed January 25, 1889. Serial No. 297,504. (No model.)

To all whom it may concern:

Be it known that we, ANDREW S. UPSON, a citizen of the United States, residing at Unionville, in the county of Hartford and State of Connecticut, and FREDERICK A. SMITH, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Oil-Burners, of which the following is a specification.

Our invention relates to improvements in oil-burners of the class in which the oil is delivered from the burner in connection with an air-blast, and the main object of our improvement is to better regulate the relative supply of air and oil.

In the accompanying drawings, Figure 1 is a plan view of our burner. Fig. 2 is a section thereof on line *x x* of Fig. 1. Fig. 3 is a plan view of our burner of a somewhat different construction, and Fig. 4 is a section thereof on line *y y* of Fig. 3.

3 designates the oil-supplying tube which extends along the inside of the air-supplying conduit 4, both of these conduits having an angular elbow form to facilitate adjustment and to enable that portion which is represented as horizontal in the drawings to be extended to any suitable supply for air and oil. The elbow of the oil-pipe 3 is provided with an extension 5 screw-threaded and extending into the nut 6, which nut is provided with an operating-wheel 7, whereby turning said wheel will move the effluent end of the oil-tube 3 longitudinally for the purpose of adjustment. At this end of the air-conduit there is an atomizing-nozzle 8, which covers the end of the oil-tube and which is provided with a central perforation. This nozzle forms in effect a mixing-chamber in which the oil flowing from the end of the tube 3 is combined with the air, so that the oil is thrown from the orifice in the end of the nozzle 8 in the form of a spray. The parts thus far described are all old.

The adjusting-wheel 7 is designed to bring the effluent end of the oil-tube 3 to and from the end of the nozzle 8 and to enable it to be forced into the end of said nozzle far enough to entirely cut off the supply of air. By withdrawing the tube there will evidently be greater space for air, and in fact more air will be permitted to pass out of the nozzle, but this does not regulate the relative supply of air and oil as is desired, because the excess of air flowing through the nozzle will form a suction on the end of the tube 3 and thereby increase the flow of oil with an increased flow of air.

Surrounding the body of the air-conduit 4 we attach a socket 9, having an annular chamber 10, which may be connected by a pipe 11, Figs. 1 and 2, with any proper air-supplying source, either the same as that which supplies the conduit 4 or other supply, as may be desired. A collar 12 is placed upon the conduit 4 and the atomizing-nozzle 8 screwed down upon its end so as to hold the socket 9 in place; but the manner of holding the socket in place is not essential to our improvement. In this socket, and surrounding the nozzle 8, we place a larger outer cone 13, the same being screwed into the socket and preferably provided with projections 14 for convenience of turning it for adjustment. This outer cone is dome-shaped, contracted abruptly toward the center at its outer end so as to partially cover the rounded outer end of the dome-shaped atomizing-nozzle 8. The central orifice is, however, large enough to expose the atomizing-jets and yet of a diameter smaller than the tubular portion of said nozzle, whereby the inner face of said outer cone directs the air transversely across the jets of the atomizing-nozzle. The projections 15 are only steadying-lugs, and do not obstruct the passage of air through the outer cone. This separately-adjustable outer cone 13 may be screwed down so as to entirely shut off the passage of air through it, or it may be unscrewed so as to deliver any desired amount of air relatively to the supply of oil. Inasmuch as this cone is outside of the mixing-chamber, removed from the end of the oil-tube 3, and adjusted separately from the adjustment of said tube which governs the supply of combined air and oil, an increase in the secondary supply of air flowing through said outer cone does not operate by suction to increase the supply of oil

as does the increased flow of air through the atomizing-nozzle, and therefore the device with our improvement can be regulated so as to get the relative proportion of oil and air which may be desired.

In Figs. 3 and 4 we have shown an arrangement for carrying out the hereinbefore-referred-to suggestion of connecting the outer cone and atomizing-nozzle with a common air-supply, and in this particular feature the construction shown in the latter figures is the preferred one. Near the base of the socket 9 we form an annular groove 16, while the walls of the air-supplying conduit 4 are perforated, as at 17, through into said annular groove. A conduit 18 leads to one side from said annular groove 16 and then bends around into the annular chamber 10. This conduit 18 is also provided with a stop-cock 19, as shown.

The atomizing-nozzle shown in Figs. 1 and 2 has only one orifice for forming a single jet, and the interior of said nozzle is formed so as to concentrate the oil and air and direct it into said single jet. Whenever a single jet only is required this form will be used. When two or more jets are required to form in effect two or more burners, we use the construction of atomizing-nozzle and oil-tube illustrated in Figs. 3 and 4. The upper end of the oil-tube 3 is made with a diverging or outwardly-flaring and open mouth 20, and the interior of the end of the nozzle 8, immediately over and adjacent to said mouth, has a spreading-face 21, which may be flat or diverging, to spread the oil to its two or more orifices 22 for discharging the combined air and oil in two or more jets.

We are aware that prior patents show injector-burners with two or more jet-orifices in the atomizing-nozzle, and a distributing face on the interior of said nozzle, and burners with three concentric passages for supplying oil, steam, and air. All of said prior art is hereby disclaimed.

We claim as our invention—

The combination of an oil-supply tube, an air-supply tube surrounding said oil-supply tube, a dome-shaped atomizing-nozzle 8, secured to said air-supply tube and inclosing and covering the effluent end of said oil-supply tube, and having on its inner face a valve-seat which, in connection with the end of said oil-supply tube, serves as a valve, an outer air-supply tube, and the separately-adjustable outer cone 13, connected with said air-supply and having on its inner face a valve-seat which, in connection with said inclosed dome-shaped atomizing-nozzle, forms a second valve, substantially as described.

ANDREW S. UPSON.
FREDERICK A. SMITH.

Witnesses:
D. A. UPSON,
HENRY W. MCDOLE.