No. 721,900. PATENTED MAR. 3, 1903.

V. F. LÄSSOE & L. D. LOVEKIN.

OIL BURNER.

APPLICATION FILED AUG. 5, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

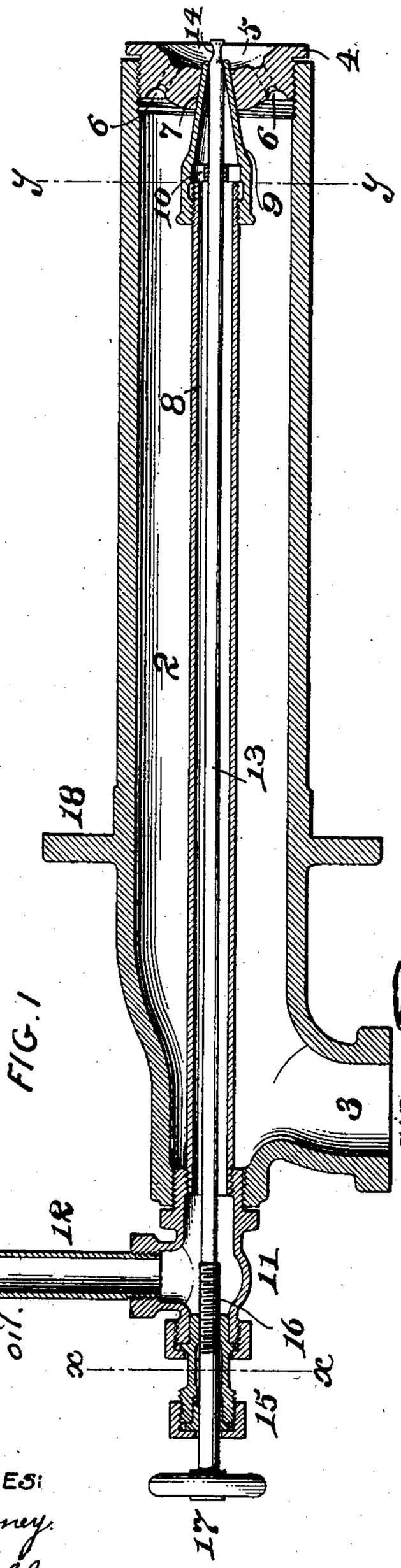

FIG. 1

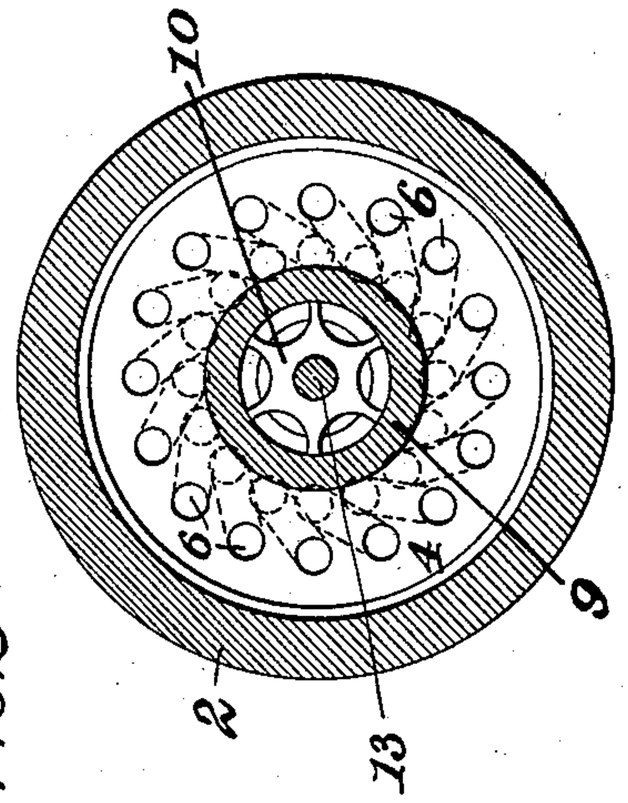

FIG. 3

