

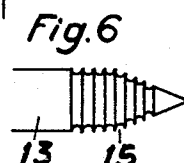
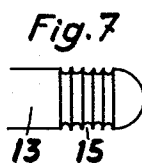
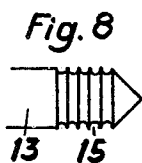
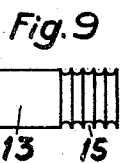
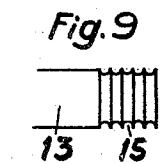
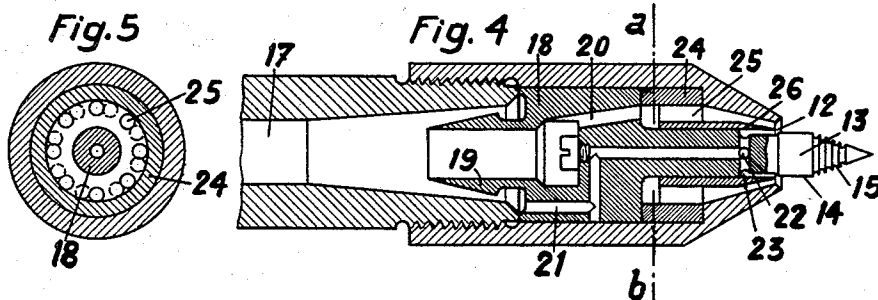
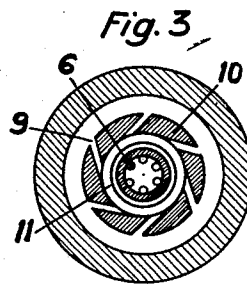
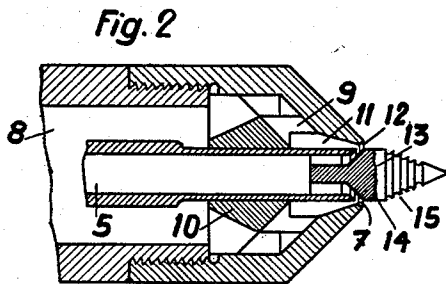
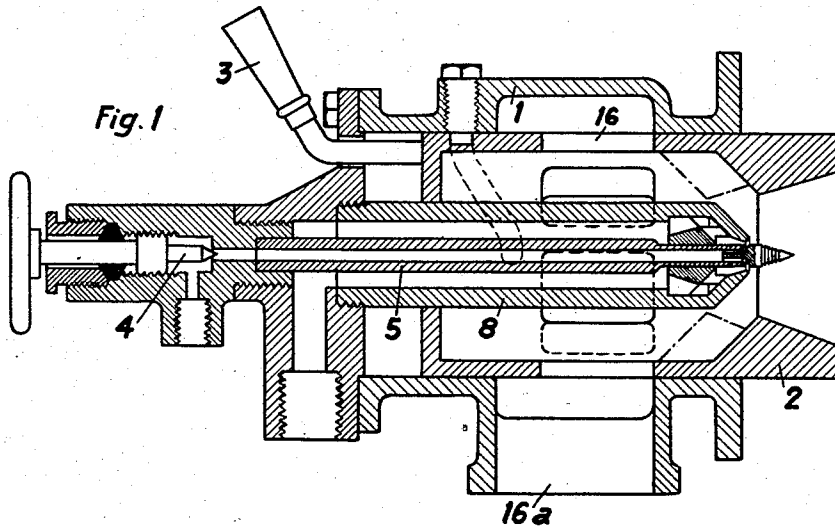
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OIL ATOMIZER

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WITNESSES.

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OIL ATOMIZER

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5 Claims. (Cl. 299—140)

The present invention relates to a device for completely atomizing light and heavy mineral oils and mixing them with air.

Two constructions embodying the features of the invention are illustrated in the accompanying drawing by way of example.

Figs. 1, 2 and 3 show the first construction,

Fig. 1 being a sectional elevation through an atomizer adapted to be used as an oil burner,

Fig. 2 is a sectional elevation drawn to a larger scale through the front portion of the atomizer, Fig. 3 is a cross section of Fig. 2.

Figs. 4 and 5 show a construction in which the atomizer is used as a fuel nozzle,

Fig. 4 being a sectional elevation and

Fig. 5 a cross section of the atomizer according to line *a—b* of Fig. 4.

Figs. 6 to 9 show in detail various forms of the grooved forward end of the atomizer nozzle.

Referring first to Figs. 1, 2 and 3, illustrating a first construction, 1 indicates an outer casing in which is longitudinally slidable a burner tube 2 provided with a manipulating handle 3 for facilitating longitudinal adjustment of the tube 2 in the casing 1 for the purpose of regulating the amount of secondary combustion air admitted to the burner. The atomizer proper comprises two concentric tubes 5 and 8 of which the inner tube 5 terminates in an atomizer nozzle 13. The inner tube 5 is provided with a throttling valve 4 by means of which the amount of fuel admitted to the tube 5 can be regulated. The outer tube 8 is in communication with a transverse conduit through which air effecting the atomization of the fuel is admitted. At the end adjacent to the outer nozzle there is mounted upon tube 5 a guide member 10 connected in any suitable manner with the outer tube 8, for instance by screwing. The fuel passes in a constant stream through the inner tube 5 and to the atomizer nozzle 13. Before reaching the atomizer nozzle 13 the fuel passes through a plurality of bores 6 and then enters an annular port 7, on leaving which it comes into contact with the atomizing air. The atomizing air passes through the outer tube 8 to the guide member 10, then moves through tangential passages 9 provided in the guide member, whereby it receives in the adjacent annular passage or port 11 a rotary movement. The passage 11 tapers towards the discharge opening 12 for the purpose of increasing the velocity of the atomizing air. The atomizing air on leaving the discharge opening 12 comes into contact with the fuel discharged through the annular port 7. The rotating air stream catches and grips the fuel

