J. A. DARST & M. BRITTAIN.

HYDROCARBON BURNER.

APPLICATION FILED OCT. 15, 1910.

999,098. Patented July 25, 1911.

Fig. 1.

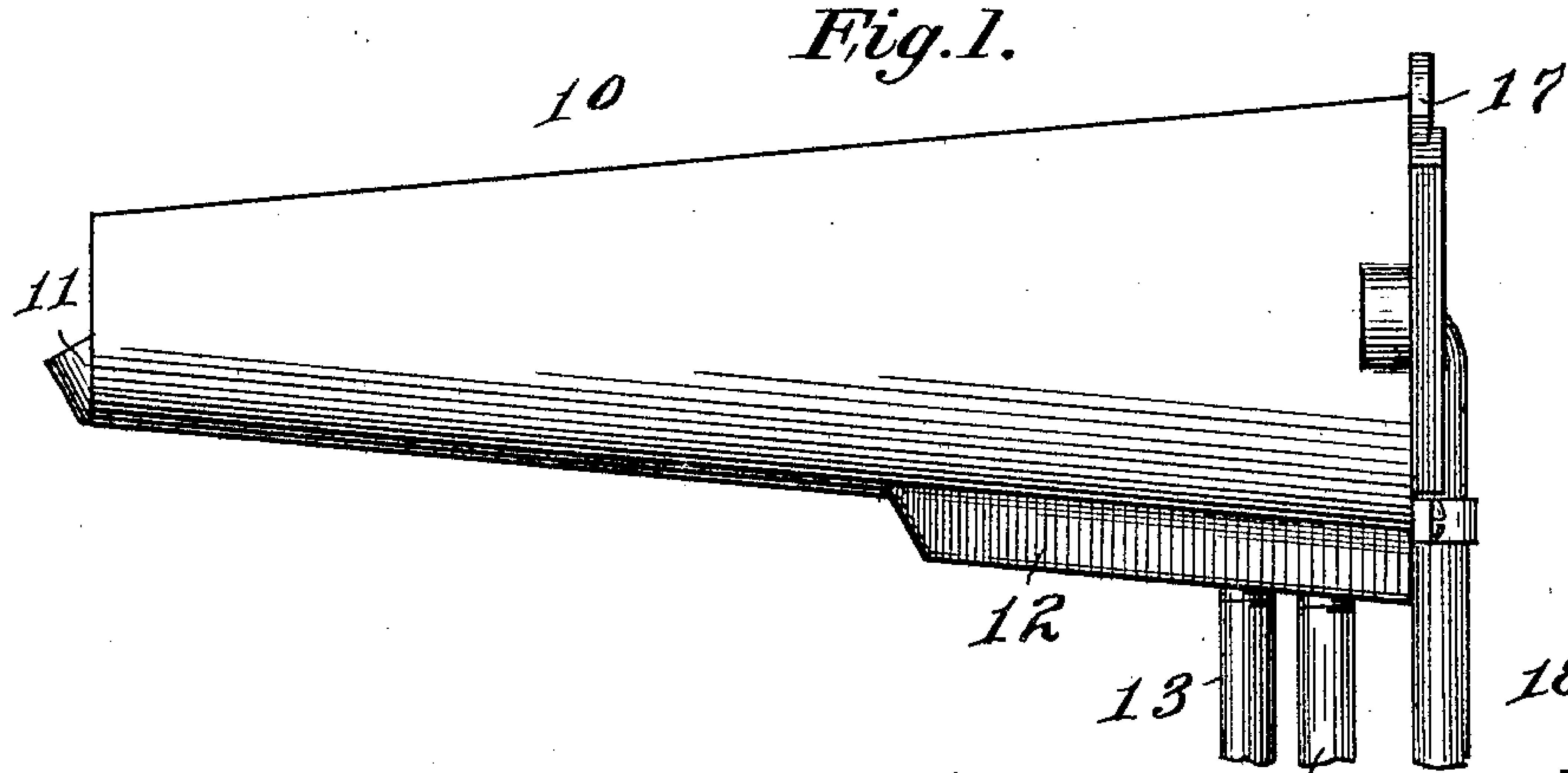


Fig. 2.

