Aug. 7, 1928. 1,679,830

A. LANG

LIQUID FUEL BURNER

Filed July 24, 1925

FIG.1.

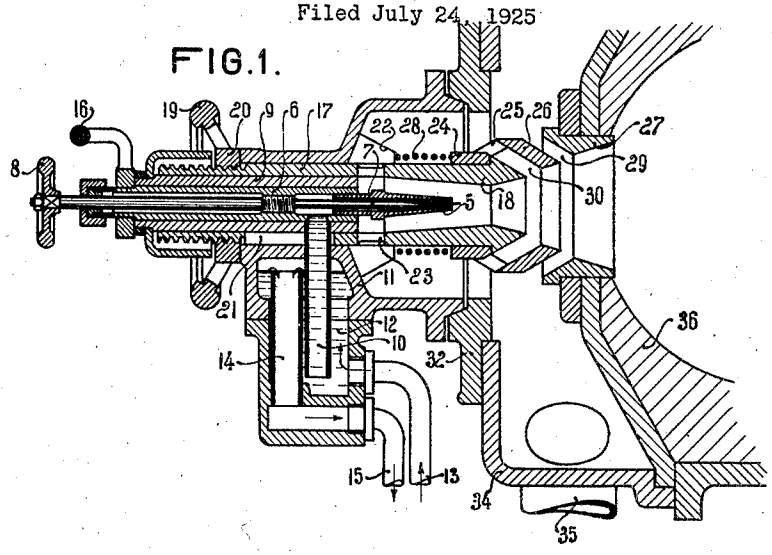


FIG.2.

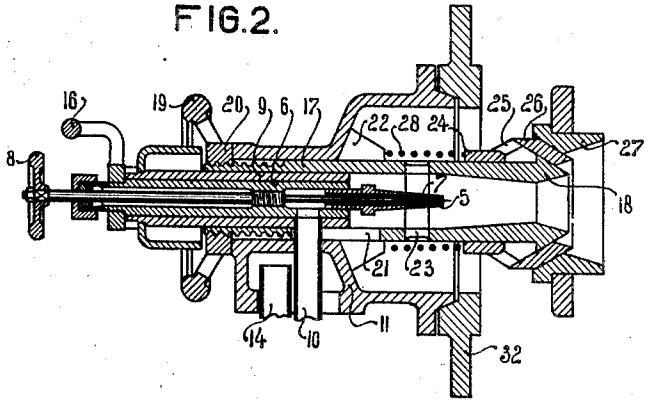
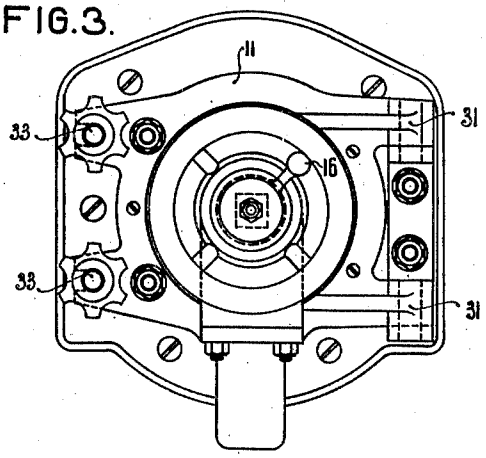


FIG.3.



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UNITED STATES PATENT OFFICE.

ADOLF LANG, OF THE HAGUE, NETHERLANDS.

LIQUID-FUEL BURNER.

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My present invention relates to liquid fuel burners and has for its object a burner of this type in which the fuel is drawn in, atomized and completely burnt by means of low pressure air and in which the combustion is under full control.

With this object in view, I provide for a nozzle and for a primary air injector cone for drawing in the fuel, said nozzle and said cone being axially adjustable relative to one another and I dimension the air way to the injector cone in such a manner, that the velocity of the air flowing past the nozzle is comparatively great when the cone is located in the proximity of the nozzle, but that said velocity and, consequently, also the air suction force has a smaller value when the cone is located at an increased distance from the nozzle. In order that the fuel may be well atomized and thoroughly mixed with the air, I further suggest to provide for a supplementary air cone, or a set of such cones, which likewise is axially adjustable relative to the fuel nozzle in such a manner that, when the primary air injector cone assumes a position relatively close to the fuel nozzle and, as a consequence, the velocity of the air flowing past the nozzle and the air suction force have a great value, a correspondingly increased amount of air is introduced by said supplementary air cone, or set of cones. This supplementary air serves for completely atomizing and burning the increased amount of fuel drawn in by the nozzle. It will thus be understood that the air way to the supplementary air cone, or set of cones, should have an ample cross sectional area.

The annexed drawing illustrates, by way of example and not of limitation, a liquid fuel burner constructed in accordance with my present invention, Figs. 1 and 2 being axial sectional views of the burner in its two extreme positions, Fig. 3 being a rear elevational view.

The oil nozzle 5 is secured to a cylindrical pipe 6, in which a control needle 7, having a screw connection therewith, is adapted to be lengthwise adjusted by means of a handle 8, whereby the cross sectional area of the outlet of the nozzle can be regulated in accordance with the viscosity of the fuel used. The pipe 6 is located within a sleeve 9, which is held in its place by the vertical oil feed pipe 10, the latter projecting downwardly through an aperture in the burner casing 11 into a fuel chamber 12. The fuel is supplied in excess by a pipe 13 into said chamber 12, whence the surplus returns to the fuel pump (not shown) by way of an overflow pipe 14 and a return tube 15. The pipe 6, which is provided with an operating handle 16, functions as a rotary valve to cut off the inflow of fuel, and to this end it is provided with a port which may be moved into and out of register with the mouth of the uptake 10.

