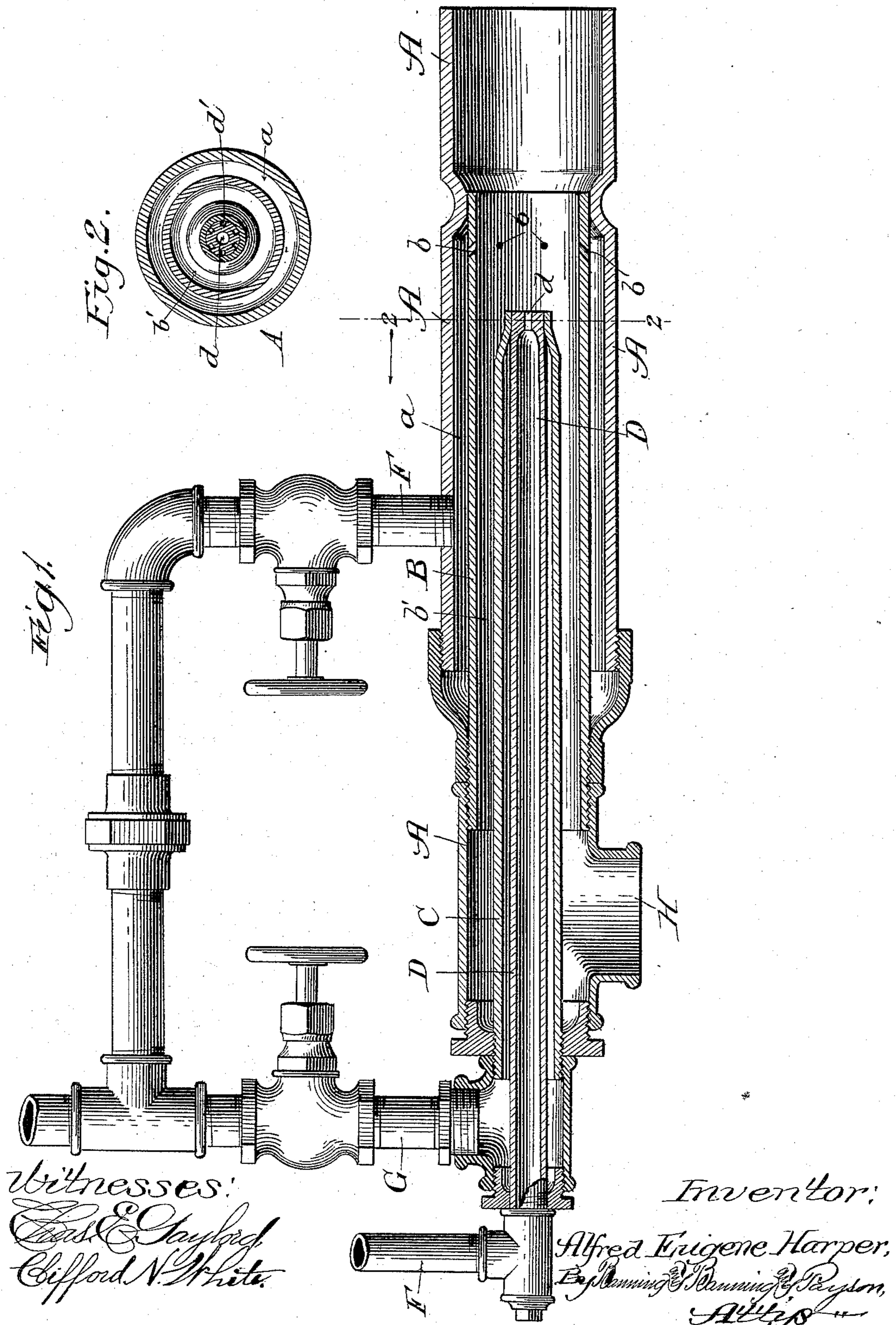


(No Model.)

A. E. HARPER.
OIL BURNER.

No. 488,355.

Patented Dec. 20, 1892.



UNITED STATES PATENT OFFICE.

ALFRED EUGENE HARPER, OF CHICAGO, ILLINOIS.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 488,355, dated December 20, 1892.

Application filed September 23, 1891. Serial No. 406,556. (No model.)

To all whom it may concern:

Be it known that I, ALFRED EUGENE HARPER, of Chicago, Illinois, have invented a new and useful Improvement in Oil-Burners, of which the following is a specification.

The object of my invention is to provide a simple, efficient and economical oil burner for use in furnaces or other places in which liquid fuel is applicable; and the invention consists in the features and combinations hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section of my improved oil burner, and side elevation of other parts; and Fig. 2 is a cross-section taken in line 2—2 of Fig. 1.