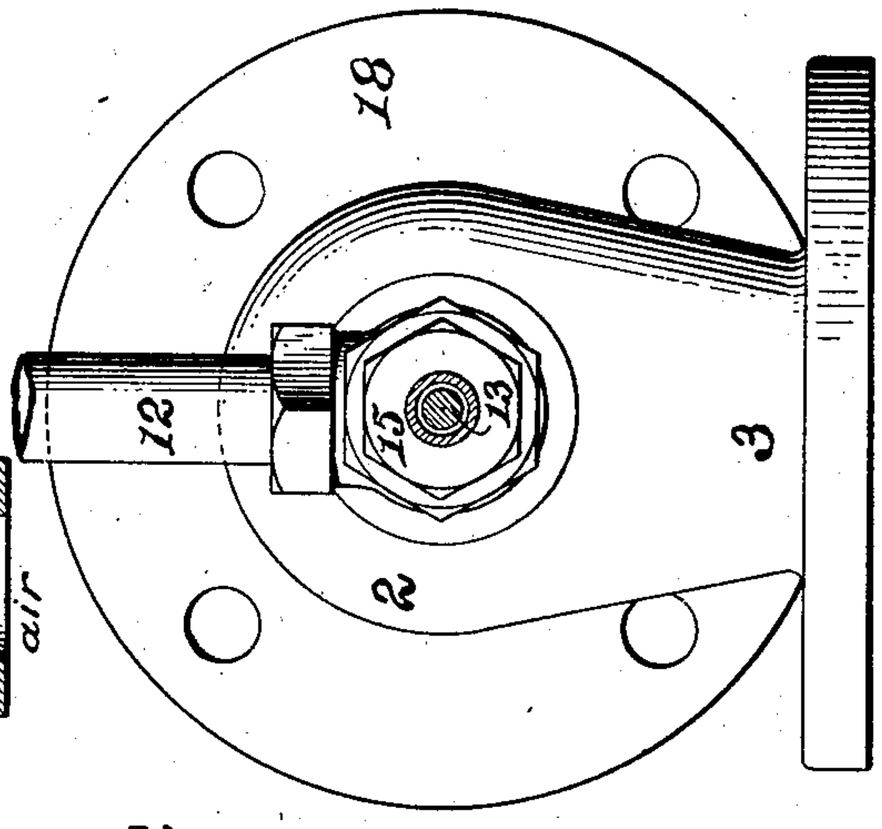

FIG. 2

WITNESSES:
Wm Rooney.
E. Gall

INVENTORS:
V. F. Lässoe and
L. D. Lovekin
By thimally & Thomson

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

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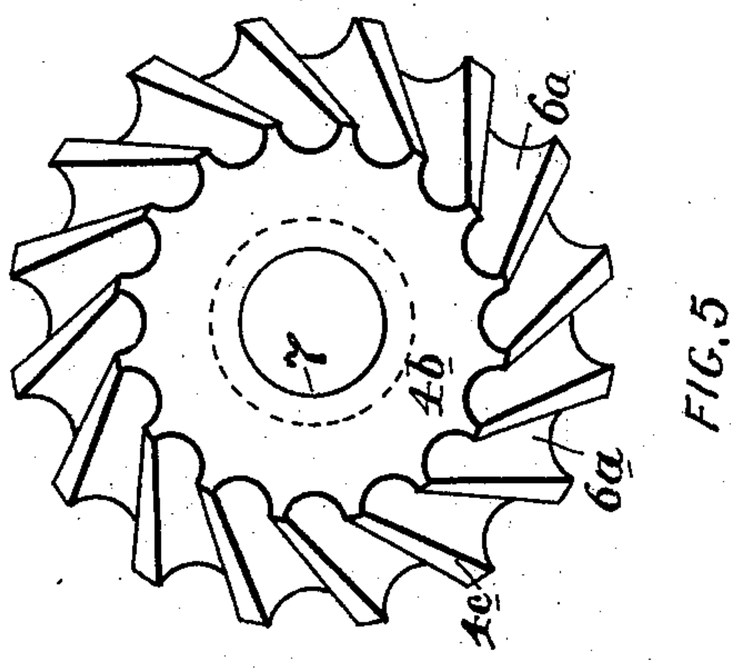

