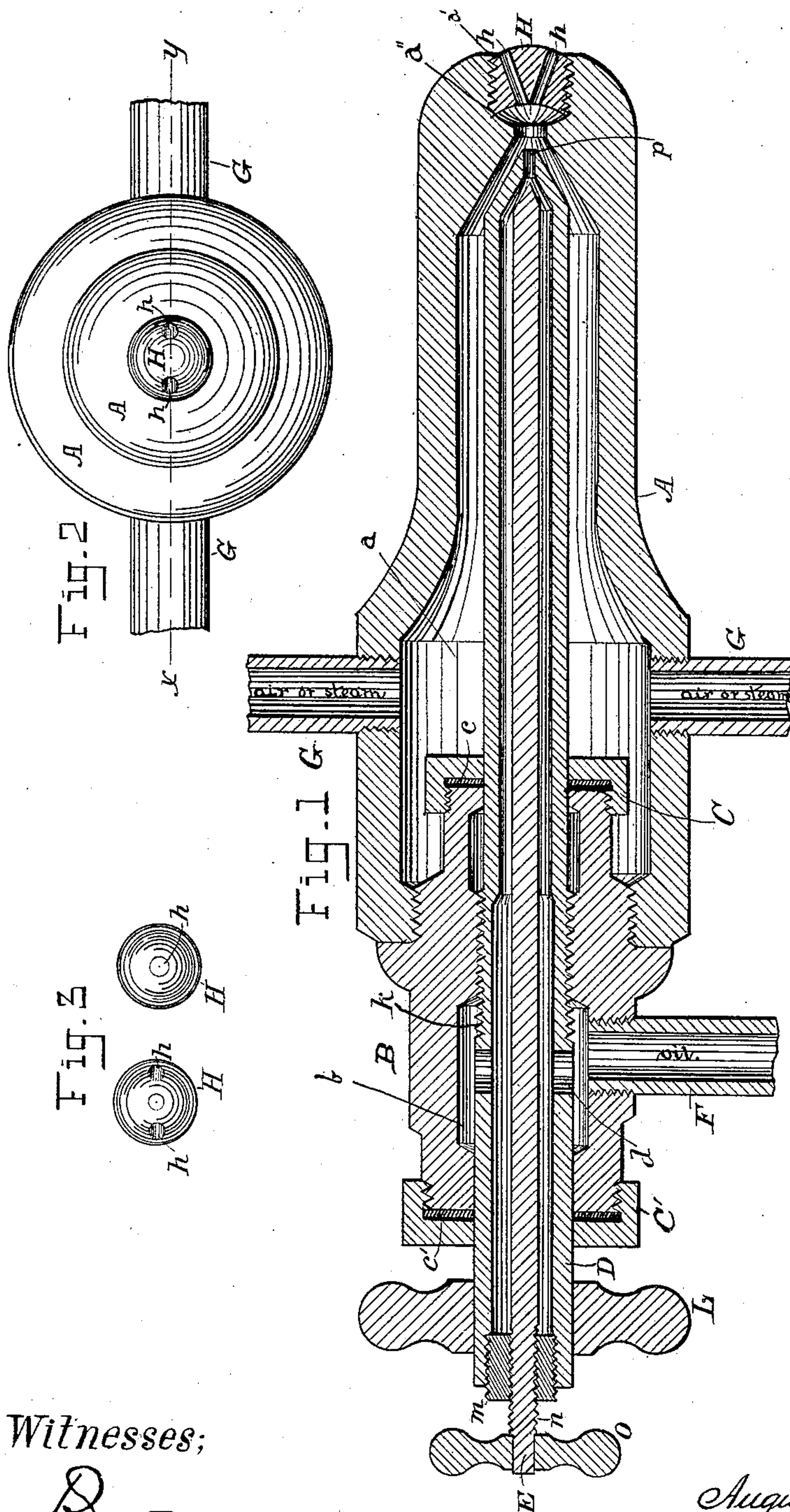


2 Sheets—Sheet 1.

OIL BURNER.