Surrounding sleeve 9 is the cylindrical support 17 of the primary air injector cone 18. The rear end of said support 17 is provided with screw thread cooperating with a nut 20 having a hand wheel 19, whereby said support can be moved axially to and fro as it is prevented from rotation by the pipe 10 projecting through a longitudinal slot 21 thereof. Integral with the casing 11 are a plurality of webs 22 for guiding the support 17, the latter having a suitable number of air inlet openings 23 regularly spaced around its circumference.

In Figs. 1 and 2, the primary air cone 18 assumes its extreme position to the left and to the right, respectively. The cross sectional areas of the air way around the nozzle 5 at the various positions of the air cone 18 and the width of the air inlet openings and of the slot 21 (Fig. 2) are so dimensioned, that at a substantially invariable air pressure (say 8″–12″ head of water) the velocity of the air past the fuel nozzle and, consequently, the air suction force have their maximum and minimum values when the different parts assume the positions shown in Fig. 1 and Fig. 2, respectively.

Slidably mounted on the support 17 of air cone 18 is a ring 24 having arms 25 supporting the supplementary air cone 26. Said cone 26 is double acting owing to it being mounted opposite a stationary cone 27. A coil spring 28 tends to move the ring 24 to the right. If, therefore, the support 17 of the primary air cone is moved from its position shown in Fig. 1 to the right, the width of the annular slot 29 decreases until cone 28 engages the stationary cone 27 and thereafter the width of the annular slot 30 is decreased until the air cone 19 contacts with cone 26, when the position according to Fig. 2 is reached. It will thus be seen that when the air suction force diminishes the inlet for the supplementary air is concurrently reduced and eventually closed, so that with the

parts in the positions shown in Fig. 2 the amount of air just suffices to draw in, atomize and burn a minimum quantity of liquid fuel.

The casing 11 is hinged to a base plate 32 by means of bolts 31 and held in place by screw bolts 33, as clearly shown in Fig. 3. When the said screw bolts 33 are loosened, the burner can be swung out for inspection and cleaning purposes.

The air casing 34 is provided with a tangential air feed pipe 35, so that the air introduced into said casing flows through a spirally wound path around the burner whereby it is preheated.

The cone 27 opens into the combustion space, which is provided with a lining 36 of refractory material and preferably has the form of a paraboloid having its focus in the burning plane of the burner.

What I claim is:—

1. An oil burner comprising a casing, a primary burner cone longitudinally adjustable therein, a sleeve mounted within the primary cone, a fuel feed pipe passing through an elongated slot in the primary cone and seated in an opening in the sleeve, a nozzle tube formed with an opening to register with the fuel feed pipe, said tube being mounted for rotation to control the fuel inlet, and a nozzle carried by the nozzle tube.

2. An oil burner comprising a casing, a primary burner cone longitudinally adjustable therein, a sleeve mounted within the primary cone, a fuel feed pipe passing through an elongated slot in the primary cone and seated in an opening in the sleeve, a nozzle tube formed with an opening to register with the fuel feed pipe, said tube being mounted for rotation to control the fuel inlet, a nozzle carried by the nozzle tube, and a secondary cone slidably mounted on the primary cone and normally maintained for the maximum admission of air.

3. An oil burner comprising a casing, a primary burner cone longitudinally adjustable therein, a sleeve mounted within the primary cone, a fuel feed pipe passing through an elongated slot in the primary cone and seated in an opening in the sleeve, a nozzle tube formed with an opening to register with the fuel feed pipe, said tube being mounted for rotation to control the fuel inlet, a nozzle carried by the nozzle tube, a secondary cone slidably mounted on the primary cone and normally maintained for the maximum admission of air, and means engaging the secondary cone to reduce the air inlet thereto in the adjustment of the primary cone to decrease the air suction.

4. A liquid fuel burner, comprising a nozzle tube, a nozzle mounted therein, a sleeve supporting the nozzle tube, a fuel supply opening through the sleeve, the nozzle tube being rotatable to control the fuel supply, a primary air injector cone adjustable longitudinally of the sleeve, and a supplementary air cone mounted on the primary air injector cone and automatically operable in the adjustment of the primary cone to control the supplementary air in accordance with the position of the primary air injector cone relative to the nozzle.

5. A fuel burner comprising a nozzle, means for admitting fuel thereto, a primary air cone surrounding and adjustable relative to the nozzle to vary the air suction on said nozzle, and a secondary cone providing air admission beyond the primary cone, said secondary cone being slidable on the primary cone and operated relative to the primary cone in the adjustment of the latter.

6. In combination with a furnace or the like, an inlet cone for the furnace, a burner movably mounted in line with the inlet cone and including a nozzle, means for supplying fuel thereto, a primary air cone surrounding and adjustable relative to the nozzle, and a secondary air cone mounted on the primary air cone, said secondary air cone being adjustable relative to the primary air cone in one direction through contact with the inlet cone, and means for automatically adjusting the secondary air cone in the opposite direction.

7. In combination with a furnace or the like, an inlet cone for the furnace, a burner movably mounted in line with the inlet cone and including a nozzle, means for supplying fuel thereto, a primary air cone surrounding and adjustable relative to the nozzle, a secondary air cone mounted on the primary air cone, said secondary air cone being adjustable relative to the primary air cone in one direction through contact with the inlet cone, and means for automatically adjusting the secondary air cone in the opposite direction, and means for preheating the air admitted through said cones.

In testimony whereof I affix my signature.

ADOLF LANG.