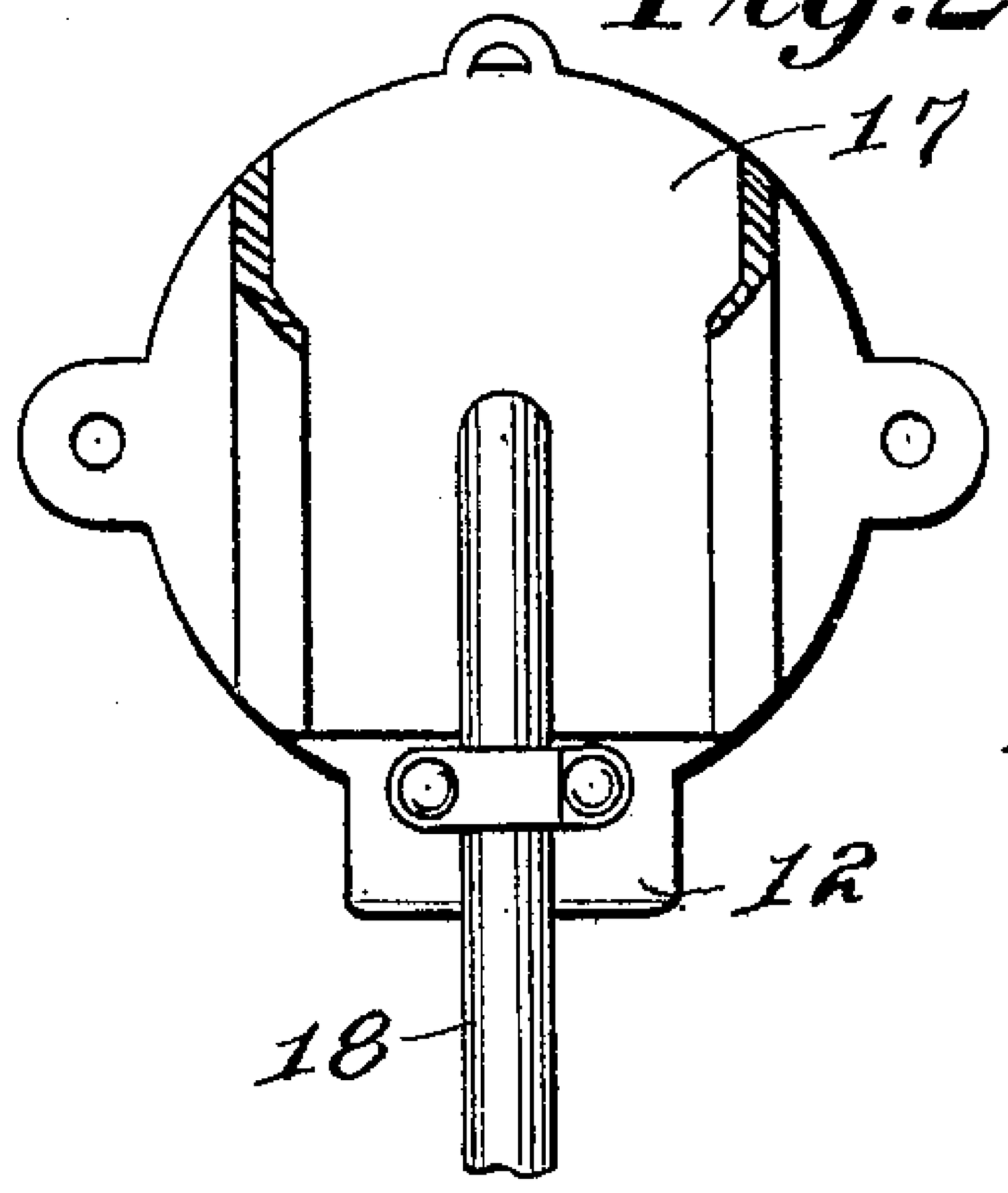


Fig. 3.

