No. 708,691. Patented Sept. 9, 1902.

# G. W. ARPER.

## OIL BURNER.

(Application filed May 1, 1901.)

(No Model.)

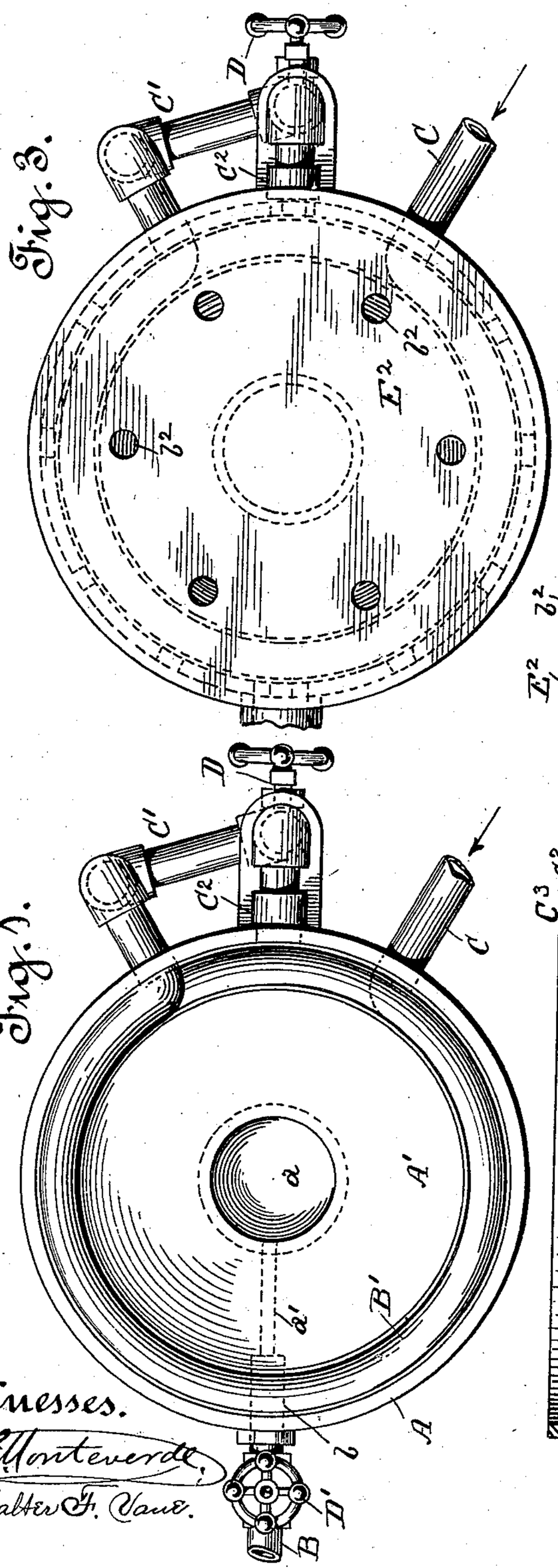


Fig. 3.