Patented May 12, 1891.



Inventors;

Augustus W. Page
Daniel A. Stewart

by *C. M. Vance* Atty.

(No Model.)

2 Sheets—Sheet 2.

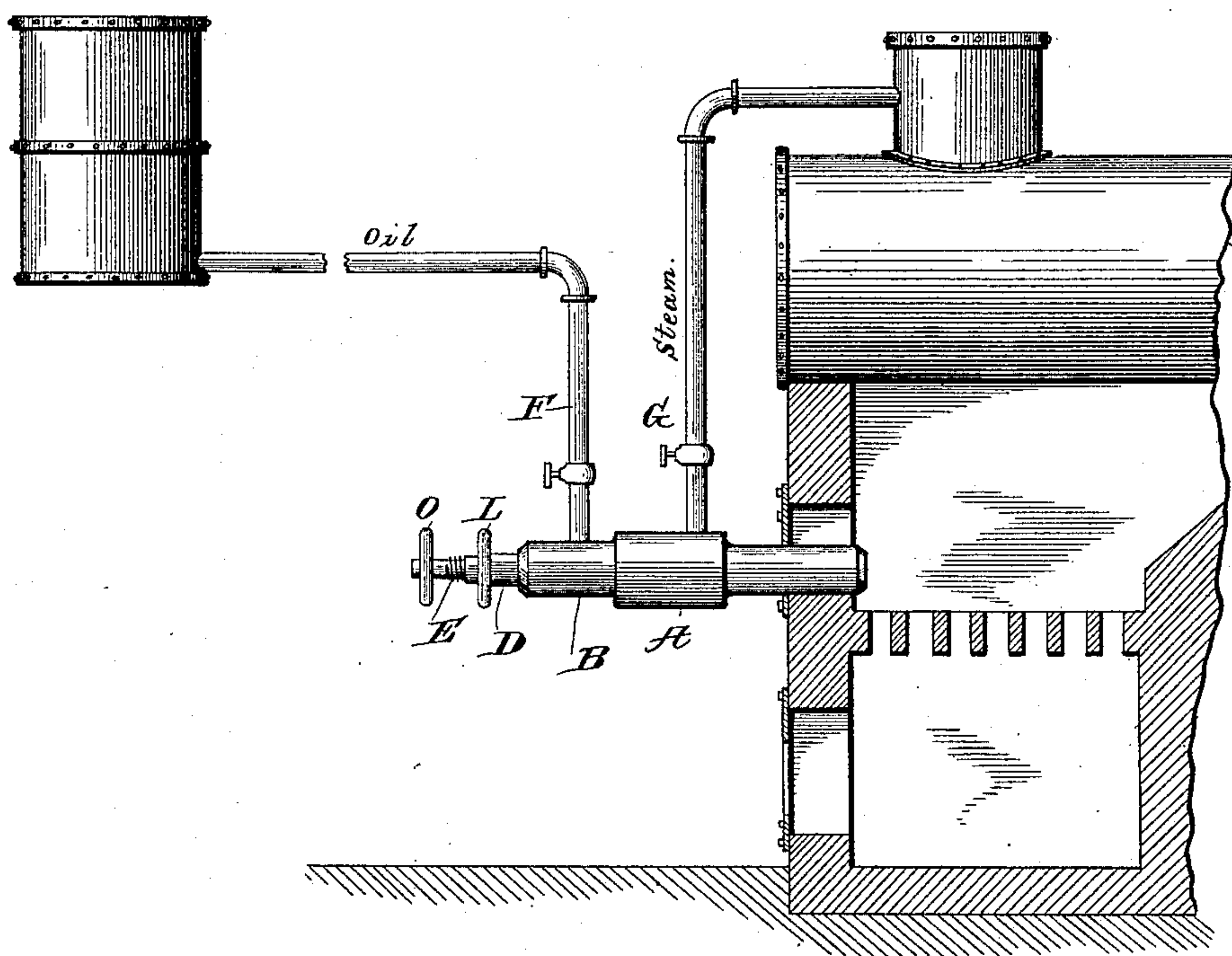
A. U. PAGE & D. A. STEWART.