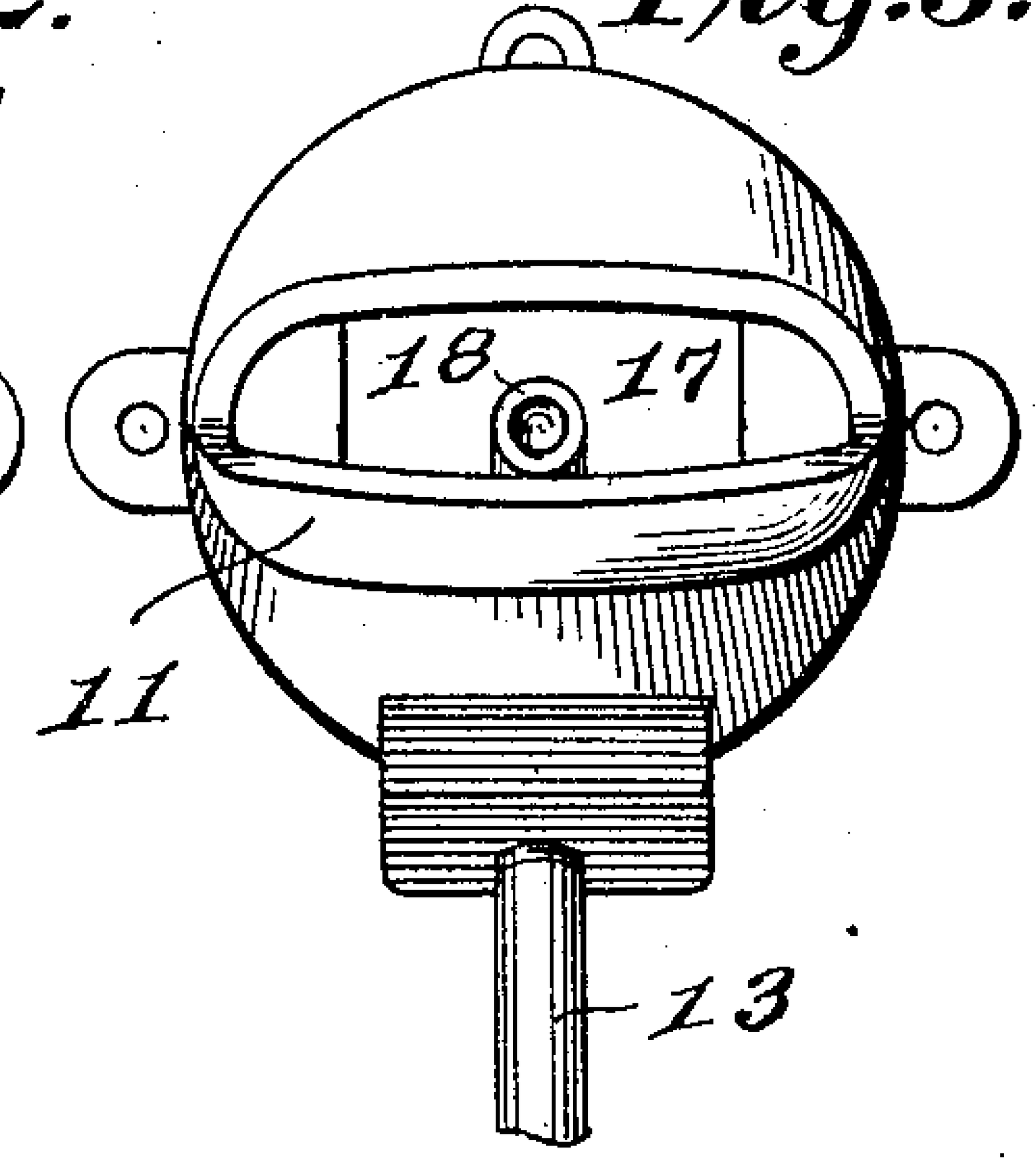


Fig. 4.