FIG. 5

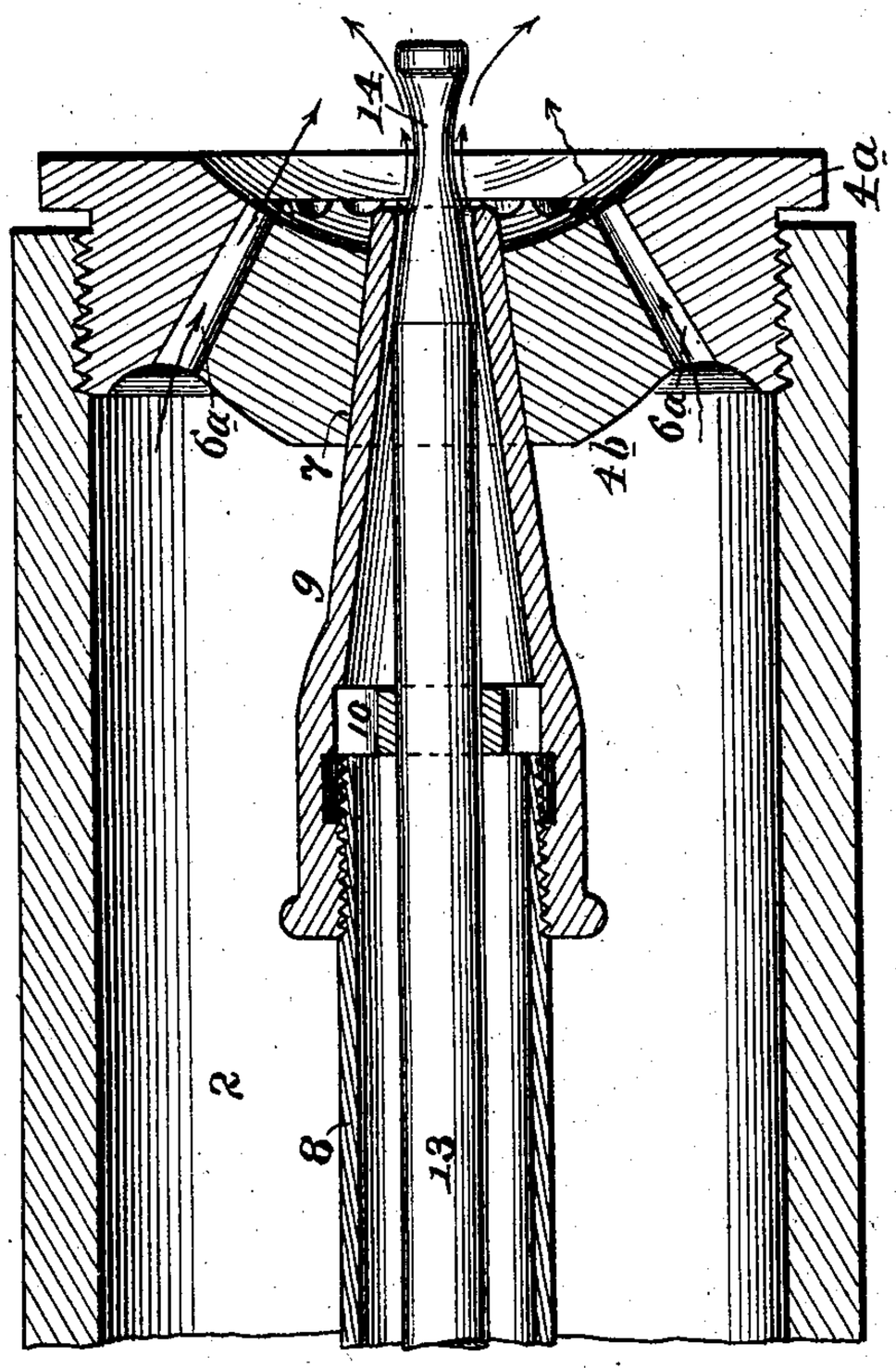

FIG. 4

WITNESSES:
Wm Pomeroy
E. Gale

INVENTORS:
V. F. Lässoe and
L. D. Lovekin
By Their atty
Thos. G. Orwig & Son

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

UNITED STATES PATENT OFFICE.

VALDEMAR F. LÄSSOE, OF NEW YORK, N. Y., AND LUTHER D. LOVEKIN, OF ARDMORE, PENNSYLVANIA.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 721,900, dated March 3, 1903.

Application filed August 5, 1902. Serial No. 118,468. (No model.)

To all whom it may concern:

Be it known that we, VALDEMAR F. LÄSSOE, of the city, county, and State of New York, and LUTHER D. LOVEKIN, of Ardmore, Montgomery county, State of Pennsylvania, have invented an Improvement in Oil-Burners, of which the following is a specification.

Our invention has reference to oil-burners; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of our invention is to provide a simple and durable construction of burner which has capacity for spraying the oil to be burned by forcing it through a nozzle in a thin sheet or film and subdividing it by a series of transversely-acting currents of air under pressure, preferably in diagonal directions, so as to produce a spiral or gyrating motion to the particles of oil and air beyond the end of the burner, where the subdivided oil is burned.

The burner herein described is especially adapted for use in the system of burning oil as fuel set out in our application, Serial No. 117,673, filed July 30, 1902, a reference to which application will show the manner of supplying the burner with oil and spraying air under pressure, as well as the additional air at lower pressure, for combustion purposes, said application clearly illustrating the manner in which we have commercially applied our invention.