A is the outer casing of the burner, and *a* a space for steam under the same; B an inner casing, *b* steam ports or openings therein, and *b'* a space for air thereunder; C a second inner casing forming a steam pipe; D an oil pipe in the steam pipe, *d* an opening or outlet in the end thereof through which oil flows therefrom, and *d'* channels in the outer end circumference through which steam enters and is mingled with the outflowing oil; E, a pipe or inlet for introducing oil, adapted to communicate with a suitable tank or oil supply; F, a pipe for introducing steam into the space between the outer casing and air pipe; G, a pipe for introducing steam into the main steam pipe, and H an opening or inlet for introducing heated air into the air pipe.

In the use of oil burners, the velocity of the jet of mingled steam and oil has heretofore been so great as to render it difficult to control the heat at the point immediately in front of the burner, which has rendered the use of combustion chambers necessary, caused an undue consumption of fuel, and produced an irregular heating of the material immediately in front of the burners,—as for instance, steel billets, blooms or ingots. The object of my invention is to overcome or remove these objections by regulating or retarding the velocity of the flame.

In constructing my improved oil burner I provide a pipe of suitable size and length, and means for introducing oil into the same from an oil supply, of any suitable kind or location. This oil supply may be so placed as to permit the oil to flow into the pipe by gravity, or provision may be made for pump-

ing the oil in as desired, but in all cases, I prefer to have the oil introduced under pressure.

The inner end of the oil pipe, that is, the end farthest from the source of supply, is provided with a suitable opening for the outflow of oil, and preferably with channels in its outer end circumference for the escape of steam from the steam pipe, as hereinafter described. I prefer to have the opening for the outflow of oil diametrically central and relatively small, say as shown in the drawings, and to have the openings for the escape of steam in the form shown, but other equivalent forms may be used, as desired.

The oil pipe is surrounded by a steam pipe of a diameter sufficiently large to leave an annular space around the oil pipe, into which steam flows from a boiler or other source of supply. The inner end of this steam pipe is contracted, so as to come down into close contact with the oil pipe, thus leaving no space for the escape of steam except the channels in the oil pipe. It will of course be understood that the steam flowing out through these channels instantly mingles with the outflowing oil, and causes the atomization necessary to convert the oil into vaporous gas.

I surround the inner steam pipe above described with an air pipe of considerably larger diameter, and provide means for introducing heated air into this pipe. As shown, these means consist of a suitable pipe or conduit adapted to communicate with a chamber containing heated air, and from this chamber the heated air is drawn by the suction or vacuum caused by the issuing of the steam and oil together into the farther end of the air pipe. I also prefer to have this air pipe extend forward of the oil pipe and main steam pipe a sufficient distance to form a suitable expansion chamber. The outer casing is of a diameter sufficient to allow a space around the air pipe for the introduction of steam along at least part of its length, and the steam flowing into this space is permitted to escape into the air pipe through ports or openings at any suitable point in the expansion chamber. I prefer to make these ports or openings in an angle, say, of forty five degrees, so that steam flowing through will pass somewhat crosswise, but still along in the same general direction as the current of mingled

oil, air and steam, and retard the progress or velocity thereof. By thus checking or holding the mingled oil air and steam, they become more thoroughly mingled or atomized.

5 They then pass into an outer and enlarged chamber of the burner, where they still further expand, and from which they flow as a vaporous gas of light velocity.

I claim:—

10 1. In an oil burner, the combination of an oil pipe provided with an opening for the escape of oil and with channels in its outer end circumference, a steam pipe inclosing the oil pipe and closed down upon its end and an air
15 pipe inclosing the steam pipe and extending forward of the oil and steam pipes to form an expansion chamber in front thereof and provided with ports or openings for introducing steam into the expansion chamber, substan-
20 tially as described.

2. In an oil burner, the combination of an oil pipe provided with an opening for the escape of oil and with channels in its outer end circumference, a steam pipe inclosing the oil
25 pipe and closed down upon its end and an air pipe inclosing the steam pipe and extending forward of the oil and steam pipe to form an expansion chamber in the front thereof and provided with diagonal forwardly directed
30 ports or openings for introducing steam into the expansion chamber, substantially as described.

3. In an oil burner, the combination of an oil pipe communicating with a source of oil supply, provided with an opening for the es- 35 cape of oil, and with channels in its outer end circumference, a steam pipe communicating with a source of steam supply, surrounding the oil pipe, and closed down upon its end, and a surrounding air pipe extending forward 40 of the oil pipe and main steam pipe, and provided with means for introducing heated air, substantially as described.

4. In an oil burner, the combination of an oil pipe communicating with a source of oil 45 supply, and provided with an opening for the escape of oil and with channels in its outer end circumference, a steam pipe communicating with a source of steam supply surrounding the oil pipe and closed down upon 50 its end, an air pipe provided with means for introducing heated air, and a surrounding steam pipe communicating with a source of steam supply, the air pipe extending forward of the oil pipe and main steam pipe, and be- 55 ing provided with ports or openings whereby steam may be introduced into an expansion chamber in front of the end of the oil pipe and main steam pipe, substantially as described.

ALFRED EUGENE HARPER.

Witnesses:

EPHRAIM BANNING,
SAMUEL E. HIBBEN.