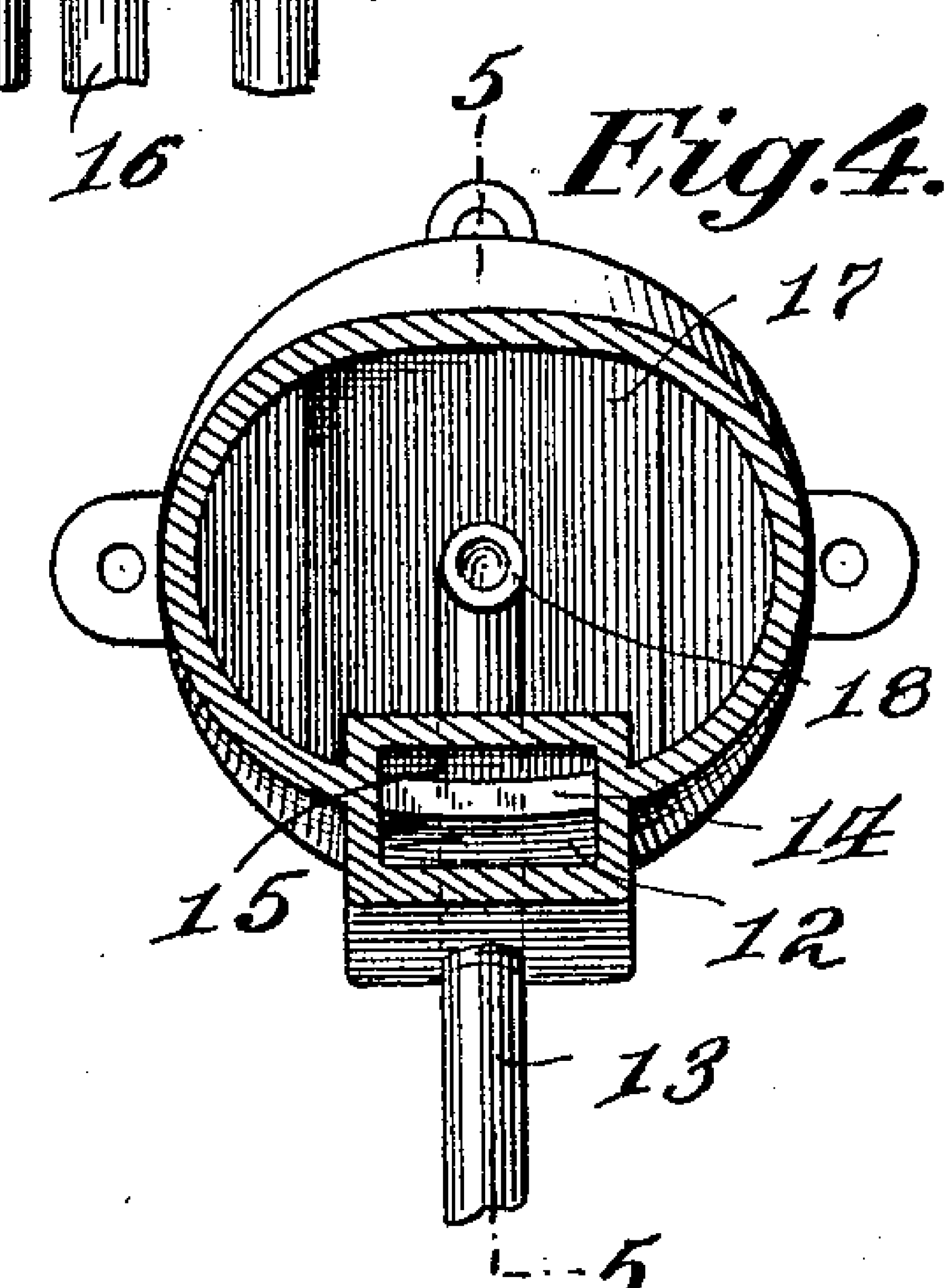
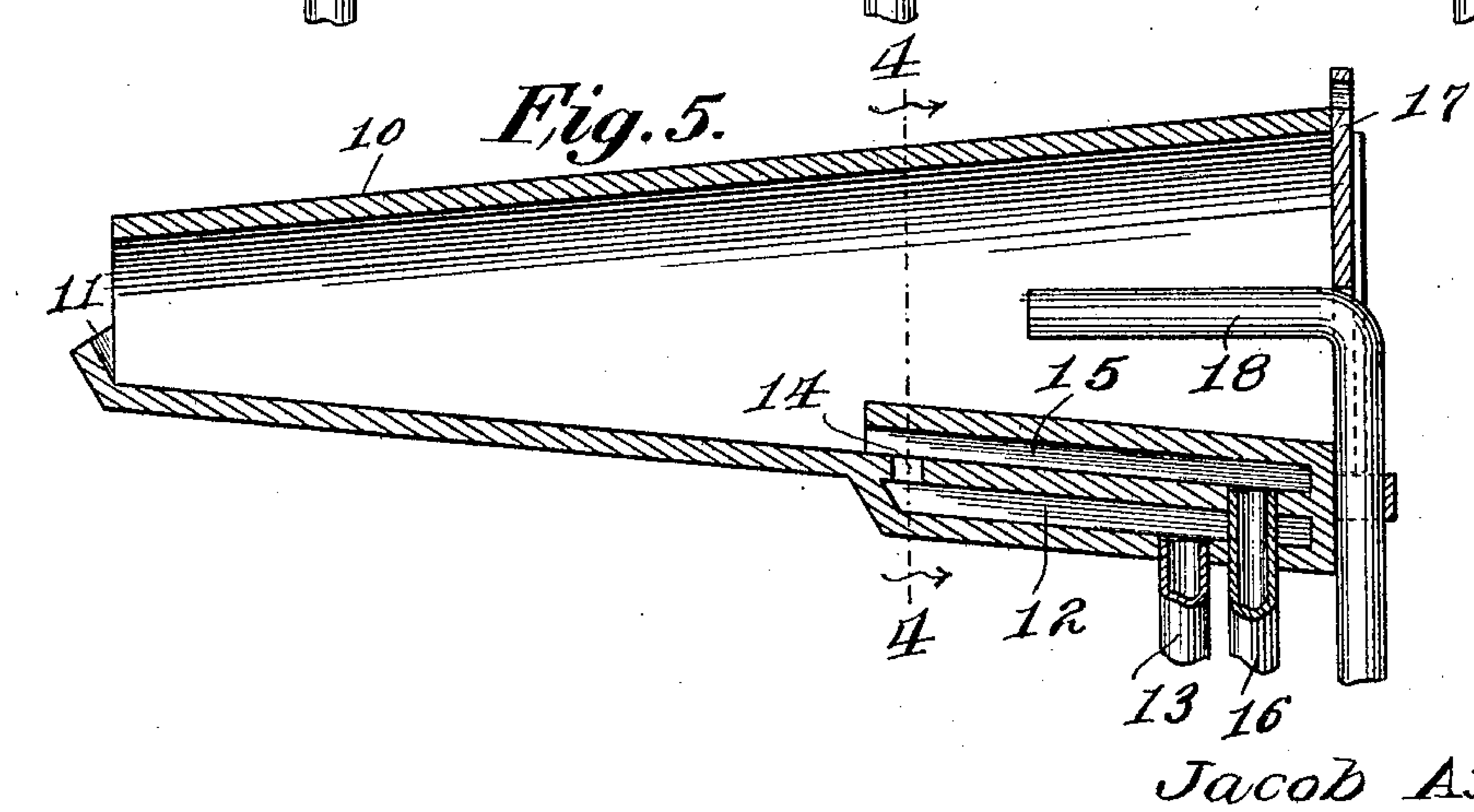