OIL BURNER.

No. 452,314.

Patented May 12, 1891.

Fig. 4



Augustus U. Page
and David R. Stewart

Witnesses

J. A. Tauberschmidt,
O. H. Buddong

Inventors

By Chas. J. Stockman
their Attorney

UNITED STATES PATENT OFFICE.

AUGUSTUS U. PAGE AND DANIEL A. STEWART, OF CLEVELAND, OHIO;
SAID STEWART ASSIGNOR TO SAID PAGE.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 452,314, dated May 12, 1891.

Application filed October 15, 1888. Serial No. 288,073. (No model.)

To all whom it may concern:

Be it known that we, AUGUSTUS U. PAGE and DANIEL A. STEWART, citizens 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; 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.

The object of our invention is to produce an oil-burner at once economical in construction and in the use of oil and which can be readily adapted to different uses and modes of operation; and our invention consists in the construction and arrangement of parts hereinafter described, and specifically pointed out in the claims.

In the drawings, Figure 1 represents a central horizontal longitudinal section of a burner constructed according to our invention, the section being taken on the line indicated by *x y* in Fig. 2, which is a front view in elevation of the burner. Fig. 3 is a plan view showing various modifications of construction of the plug H, hereinafter described. Fig. 4 is a view in elevation of the burner in place under the boiler.

The burner consists, essentially, of a tubular shell somewhat flask-shaped for most purposes, into the rear end of which is threaded a nipple or sleeve technically known as a "center piece," and into the front end or tip of the shell is threaded a nozzle or vent-plug suitably perforated to direct the emitted spray of oil or gas. The sleeve or center piece bears at one part an internal thread and at one part is recessed within to form an oil-space. Each end of the sleeve is provided with a perforated cap so threaded to the sleeve that packing may be interposed to form stuffing-boxes. Through the sleeve passes an oil-pipe conical at its tip to fit into the outlet of the shell and pierced by a small opening for emitting oil. The oil-pipe bears an external thread engaging the internal thread of the sleeve and passes smoothly through the stuffing-boxes formed by the caps at each end of the sleeve. The outer end of the oil-pipe bears a hand-wheel

for turning it and is closed by a cap or bushing, through which is threaded a cone-pointed rod extending through to the tip of the oil-pipe, forming a plug-valve, which seats in the opening at the end of the oil-pipe, the projecting end of the rod bearing a thumb-piece or hand-wheel to turn it. An oil-supply pipe is tapped into the sleeve at the recessed part, and the oil-pipe is perforated at this point. A supply-pipe is tapped into one or more sides of the outer shell and connected with an air-supply or steam-supply, as desired.

In the drawings, A designates the outer shell, having within it a chamber *a*, formed with a cone-shaped forward end and at its forward extremity with a recess *a'*, having threaded wall and communicating through an opening *a''* with chamber *a*. The rear end of this chamber *a* is preferably of greater diameter than the other parts thereof, and opening into said enlarged end are the air or steam supply pipes G G, which are provided at any suitable points with cocks or valves for regulating the admission of air or steam therethrough. Secured to the rear end of this shell A and extending forward into the chamber *a* therein, and also extending rearward of said shell, is a sleeve or center piece B, which closes the rear end of said shell. At opposite ends of said center piece are perforated caps C C', and interposed between the inner surfaces of said caps and the ends of said center piece are packing-rings *c c'*. The office of these caps and rings is to form an oil-tight joint around the oil-pipe D, which is formed with external threads *k*, engaging internal threads on said center piece, and has a cone-shaped forward end or tip formed with an opening *p*, through which the oil escapes into the forward conical end of the chamber *a*, contiguous to the opening *a''* in the shell A. This oil-pipe D is provided outside the center piece B with a hand-wheel L, by means of which it is moved longitudinally, whereby it is capable of acting as a valve to regulate the emission of air or steam from the shell A. The center piece B is formed with an internal recess *b*, which communicates with the interior of oil-pipe D through openings *d*, formed in said oil-pipe, and opening into said

recess *b* is an oil-supply pipe *F*, having at a suitable point a cock or valve (not shown) for regulating the passage of oil through it.