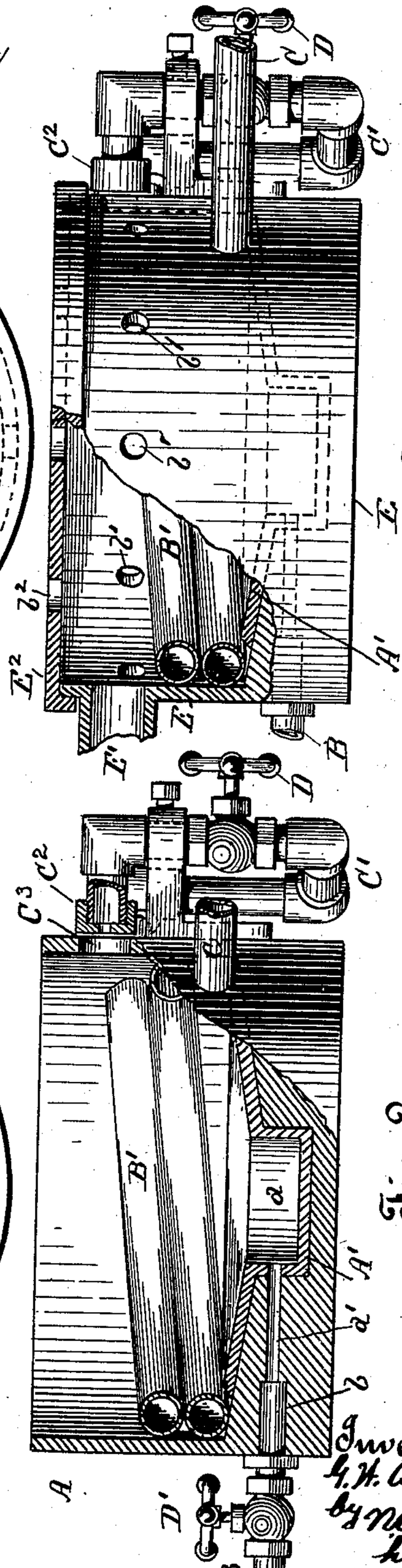


Fig. 4.




Fig. 1.




Fig. 2.

Witnesses.
F. C. Monteverde.
Walter F. Vane.

Inventor.
G. W. Arper
by Wallace,
his atty

# UNITED STATES PATENT OFFICE.

GEORGE W. ARPER, OF OAKLAND, CALIFORNIA.

## OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 708,691, dated September 9, 1902.

Application filed May 1, 1901. Serial No. 58,282. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. ARPER, a citizen of the United States, residing at Oakland, county of Alameda, State of California, have invented certain new and useful Improvements in Oil-Burners; and I do hereby declare the following to be a full, clear, and exact description of the same.

The present invention relates to a certain new and useful device for the burning of oil, and more especially adapted for the burning of crude oil of that character known as "California petroleum;" and the main object of the invention is to produce a burner which may be used in connection with the utilization of oil as a fuel for stoves or heating purposes generally.

A further object of the invention is to produce an oil-burner which will permit of perfect combustion and which will provide against the jet-orifices becoming clogged by the oil and steam passing therethrough.

In the ordinary oil-burner the superheated steam and oil is mixed within a suitable mixing-chamber prior to being ejected from the burner for ignition. It is this intermixing prior to ignition that the present invention aims to dispose of.

To comprehend the invention, reference should be had to the accompanying sheet of drawings, wherein—

Figure 1 is a top plan view of an oil-burner adapted for use in connection with oil-burning stoves. Fig. 2 is a side view thereof, partly in section. Fig. 3 is a plan view of the oil-burner adapted for blast-flame purposes; and Fig. 4 is a side view thereof, partly broken away.

In the drawings the letter A is used to indicate the oil-receiving receptacle, the bottom of which in the present case is made sloping and provided with a central countersunk portion *a*. The shape, size, or construction of the receiving-receptacle is immaterial, as this will vary in accordance with the use to which the burner is applied. Within the receptacle is fitted a removable false bottom A′. The object of this false bottom is to enable the receptacle to be readily cleaned and any carbon formed by the burning of the oil to be removed. For this purpose it is only necessary to lift the said bottom from within the receptacle. Still, if desired, this feature may be omitted and the receptacle cleaned in any suitable manner. The lower portion of the oil-receptacle is cast considerably thicker than its upper portion, and through the side wall of the receptacle is formed an oil passage-way *b*, with which connects an oil-supply pipe B. This pipe leads from any suitable source of supply, as an oil-tank located at any convenient distance from the burner. The oil passage-way is somewhat reduced to its inner end portion *a*′ and communicates with the open bottom of the receptacle. The oil thus flowing from the supply-pipe B enters the bottom of the open-top receptacle A through the said passage-way. Preferably inside of the receptacle is spirally arranged or coiled the water-back B′. Instead of the water-back being arranged within the receptacle the upper portion of said receptacle may be water-jacketed. To one end of this water-back is coupled the water-supply pipe C, which connects with the water-supply. The opposite end of the coiled water-back is by means of the coupling C′ connected with the nozzle $C^2$ in alinement with an opening $C^3$ in said receptacle. The coupling C′ is provided with the hand-valve D and the oil-supply pipe with hand-valve D′. When the burner is to be used in connection with a stove, in order to convert same into an oil-burning stove the receptacle A is fitted within the fire-box thereof. In such case the water-supply pipe and oil-supply pipe will extend through the walls of the stove, likewise that of coupling C′.

