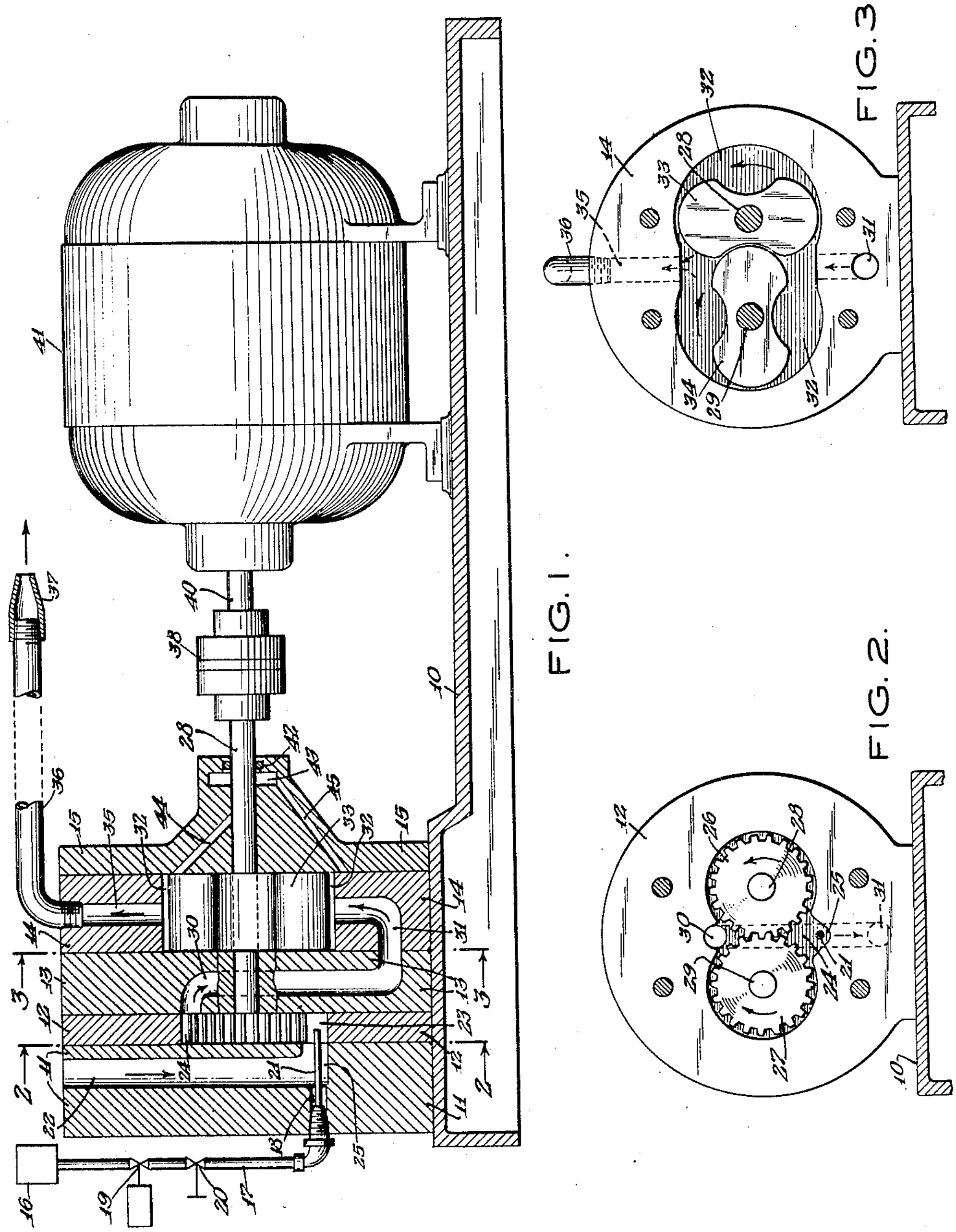
July 13, 1943. G. SIVERTSEN 2,324,116

ROTARY OIL PUMP

Filed March 26, 1941



INVENTOR

BY

ATTORNEY

Patented July 13, 1943

2,324,116

UNITED STATES PATENT OFFICE

2,324,116

ROTARY OIL PUMP

Gudmund Sivertsen, Brooklyn, N. Y.

Application March 26, 1941, Serial No. 385,342

1 Claim. (Cl. 261—28)

This invention relates to rotary pumps, and more particularly to a novel compact multiple pump structure for supplying an oil burner with a predetermined mixture of air and oil.

In accordance with the invention I provide a compact sectional casing having spaced connected chambers, housing a gear pump and an impeller unit. The gear pump and the impeller unit are used to respectively and successively mix and atomize suitable proportions of oil and air, in two stages. The oil is supplied to the gear pump by gravity feed through an external controllable valve. The use of an oil sump is rendered superfluous. The pump of the invention contains no restricted passages or needle valves, avoiding the danger of clogging.

Prior pump units for oil burners employed a special pump to feed the oil from a reservoir to an oil sump. The oil in the sump was drawn up by another pump which also mixed it with a suitable proportion of air. The thus obtained mixture of oil and air was atomized by an impeller and discharged through a burner nozzle. A pump was required for returning the oil into the reservoir.

It is among the objects of the invention to provide a novel compact multiple pump structure of simple construction which operates without an oil sump.

Another object of the invention is to provide an oil burner pump with no restricted passages or needle valves that are likely to clog up.