and spreads the fuel in the form of a thin film over the cylindrical surface 14 of the atomizer nozzle 13 at the same time rotating this fuel film. The fuel film then passes over a series of sharp-edged grooves 15. These grooves are either of the same diameter as shown in Figs. 6, 7, 8 and 9, or they may be of a decreasing diameter as shown in Figs. 2 and 4. In the latter case, the nozzle may be provided with a pointed end, see Figs. 2, 4 and 6. In the construction shown in Fig. 7, the nozzle is provided in front of the grooves with a semispherical portion. According to Fig. 8, the nozzle has a conical front portion and according to Fig. 9 the grooves 15 extend right up to the front end of the nozzle. These sharp-edged grooves further facilitate the disintegration of the film by the rotating atomizing air current.

The number and the shape of the grooves depends on the shape of the flame to be produced. Additional secondary air is admitted through the burner tube 2 in front of the atomizer nozzle. This additional air passes through a conduit 16a provided in the outer casing 1 and then through openings 16 in the tube 2. This additional combustion air is also given a rotary movement by the provision of suitable guide passages in the front portion of the tube 2, so that it assists in atomizing the fuel and becomes thoroughly mixed therewith.

Figs. 4 and 5 show a similar construction in which the device is used as a fuel nozzle. In this construction the atomizing air and the fuel are simultaneously admitted through a rear tube 17. The tube 17 is connected with the atomizer casing 18, said atomizer casing having a portion projecting rearwardly into the tube 17 and formed with a sharp edge. The fuel is separated from the atomizing air in the tube 17 and flows downwardly and under the extension 19, then reaches a passage 21 provided in the casing 18 and passes from the latter through a cross bore and a central passage into a plurality of radial passages 22 leading to an annular passage 23. From the annular passage 23, the fuel passes forwardly and spreads upon the atomizer nozzle 13. This atomizer nozzle is again provided with a cylindrical portion 14, and sharp-edged grooves 15 of decreasing diameter. The atomizing air passes through the member 19 into a bore 20 of the casing 18 and from the latter into a guide member 24 having tangential passage 25 by which the atomizing air is given a rotary movement so that, on leaving through the front opening 12, it will again grip

the fuel and separate same in the form of a fine film on the front portion of the nozzle.

It will be seen that the guide member 24 is made separate from the casing 18 and has a cylindrical portion 26 fitting the front portion of the casing 18. The passage through which the atomizing air moves towards the opening 12 tapers towards the opening, that is to say, it has a cross section of decreasing size, whereby the velocity of the atomizing air current is increased.

I claim:

1. A device for atomizing liquid fuel and mixing same with air, comprising in combination: a common conduit for the liquid fuel and the air; means at the front end of said conduit for separating the fuel from the air; a conduit for delivering said separated fuel in the form of a rotating hollow jet; a conduit for delivering the separated air in the form of a rotating hollow jet enclosing the hollow fuel jet; and a nozzle arranged in front of the delivery openings of said two conduits, said nozzle being provided with a smooth cylindrical portion and a portion in front of said smooth cylindrical portion formed with a number of sharp-edged grooves.

2. A device for atomizing liquid fuel and mixing same with air, comprising in combination a common conduit for the liquid fuel and the air, means at the front end of said conduit for separating the fuel from the air, a conduit for delivering said separated fuel in the form of a rotating hollow jet, a conduit with tangential passages for delivering the separated air in the form of a rotating hollow jet enclosing the hollow fuel jet, and a nozzle arranged in front of the delivery openings of said two conduits, said nozzle being provided with a smooth cylindrical portion upon which the fuel is sprayed in the form of a thin film by the enclosing air jet and a portion in front of said smooth cylindrical portion formed with a number of parallel sharp-edged grooves.

3. In a device for atomizing liquid fuel and mixing same with air, a nozzle provided with a

smooth cylindrical portion and a portion in front of said cylindrical portion provided with a plurality of sharp-edged grooves, said nozzle being arranged to receive axially thereabout a hollow fluid jet and a hollow enclosing atomizing air jet, means for delivering said atomizing air in the form of a hollow jet enclosing and surrounding said fluid jet, said means comprising a tubular member, a guide member within said tubular member provided with tangential passages for imparting rotary motion to the atomizing air.

4. In a device for atomizing liquid fuel and mixing same with air, a nozzle provided with a smooth cylindrical portion and a portion in front of said cylindrical portion provided with a plurality of sharp-edged grooves, said nozzle being arranged to receive axially thereabout a hollow fluid jet and a hollow enclosing atomizing air jet, means for delivering said atomizing air in the form of a hollow jet enclosing and surrounding said fluid jet, said means comprising a tubular member, a guide member within said tubular member provided with tangential passages for imparting rotary motion to the atomizing air, said nozzle being also provided with a semispherical portion in front of the grooved portion.

5. In a device for atomizing liquid fuel and mixing same with air, a nozzle provided with a smooth cylindrical portion and a portion in front of said cylindrical portion provided with a plurality of sharp-edged grooves, said nozzle being arranged to receive axially thereabout a hollow fluid jet and a hollow enclosing atomizing air jet, means for delivering said atomizing air in the form of a hollow jet enclosing and surrounding said fluid jet, said means comprising a tubular member, a guide member within said tubular member provided with tangential passages for imparting rotary motion to the atomizing air, the diameter of said grooves upon the grooved portion decreasing in the direction of the movement of the fuel.

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