Fig. 5.



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UNITED STATES PATENT OFFICE.

JACOB A. DARST AND MONROE BRITTAIN, OF CALDWELL, KANSAS.

HYDROCARBON-BURNER.

999,098. Specification of Letters Patent. Patented July 25, 1911.

Application filed October 15, 1910. Serial No. 587,321.

To all whom it may concern:

Be it known that we, JACOB A. DARST and MONROE BRITTAIN, citizens of the United States of America, residing at Caldwell, in the county of Sumner and State of Kansas, have invented new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

The invention relates to liquid fuel burners and more particularly to the class of hydrocarbon burners, especially adapted for use in boiler and locomotive furnaces.

The primary object of the invention is the provision of a burner of this character in which liquid fuel will be distributed for the proper burning thereof and also that it will be thoroughly mixed with a flow of air and steam for the spraying of the liquid fuel and at the same time assuring the consumption of gases, thereby preventing the throwing off of such gases and smoke.

Another object of the invention is the provision of a burner of this character in which oil, air and steam will be thoroughly mixed for expanding and forcing the oil from a spray for the burning thereof, the air induced into the burner being heated as it comes in contact with the steam, hence obviating cold air reaching the flame that necessarily would cool the gases below igniting point, thus assuring a perfect mixture of carbon, hydrogen and hot air at atmospheric pressure and obviating the throwing off of the gases and also at the same time eliminating smoke with a great saving in fuel.

A still further object of the invention is the provision of a burner of this character which is simple of construction, thoroughly reliable and efficient in operation and inexpensive in manufacture.

With these and other objects in view, the invention consists in the construction, combination and arrangement of parts, as will be hereinafter more fully described, illustrated in the accompanying drawing and pointed out in the claims hereunto appended.

