F. I. DU PONT.

OIL BURNING APPARATUS.

APPLICATION FILED NOV. 7, 1919.

1,393,207. Patented Oct. 11, 1921.

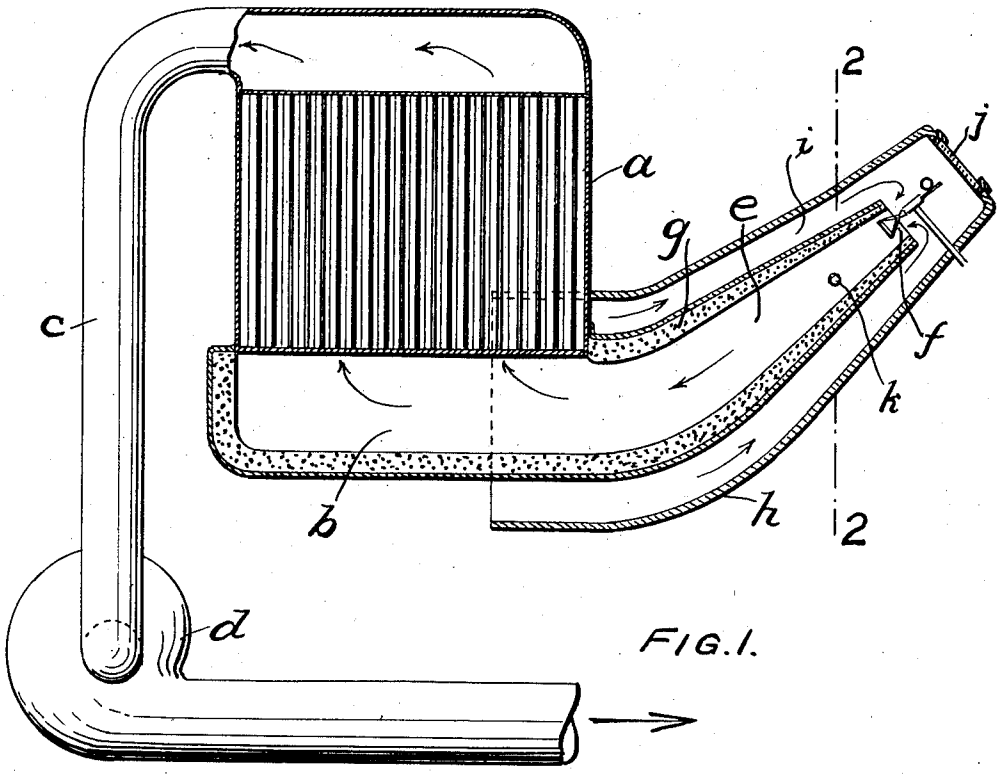


FIG. 1.

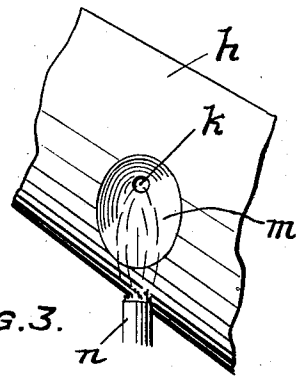


FIG. 3.

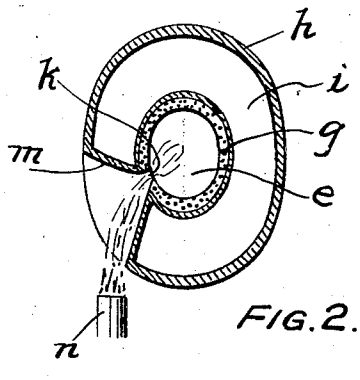


FIG. 2.

WITNESS:

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FRANCIS I. DU PONT, OF WILMINGTON, DELAWARE.

OIL-BURNING APPARATUS.

1,393,207. Specification of Letters Patent. Patented Oct. 11, 1921.

Application filed November 7, 1919. Serial No. 336,359.

To all whom it may concern:

Be it known that I, FRANCIS I. DU PONT, a citizen of the United States, residing at Wilmington, county of New Castle, and State of Delaware, have invented a new and useful Improvement in Oil-Burning Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

The object of my invention is to provide a fuel burning contrivance for use in connection with automobile steam boilers or with furnaces in which oil is burned.