E designates a solid rod, which is provided at its rear end with a hand-wheel or thumb-nut *O* and formed near said end with external screw-threads *n*, which engage corresponding screw-threads formed in the wall of an opening extending through a bushing *m*, said bushing being inserted within the outer end of the oil-pipe *D* and having threaded engagement therewith. This rod *E* extends, as shown, through said bushing within said oil-pipe, is longitudinally movable within the latter by means of its thumb-nut or hand-wheel *O*, and has screw-threaded engagement with bushing *m*, and its forward end or tip is cone-shaped, whereby it is adapted to act as a valve to regulate the flow of oil through opening *p* in the oil-pipe. The function of the bushing *m* is obviously to close the outer end of the oil-pipe *D*. Instead of said bushing we may use a cap, and, if necessary, a stuffing-box may be provided around the rod *E* at the outer end of pipe *D*.

H designates a vent-plug or nozzle perforated with one or more holes *h* to direct the spray of oil or gas emitted from the burner. This vent-plug *H* is removably located within the recess *a'* in the forward end of the shell *A* and has screw-threaded engagement with the walls thereof. In assembling the parts of the burner the rod *E* is first threaded through the cap or bushing *m* and the bushing, with rod in place, screwed into pipe *D*. The pipe *D*, with rod and bushing in place, is now passed through the sleeve *B* until the thread *k* engages the thread within the sleeve and screwed nearly home. The cap *C* and packing-ring *c* are then slipped over the pipe *D* and the cap screwed onto sleeve *B*, which is then passed into the shell *A* and screwed home, interposing packing between the flange of sleeve *B* and the end of shell *A*, if required; but this we have not found necessary. The cap *C'* and packing-ring *c'* are now passed over the projecting end of pipe *D* and the cap screwed home. The hand-wheel *L* is put on pipe *D* and screwed rigidly in place by set-screw or other fastening, and the hand-wheel or thumb-nut *O* is then secured upon the end of rod *E* and the burner is ready to be connected for use.

The burner may be operated by either steam or air, the latter being preferred. If steam is to be used, the plug *H* is omitted or removed, and the pipes *G*, one or both, are connected with the steam-supply, and preferably with a superheater. If air is to be used, the plug *H*, having such number of holes and so arranged as may suit the particular work to be done is screwed in place. One or both of pipes *G* are connected with an air-blower or a supply of compressed air. When but one of pipes *G* is used, the other is of course closed or replaced by a solid plug.

The oil-supply pipe *F* is connected with a

supply of oil under pressure either of a pump or of steam or air pressure, and the burner is set so that only its tip projects within the fire-box or furnace. To operate the burner the pipe *D* and rod *E* are first screwed home. Air or steam, as the case may be, and oil are then turned on in the supply-pipes *G* and *F* by means of their respective valves, thus filling the shell *A* with air and the pipe *D* with oil through the holes *d*, both air and oil being under pressure. The pipe *D* is first slightly withdrawn and then the rod *E*, which allows the oil to escape from pipe *D* and, mingling with the air escaping around the pipe *D*, to form a spray of oil and air partially passing into vapor as the heat increases, which mingled spray of oil, air, and vapor issues through the holes *h* and is thereby directed as required; or if the plug *H* is not used the emitted spray issues as a conical cloud of spray and vapor, and in either case burns close up to the burner and with great diffusion of flame, giving a very equal distribution of heat. The amount of flame is capable of very exact regulation by means of the threads on pipe *D* and rod *E*, whereby the relative proportions of oil and air or oil and steam can be adjusted and maintained with the utmost nicety and far more easily than by means of valves in the various supply-pipes. The holes *h* in the nozzle-plug *H* may be of any size or number and drilled in such direction as to throw the flame directly forward, upward, or sidewise, while the burner itself is set straight; but for most purposes we prefer either two or three diverging holes placed in the same horizontal line, as shown in Figs. 2 and 3. One plug can be removed and another substituted with the utmost facility when required.

