No. 731,133. PATENTED JUNE 16, 1903.

F. SAFFELL.

OIL BURNER.

APPLICATION FILED MAY 15, 1902.

NO MODEL.

Fig. 1.

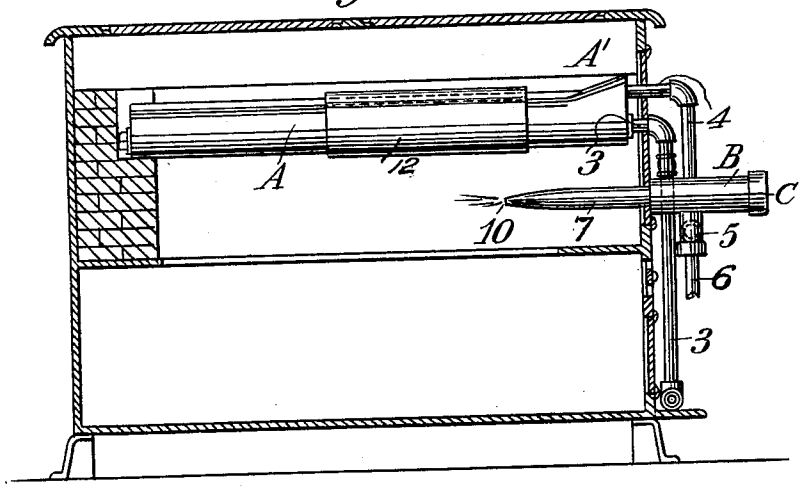



Fig. 2.

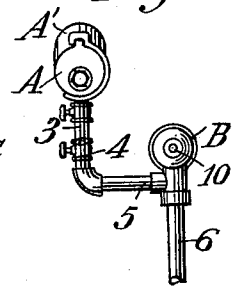
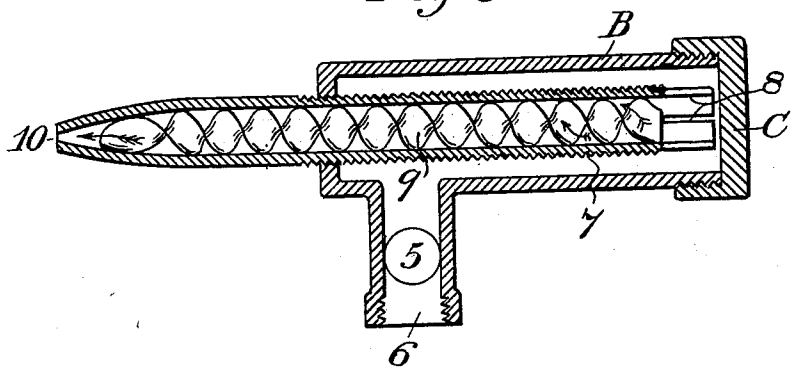



Fig. 3.




Witnesses,

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No. 731,133. Patented June 16, 1903.

# UNITED STATES PATENT OFFICE.

FREDERICK SAFFELL, OF FRESNO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO RICHARD J. POWERS, OF SAN LEANDRO, CALIFORNIA.

## OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 731,133, dated June 16, 1903.

Application filed May 15, 1902. Serial No. 107,381. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK SAFFELL, a citizen of the United States, residing at Fresno, county of Fresno, State of California, have invented an Improvement in Oil-Burners; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a device which is especially designed for the burning of heavy unrefined petroleum-oil in conjunction with steam, and a means for supplying and mixing the steam and oil before it reaches the point of ignition.

It consists in an apparatus adapted to be employed in conjunction with stoves or like heating apparatus, and comprises a device for furnishing the steam, a device into which the steam thus furnished and oil are delivered, and a means for intimately mixing the steam and oil before they arrive at the point of ignition.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a transverse section through the combustion-chamber of a stove, showing my invention. Fig. 2 is a front end view of the apparatus. Fig. 3 is a longitudinal section of the oil-burner.

The device consists of two chambers united in any suitable manner and adapted to be placed with such relation to the stove or heater that one portion is exposed to sufficient heat to generate steam therein. This portion of the apparatus comprises a chamber A, a portion of the length being substantially tubular, and near one end the upper side is extended, so that an end view of this part of the chamber is in appearance a vertical oval, as at A'.

3 is a pipe extending longitudinally through the lower part of the chamber. This pipe serves as an inlet for water, which passes through the pipe and is delivered into the chamber. The water is here turned into steam, which, passing back toward the inlet and deeper end of the pipe A, is discharged through a connection, as shown at 4, and passes from this discharge to the burner-chamber. From the greater depth of the chamber at the point A' this discharge-opening will be located at practically the highest point in the chamber. From the discharge 4 the steam is delivered into a branch 5, which projects from the side of the section B of the apparatus, and oil is also admitted through an opening at 6. The chamber B is closed at both ends and has a tube 7, screwed or otherwise secured centrally within it, extending to the rear end and abutting against the closing-cap C. This tube is of sufficiently smaller diameter than the chamber B to leave an annular space around it, into which space the oil and steam pass and are carried to the rear end of the chamber B. The tube 7 has slits formed in it, as shown at 8, and these slits serve to admit the steam and oil into the interior of the tube 7. Within this tube is formed a spiral passage or passages by means of an interior auger or similar structure, as at 9, so that the oil and steam admitted at the rear end are continually carried around in a spiral manner until they reach the front or discharge end 10 of the pipe 7, which forms the jet or burner, and it is projected sufficiently beyond the end of the chamber B to allow it to discharge the mixed oil and steam at the point where ignition is desired. The tendency of the oil, which is of crude unrefined character, is to adhere to the blades of the spiral 9, while the jet of steam passing through continually washes it off and carries it toward the discharge-opening, the steam and oil thus becoming intimately mixed and in condition to burn. As a result the apparatus does not become clogged, and the combustion takes place continuously at a very short distance from the jet-opening at 10.

In order to protect the generator portion of the apparatus from too intense heat from the burner, I employ a shield or guard 12, which is slidable and adjustable with relation to the generator.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with a steam-generator, of a mixing-chamber connected with an oil-supply and with the outlet from the generator, a burner-tube extending longitudinally through the mixing-chamber, having one end to abut against an inner end wall of the chamber, and provided with means for admitting

the mixed oil and steam, said tube provided with a spiral passage which extends substantially throughout its length, for mixing the components, and having, also, a discharge end projecting beyond the chamber.

2. The combination with a steam-generator, substantially as described, of a chamber connected with the steam-outlet of the generator, an oil-supply pipe connecting with the chamber, an externally-threaded tube extending longitudinally through the chamber having one end in open communication with the interior of the chamber and having its opposite end projecting beyond said chamber, said tube having means for mixing the oil and steam and having a discharge-opening through which the mixed product is delivered to be burned.

3. The combination in an oil-burner of a steam-generator and a mixing-chamber with which the generator is connected, said mixing-chamber having a tube of smaller diameter extending longitudinally through it, means for admitting oil and steam to the chamber, slits through which the mixed oil and steam enter the inner tube, means for mixing said components, and a discharge-opening through which they are delivered to be burned.

4. The combination in an oil-burner of a steam-generator, a mixing-chamber having a tube of smaller diameter extending from one end to the other and having a burner-tip projecting beyond one end, slits in the opposite end, passages by which oil and steam are admitted into the space surrounding the central tube into which they pass through the slits and spirally-disposed passages extending from one end to the other of the interior tube as described.

In witness whereof I have hereunto set my hand.

FREDERICK SAFFELL.

Witnesses:
GEO. H. STRONG,
S. H. NOURSE.