In carrying out our invention forming the subject-matter of the present application we employ an air-tube having its rear end provided with an air-inlet and its forward end with a spraying-bushing having a central aperture for receiving the oil-nozzle and a series of surrounding spraying-apertures through which the air is forced under pressure, said apertures being preferably arranged on an incline or spiral, so as to impart a spiral or gyratory motion to the air and oil, and with said air-tube we combine a central oil-tube having its rear end furnished with a connection for oil and its forward end with a nozzle fitting the bushing and a regulating and spraying rod adjustably secured in the oil-tube for regulating the character of oil film or spray delivered from the nozzle.

Our invention also comprehends details of construction which, together with the above features, will be better understood by reference to the drawings, in which—

Figure 1 is a longitudinal sectional elevation of an oil-burner embodying our improvements. Fig. 2 is a cross-sectional elevation of same on line *x x* of Fig. 1. Fig. 3 is a cross-section of same on line *y y* of Fig. 1. Fig. 4 is a sectional elevation of the forward end of a modified form of our burner, and Fig. 5 is an elevation of one part of the spraying-bushing.

2 is the air-tube of the burner, through which air is forced, preferably, at about one and one-half pounds pressure. The air is supplied to the tube by an inlet 3 and is discharged at the forward end through apertures 6 in a bushing 4, screwed into the end of the tube. This bushing is preferably hollowed out or recessed on the front or outside face, as at 5, and into this the apertures 6 open, said apertures being arranged on spiral inclines, as more fully indicated in Fig. 3, and grouped about a central aperture 7, which is tapered and adapted to receive the end of the oil-nozzle 9. These apertures are directed inward and open through the recessed face of the bushing. The oil-nozzle 9 is conical, has a tapered hole, and is of such length that its nose just protrudes through the bushing. It is fitted on the interior with a star-frame 10, which is clamped in position upon a shoulder by the oil-pipe 8 when screwed into the nozzle. The rear end of the oil-pipe is secured to an L-head, into which the oil is fed under about fifteen pounds pressure by a pipe 12.

Extending through the head 11 and the pipe 8 is a control-rod 13, the end of which is tapered to form a throttling-valve with the nozzle to regulate the extent of orifice for the escape of oil. The end of the rod beyond the nozzle is enlarged, so as to form an annular head 14, against which the oil impinges and by which it is spread or sprayed outward in a thin layer, as indicated by the arrow in Fig. 4. By adjusting the rod 13 the extent and angle of the spraying of the oil may be varied. The rod 13 is made adjustable by

having its rear end screw-threaded, as at 16, and working in the head 11. The extreme rear end of the rod passes through a stuffing-box 15 on the head and is provided with a hand-wheel 17, by which to rotate it for adjustment purposes.

When the oil is forced out under about fifteen pounds pressure, it is spread and brought to a condition of a very thin film. This is rapidly dissipated into a fine spray by the action of the series of spiral air-jets from the apertures 6, which not only produce the subdivision, but also gives to the mixture of air and oil a gyratory motion, which is important in that it produces the better subdivision, a most intimate admixture with the combustion-air supplied to the furnace from around the burner, and a constantly-shifting flame, which secures uniform distribution of the heat within the furnace.

In use the burner fits into the usual furnace or fire-box, the flange 18 on the burner-tube acting as a support and means for securing it in place upon the projecting front of the furnace.

To cheapen the cost of constructing the bushing 4, we may make it in two parts, as shown in Figs. 4 and 5. In this case the part 4^b has the grooves 6^b cast in it, as shown in Fig. 5, the construction resembling very closely a bevel-gear, having spiral teeth 4^c. The bushing 4^a is screwed into the end of the tube 2 and is made with a conical aperture adapted to receive the conical surface 4^c produced by the teeth of the part 4^b. This latter part has also a conical aperture 7, adapted to receive the nozzle 9. When the part 4^b is placed upon the end of the nozzle and the bushing 4^a screwed into place, it clamps the part 4^b firmly upon the nozzle, and the grooves 6^b constitute a series of spirally-arranged apertures. In this case, as in the construction shown in Fig. 1, the bushing is formed with the recessed end, as at 5. While we prefer that these apertures shall be diagonal or spirally arranged, this is not essential.

While we prefer the construction shown, the details may be modified without departing from the spirit of the invention.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an oil-burner, the combination of an air-tube, a head at its front end having a series of perforations arranged about its center and directed inward, an oil-nozzle extending through the center of the head and constituting a valve-seat, an oil-pipe leading to the nozzle and having no communication with the air-tube, and an adjustable controlling-rod extending through the nozzle and having its end annularly grooved to form a valve for the nozzle and a head out of line of the discharge of the air for directing the oil outward in a thin film into an isolated position so as to be met by the air-jets from the head and transformed into a spray.