In Figs. 3 and 4 of the drawings the oil-receptacle E is illustrated as being formed with an extension E′, which is preferably of circular form and open at each end. The wall of the receptacle is formed with a series of air-inlet holes *b*′, and the cover $E^2$ is formed with air-openings $b^2$. This construction is employed where it is desired to employ a blast-flame, for instance, for use as a torch or where it is desired to direct the flame a distance outward. The arrangement of the remaining parts of the burner is the same as that previously described.

In operation the valve of the oil-supply pipe is opened so as to admit of a small quantity

of oil flowing into the bottom of receptacle A, which oil is ignited by dropping a lighted piece of paper or waste therein. During the consumption or burning of this oil, which may be termed the "initial" lighting, the heat thereof quickly warms the water-pipe or coils B′ to such an extent as to generate steam. The valve D is then opened, so as to force the generated steam through the jet-nozzle $C^2$ directly into the flame of burning oil within the receptacle. The steam thus ejected into the flame under pressure supplies the requisite oxygen to produce proper combustion and scatters the flame perfectly. The jet of steam sprayed into the flame impinges against the inner wall of the receptacle A at a point opposite its entrance and is broken or sprayed back into the flame. In this manner an intense heat is created and liability of the passage-ways becoming clogged obviated. After the parts have been adjusted so as the steam admitted is proportionate to the feed of oil it is not required that further attention be given the burner, as its feed of steam and oil is automatic thereafter.

The operation of the form of burner illustrated by Figs. 3 and 4 of the drawings is the same as that previously described, excepting it is required that the cover $E^2$ be removed for the purpose of the initial lighting of the oil. Instead of the steam-jet impinging against the wall of the receptacle E and being sprayed into the flame the jet is directed into the flame and forces the same outward in a compact body through extension E′. In one case the flame is spread by the jet of steam within the receiving-receptacle for the oil and in the other it is forced therefrom in a compact form. In either case the intensity of the flame is due to directing the jet of steam directly into the flame of oil instead of mixing the same therewith prior to ignition.

Obviously the burner may be applied to various purposes and used in connection with the burning of oil as a fuel for machinery generally.

Having thus described the invention, what is new, and desired to be protected by Letters Patent, is—

1. A burner comprising a casing having alined openings through the wall thereof, a removable cover for said casing, an oil-supply at the lower portion of the casing, and a nozzle supported at a point adjacent to one of the openings in the casing and adapted to discharge a jet of steam through said opening into the flame of burning oil and out of the opposite opening to induce the discharge of the burning fuel in the direction of said last-mentioned opening; substantially as described.

2. A burner comprising a casing having an opening through the wall thereof, a pipe having a plurality of coils wound around the interior surface of the wall of the casing, the adjacent coils of said pipe being superposed the one upon the other and the whole constituting a water-back for the fire-chamber, an inlet to said pipe, an outlet therefrom, and a nozzle in communication with said outlet and arranged to discharge a jet of steam through the opening in the casing into the flame of burning oil; substantially as described.

In witness whereof I have hereunto set my hand.

GEORGE W. ARPER.

Witnesses:
N. A. ACKER,
LEE D. CRAIG.