In my invention I provide a construction wherein the oil and air are thoroughly mixed and the complete combustion of the mixture insured, wherein loss of heat by radiation is minimized, wherein the air is preheated prior to admixture with the oil, and wherein the casing of the fuel burning contrivance is maintained relatively cool. The object of my invention is to provide a simple means for readily igniting, and maintaining ignited, the spray of fuel, and to this end the invention comprises a pilot burner located outside a casing connecting the boiler with an air inlet and a fuel sprayer, the flame from the burner being drawn through a hole in the casing by the fluid current flowing through the casing toward the boiler. The invention also comprises a preferable specific construction wherein this conception is embodied.

Figure 1 is a longitudinal section of the fuel burning apparatus applied to the steam boiler of a steam-driven automobile.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a face view of the pilot light opening, shown in Fig. 2.

a is the boiler, which may be of any approved type. *b* is a fire-box. From the boiler *a* extends the waste gas flue *c*, wherein is placed a suction fan *d* that may be arranged to deliver the waste gases to the rear of the vehicle.

From the fire-box *b* extends upward, in an inclined direction, a funnel *e*, affording a passage which is reduced toward its inlet, at or near which is positioned the fuel sprayer, or burner proper, *f*, which may be any known type.

The funnel *e* is lined with fireproof cement *g*. The funnel is inclosed by a casing *h*, which is spaced from the funnel both along the lengthwise extension and at the inlet of the funnel; the concentric air-passage *i* thus formed being open to the atmosphere preferably adjacent to the fire-box.

The circulation of air, produced by the suction fan *d*, takes place in the direction indicated by the arrows. That is, the incoming air flows through the passage *i* and thence, reversing its direction, through the inlet of the funnel *e*, where it flows down past, and mixes with, the jet of oil and thence flows through the funnel to the fire-box.

The described flow of air has several advantageous effects. In the first place, the casing *h* (which may, if desired, be insulated) does not get uncomfortably warm. In the next place, much heat that would otherwise be lost by radiation from the outside of the inner casing is saved, as all the air which passes along the passage *i* is used for combustion in the furnace.

The end of the casing *h*, beyond the inlet to the funnel *e*, is orificed to receive a plate *j* of glass or other transparent or translucent media. The construction of the fuel burning apparatus and the relative location thereto of the glass *j* are such as to permit observation of the flame at all times without discomfort to the observer and without danger from a flash back of the flame, which might occur from any cause, as, for example, the bursting of a tube in the boiler.

To provide a pilot light I have resorted to the following expedient. See Figs. 2 and 3. A hole *k* is located in the wall of the funnel *e* somewhat below the burner and a somewhat funnel shaped or expanding casing *m* connects this hole with the outside of the casing *h*. A small blue flame kerosene burner *n* is so positioned outside the casing *h* relatively to the funnel *m* that the flame will be licked into the funnel *m*. When the fan *d* is in operation, this flame is drawn through the hole *k* and serves to ignite, and keep ignited, the spray of fuel.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. In a liquid fuel burning apparatus, the combination with the boiler, of a casing affording a fuel passage extending toward the boiler and provided with an air inlet, a fuel sprayer in the vicinity of the air inlet, there being a hole in the casing between the boiler and air inlet, and a pilot burner located out-

side the casing and so positioned that the flame thereof is drawn through said hole by the fluid current flowing through said passage toward the boiler.

2. In a liquid fuel burning apparatus, the combination with the boiler, of an inner casing and an outer casing extending away from the boiler and communicating at their far ends, the inner casing affording a fuel passage leading toward the boiler, means to establish a forced draft through said casings successively, a fuel sprayer in the vicinity of the communicating opening between said casings, the inner casing having a hole beyond the fuel sprayer, means affording a funnel-like passage from outside the outer casing converging toward said hole, and a pilot burner so positioned outside the outer casing that the flame therefrom is drawn through said passage and hole into the interior of the inner casing.

3. In a liquid fuel burning apparatus especially adapted to steam-driven automobiles, the combination with the boiler and fire-box, of a waste gas outlet passage, a suction fan arranged therein, an upwardly inclined tapered casing communicating with the fire-box and open at its upper end, a fuel sprayer at the inlet end of said casing, a casing surrounding and spaced from the first casing along the latter's length and at its upper end, there being an air inlet at the fire-box end of the outer casing and a hole in the inner casing in advance of the fuel sprayer, means affording a passage for flame from outside the outer casing to said hole, and a pilot burner positioned to allow the flame therefrom to be drawn through said passage and hole.

In testimony of this invention I have hereunto set my hand at Wilmington, Del., on this third day of November, 1919.

FRANCIS I. DU PONT.