2. In an oil-burner, the combination of an air-tube, a head at its front end having a series of spirally-arranged perforations arranged about its center and directed inward, an oil-nozzle having its end extending through the center of the head, an oil-pipe leading to the nozzle and holding it in the head, and a controlling-rod extending through the nozzle and having its end annularly grooved to form a valve for the nozzle and a spraying-head out of line of the discharge of the air for directing the oil outward in a thin film into an isolated position so as to be met by the air-jets from the bushing and transformed into a spray.

3. In an oil-burner, the combination of an air-tube, a bushing screwed into its front end having a series of perforations arranged about its center and directed inward and a conical central hole for receiving the nozzle, an oil-nozzle having a conical end extending through the central hole of the bushing, an oil-pipe leading to the nozzle and clamping it within the bushing and through which oil is forced under pressure, and an adjustable controlling-rod extending through the nozzle and having its end formed to fit the nozzle to control the flow of oil and for directing the oil outward to a thin isolated film in a position as to be met by the air-jets from the bushing.

4. In an oil-burner, the combination of a cylindrical air-tube, a central oil-tube, a closed end for the air-tube having a series of inwardly-directed apertures independent of the oil-tube, an oil-nozzle extending through the closed end of the air-tube and having no communication with the interior of the air-tube, a controlling-rod extending through the oil-tube to control the extent of the flow of oil from the nozzle before it meets the air from the air-tube, and means for adjusting the rod in the nozzle.

5. In an oil-burner, the combination of a cylindrical air-tube, a central oil-tube, a closed end for the air-tube having a series of independent inwardly-directed and spirally-arranged apertures arranged in a circle, an oil-nozzle extending through the closed end of the air-tube centrally to the circle of air-apertures and held tight therein, and an adjustable controlling-rod extending through the oil-tube and having its end smaller than the diameter of the oil-nozzle orifice to control the flow of oil from the nozzle for spreading the oil passing from the nozzle, whereby the air-jets strike and atomize the oil at a distance from the nozzle and the burner is not overheated.

6. In an oil-burner, the combination of a cylindrical air-tube, a central oil-tube, a closed end for the air-tube having a series of inwardly-directed apertures, an oil-nozzle extending through the closed end of the air-tube and held therein by the oil-tube, a guide within the nozzle and clamped therein by the oil-pipe, a controlling-rod extending through the oil-tube to control the flow of oil from the noz-

zle and guided by the guide, and means for adjusting the rod in the nozzle.

7. In an oil-burner, the combination of an air-tube, a head fitted to the end of the tube and having a recessed end unobstructed from in front and a series of inwardly-directed independent apertures of fixed size opening through the surface of the recessed end, an oil-nozzle opening through the head centrally with respect to the apertures, and a valve-rod for controlling the oil passing through the nozzle and spreading it into an outwardly-directed thin film so as to be met by the air-jets from the bushing and atomized.

8. In an oil-burner, the combination of an air-tube, a head secured thereto having a tapering central aperture with the smallest end directed outward, a conical central part removably fitting the tapering central aperture and having the juncture of the head and central part made irregular so as to form a series of inwardly-directed air-apertures, and an oil-nozzle opening through the conical central part and holding it in place.

9. In an oil-burner, the combination of an air-tube, an oil-nozzle, means to control the oil passing through the nozzle, a bushing wholly independent of and surrounding the oil-nozzle and fitting the air-tube and formed in two parts the juncture of the parts being conical and irregular so as to form a series of air-apertures inwardly directed and wholly external to the oil-nozzle.

10. In an oil-burner, the combination of the air-tube, the oil-tube, an oil-nozzle secured to the oil-tube, a conical piece 4^b fitted to the nozzle and having a series of grooves 6^b, and a bushing 4^a fitting the conical piece to close the outer sides of the grooves to make them perform the function of apertures and also clamping the conical piece upon the nozzle.

11. In an oil-burner, the combination of an air-tube, a head secured thereto having a tapering central aperture with the smallest end directed outward, a conical central part removably fitting the tapering central aperture and having the juncture of the head and central part made irregular so as to form a series of inwardly-directed air-apertures, a fixed oil-nozzle opening through the conical central part and holding it in place, and a valve-rod adjustable in the oil-nozzle to regulate the flow of oil without disturbing the remaining parts.

In testimony of which invention we have hereunto set our hands.

VALDEMAR F. LÄSSOE.
LUTHER D. LOVEKIN.

Witnesses:
R. M. HUNTER,
R. M. KELLY.