Still another object of the invention is to provide a novel pump unit for oil burners containing a gear pump for initially admixing the oil and air, and an impeller pump for atomizing the mixture of oil and air.

These and further objects of the invention will become apparent in the following description of preferred embodiments thereof illustrated in the drawing, wherein:

Figure 1 is a longitudinal vertical section of a pump unit in accordance with the invention.

Figure 2 is a transverse section taken along the line 2—2 of Figure 1, showing the gear pump used for mixing oil and air.

Figure 3 is a transverse section taken along the line 3—3 of Figure 1, showing the impeller unit for atomizing the mixture of oil and air.

Referring to the drawing, my novel pump structure comprises bed plate 10 having rigidly mounted thereon the sectional pump casing. The casing comprises a plurality of disk and housing sections. The housing sections are open on both sides, while the disk section abuts the sides of the housing sections, greatly facilitating its construction and assembly. The pump casing comprises disk sections 11, 13 and 15 and housing sections 12 and 14.

The oil is preferably supplied to the pump by gravity feed from the tank indicated at 16. Pipe line 17 connects tank 16 with duct 18 bored through disk section 11. A magnetically operated valve 19 and an adjusting needle valve 20 are arranged in pipe line 17, both valves being schematically indicated in the drawing.

Duct 18 in disk section 11 is connected with oil nozzle 21. Oil nozzle 21 extends through air passage 22 provided in disk section 11 to space 23 provided in the mixing chamber 24. Mixing chamber 24 is arranged in housing section 12. Space 23 and air passage 22 are connected by channel 25, bored through disk section 11. A timing gear pump comprising two gears 26 and 27 is arranged in mixing chamber 24. Timing gear 26 is keyed to main shaft 28 and timing gear 27 is secured to shaft 29. Timing gear pump 26, 27 sucks in the air through air passage 22 and mixes it with the oil taken up by the passing air from oil nozzle 21.

Passage 30 in disk section 13 is connected with mixing chamber 24 as well as with conduit 31 in disk section 14 to impeller chamber 32. Impeller chamber 32 houses a pair of meshing impeller units 33, 34, each preferably having two blades. Impeller 33 is keyed to the main shaft 28. Impeller 34 is secured to shaft 29. Conduit 35 in housing section 14 connects impeller chamber 32 with pipe 36 connected with oil nozzle 37. Oil nozzle 37 is arranged with the burner or furnace, not shown in the drawing, directly supplying the combustible mixture thereto.

Main shaft 28 is connected with drive shaft 40 and electric motor 41 by flexible coupling 38. Motor 41 is fastened onto bed plate 10. Bearing 42 is arranged in a projecting hub of disk section 15, for main shaft 28. An oil collecting chamber 43 is provided behind bearing 42. Channel 44 communicates from impeller chamber 32 to shaft 28 at its bearing, affording suitable lubrication for the bearing. The oil is directed to collecting chamber 43 and returned to impeller chamber 32 through conduit 45.

In practice, the operation of my simplified oil pump is as follows: Oil from tank 16 reaches nozzle 21 by gravity feed in a regulated manner. The regulation of the oil flow is through magnetically operated valve 19 and adjustable through needle valve 20. Motor 41 rotates shaft 28 through flexible coupling 38. Gear 26 keyed to

shaft **28** meshes with gear **27** which, in turn, drives shaft **29**. Thus, gears **26** and **27** ensure the timed rotation of impeller blades **33**, **34**.

Continuous rotation of timing gear-pump **26**, **27** draws in the air from passage **22** which, in turn, takes up the oil from nozzle **21**. The air passage through channel **25** is concentric about the oil flow, and both reach mixing chamber **24** together. It is to be understood that the air flow to mixing chamber **24** may be independently regulated. The gears **26**, **27** pulverize the oil for a first stage admixture with the air. The admixed oil and air are thereupon forced into impeller chamber **32** for atomizing action by impellers **33**, **34**. The mixture of oil and air is atomized into the proper combustible mixture for the furnace and impelled to fuel nozzle **37** through opening **35**.

Various changes and modifications may be made to the details of construction of the invention without departing from the broader spirit and scope thereof, as set forth in the following claim.

I claim:

A pumping unit for oil burners comprising a sectional casing, embodying a mixing chamber, a mixing pump located therein, an atomizing chamber, an atomizing pump therein, means for operating the two pumps in timed relation, an air inlet, including a vertical portion connectable to a source of air supply, and a horizontal portion communicating with said mixing chamber below the pump therein, an oil nozzle concentrically disposed within the horizontal portion of said inlet and extending therethrough into said mixing chamber, in proximity to said mixing pump, whereby the oil issuing from said nozzle will be subjected to the action of the surrounding stream of air in its introduction to said mixing chamber, a passage leading from the top of said mixing chamber, including a horizontal portion merging into a vertical portion, parallel with the vertical portion of said inlet, a second horizontal portion parallel to the base of the unit merging into a vertical portion opening into the atomizing chamber beneath the atomizing pump, a vertically disposed discharge outlet leading from the top of the latter chamber and a fuel nozzle connected to said outlet, the defining surfaces of said passages to said mixing chamber and between the latter and the atomizing chamber, together with those of the two chambers and said discharge outlet, being uninterrupted and constituting a continuous closed conduit, wholly contained within said casing, to conduct the fluids through the casing for discharge therefrom into the fuel nozzle, in the ultimate combustible mixture, in a constant unidirectional movement from said inlet to said outlet.

GUDMUND SIVERTSEN.