In the drawing,—Figure 1 is a side elevation of a burner constructed in accordance with the invention. Fig. 2 is a rear elevation thereof. Fig. 3 is a front elevation. Fig. 4 is a transverse sectional view on the line 4—4 of Fig. 5. Fig. 5 is a longitudinal sectional view through the burner.

Similar reference characters indicate corresponding parts throughout the several views in the drawing.

Referring to the drawing by numerals, the burner comprises a nozzle body 10, the same being forwardly tapered and flattened at opposite sides of its delivery end, the body being preferably constructed from metal and may be of any desirable length and shape. The delivery or igniting end of the nozzle 10 is provided with an upturned forwardly inclined deflector lip 11, the same being for a purpose as will be hereinafter more fully described.

Formed exteriorly of the nozzle 10 and extending longitudinally thereof from its rear end is an oil inner chamber 12, the latter having communication with an oil supply pipe 13 opening into the same at the rear end thereof and which leads from any suitable oil reservoir, (not shown). Provided in the bottom of the nozzle 10 is a transverse slot 14, the same establishing communication from the oil chamber 12 with the interior of a steam chamber, as will be hereinafter described so that oil from the chamber 12 may be fed into the nozzle.

Formed interiorly of the nozzle 10 above the oil chamber 12 is a steam chamber 15, the wall of which extends beyond the slot 14 and opens directly into the nozzle 10 beyond the said slot 14, and communicating with this chamber 15 at its rear end is a steam supply pipe 16, the latter receiving its source of supply from any suitable means, and on the injecting of steam through the chamber 15 into the nozzle 10 the said steam expands the oil delivered from the oil chamber 12 into the chamber 15 and forces it in a spray against the deflector lip 11 prior to the discharge of the commingled oil and steam from the nozzle for the ignition thereof.

Suitably mounted at the rear end of the nozzle 10 is a damper plate 17, the latter capable of being regulated to control the supply of atmospheric air into the nozzle 10, the atmospheric air being drawn into the nozzle through the medium of the steam let into the said nozzle from the steam chamber 15 therein. Passed through the damper plate 17 is an injector tube 18, the same being extended for any suitable distance within the nozzle 10 and has communication with any suitable source of air supply. This injector tube 18 serves to induce a central draft through the nozzle 10 so that air

drawn into the latter will thoroughly mix with the oil and steam entering the nozzle, thereby perfecting a thorough mixture of oil, air and steam for the proper burning of the fuel and avoiding the throwing off of unburned gases and also eliminating smoke.

It will be evident that the air admitted to the nozzle 10 from its rear end will be heated by the action of the steam let into the said nozzle from the steam chamber 15, thereby preventing cold air contacting with the flame at the burner end of the nozzle. When the steam and oil let into the nozzle from the chambers 12 and 15 contact with the deflector lip 11 they are deflected upwardly across the delivery end of the said nozzle and thereby creating a vacuum within the nozzle, thus increasing the flow of air into the same.

What is claimed is:—

1. A burner of the class described, comprising a nozzle having an external oil chamber, and an internal steam chamber, the said nozzle being provided with a slot establishing communication between the oil and steam chambers, the said steam chamber being extended beyond the said slot and communicating with the interior of the nozzle, an injector tube leading into the nozzle from the rear end thereof, and means for opening and closing the rear end of the nozzle.

2. A burner of the class described, comprising a nozzle having an external oil chamber, and an internal steam chamber, the said nozzle being provided with a slot establishing communication between the oil and steam chambers, the said steam chamber being extended beyond the said slot and communicating with the interior of the nozzle, an injector tube leading into the nozzle from the rear end thereof, and means for opening and closing the rear end of the nozzle, the said means being provided with a slot for accommodating the said injector tube.

3. A burner of the class described comprising a nozzle having an external oil chamber and an internal steam chamber, the said nozzle being provided with a slot establishing communication between the oil chamber and the steam chamber, the said steam chamber being extended beyond the said slot and communicating with the interior of the nozzle, an injector tube leading into the nozzle from the rear end thereof, a deflector lip arranged at the delivery end of the nozzle, and a damper arranged at the rear end of the nozzle for controlling the admission of atmospheric air thereto.

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

JACOB A. DARST.
MONROE BRITTAIN.

Witnesses:
BERT H. SMITH,
GEO. B. SANDNER.