In case a very intense heat is required we prefer to use heated air, and in some cases to also heat the oil, which we do by passing the supply-pipes of both air and oil through a heater before entering the burner. A coil or return-bend placed in the furnace or fire-box in front of the burner accomplishes this heating in a very satisfactory manner; but any other proposed means may be used.

What we claim, and desire to secure by Letters Patent, is—

1. An oil-burner comprising the following parts in combination: a shell having an interior chamber formed with a conical forward end and communicating with a source of air or steam supply, said shell also having in its foremost extremity a recess communicating with said chamber through an opening in said shell, a center piece closing the rear end of said shell, itself closed at its ends and formed with an interior oil-chamber communicating with a source of oil-supply, a longitudinally-movable oil-pipe communicating with said oil-chamber, passing through said center piece into said shell, and having a conical end, said oil-pipe being closed at its rear end and serving both for the passage of oil and to regulate the emission of air or steam

from the shell, a longitudinally-movable rod within said oil-pipe, having a conical end for regulating the flow of oil through the opening in the conical end of said oil-pipe, and a vent-plug or nozzle formed with an opening or openings and removably located within the recess in the foremost extremity of said shell.

2. An oil-burner comprising the following parts in combination: a shell having an interior chamber communicating with a source of air or steam supply and formed at its foremost extremity with a recess communicating with said chamber through an opening formed in said shell, a center piece or sleeve projecting into the rear end of said shell and closing the same, said sleeve having an oil-chamber outside the shell communicating with a source of oil-supply, perforated caps screwed to the ends of said center piece and forming stuffing-boxes, an oil-pipe longitudinally movable within said center piece and shell screwed into said center piece, passing through said caps, and formed with lateral openings opposite the oil-chamber in said center piece, means for closing the outer end of said oil-pipe, formed with an opening having screw-threaded wall, a longitudinally-movable rod having a screw-threaded part engaging the screw-threads in said closing means, and a vent-plug or nozzle having openings and removably located within the recess in the foremost extremity of the shell, all substantially as described, and for the purposes specified.

3. An oil-burner comprising the following parts in combination: a shell formed with an interior chamber having an enlarged rear end and a conical forward end and also formed forward of the conical end of said chamber

with a recess communicating with said conical end of the chamber through an opening formed in said shell, air or steam supply pipes opening into said enlarged part of said chamber, a center piece or sleeve projecting into the rear end of said shell and closing the same, said sleeve having an oil-chamber outside said shell, an oil-supply pipe opening into said oil-chamber, perforated caps screwed to the ends of said sleeve, packing-rings interposed between the inner surfaces of said caps and the ends of said sleeve, an oil-pipe longitudinally movable within said sleeve and shell screwed into said sleeve, passing through said caps and packing-rings, having a conical forward extremity formed with a narrow opening and formed opposite the oil-chamber in said sleeve with lateral openings, means for closing the outer end of said oil-pipe, having a central longitudinal opening with screw-threaded walls, a hand-wheel on the outer end of said oil-pipe, a solid rod having screw-threads on its rear end for engaging the screw-threads in said closing means and a conical forward end, said rod being longitudinally movable within said oil-pipe, a hand-wheel or thumb-nut on the outermost extremity of said rod, and a perforated vent-plug or nozzle removably located within the recess in the foremost extremity of the shell, all substantially as shown, and for the purposes specified.

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

AUGUSTUS U. PAGE.
DANL. A. STEWART.

Witnesses:

J. V. MATHIORT,
L. PRENTISS.