This invention relates to pumps which are adapted for pumping various fluids or liquids, but which are intended particularly for pumping liquid fuel, oil, or the like; and also relates to the combination of such a pump with a storage tank and controlling means whereby the pump will be automatically regulated and there will be practically no danger of gas or fumes escaping from the tank.

My improved apparatus has been devised and constructed with special reference to its use in connection with oil burning apparatus. In order to supply oil for such apparatus, it is more or less common to provide an outdoor storage tank and to pump the oil or fuel from such tank to a supply tank located within the building and adjacent to the burner, the oil being fed by gravity or otherwise from the supply tank to the burner.

The objects of this invention are to provide an improved pumping apparatus; to provide a pumping apparatus for liquid fuel which will be economical to manufacture and which will be particularly efficient and durable in operation; to provide a pump having an inner chamber or crank case into which the liquid is discharged, whereby the operating parts will be running in the oil or liquid; to provide a supply tank having a pump mounted therein which is provided with a crank case into which the liquid is pumped and from which it overflows into the tank; to provide a motor driven pump with a sealed float control for the motor; to provide a high speed piston pump which may be driven directly from the motor; and to provide such other advantages and novel features as will be described hereinafter.

In the accompanying drawings illustrating a preferred form of this invention:

Figure 1 is a vertical sectional view with parts broken away to show the inner construction;

Figure 2 is a horizontal sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a sectional view taken on the line 3—3 of Figure 2;

Figure 4 is a sectional view taken on the line 4—4 of Figure 2; and

Figure 5 is an end view or detail of the cylinder head or plug.

The supply tank 6 which may be of any desired size and of any suitable material is provided with a substantial cover 7 which is secured thereto by means of bolts 8 and which is provided with a gasket 9 in order to make an air tight joint. The motor 10 is mounted directly on the cover with its shaft 11 projecting downwardly through a hole in the cover.

The pump 12 is of the double opposed cylinder type and has a casing 13 which is secured to the cover 7 in any suitable manner, as by means of bolts 14. The casing comprises a lower chamber or receptacle 15, which is connected by means of posts or segments 16 with a top plate 17. The chamber 15 is closed at the bottom by a disk or bottom plate 18, but is open at the top so that liquid discharged therein may overflow into the tank 6.

The cylinders 19 and 20 are arranged on opposite sides of the casing and are preferably formed integrally therewith. The outer ends of the cylinders are threaded to receive plugs or heads 21 which have inwardly extending projections 22 which are of slightly less diameter than the cylinder and which are provided on their inner ends with one or more grooves 23. These projections extend into points approximately opposite the outlet ports and with the grooves therein tend to prevent noise when the pump is in operation.

The cylinders 19 and 20 are provided respectively with pistons 24 and 25 which are driven by crank rods or eccentric rods 26 and 27. The motor shaft 11 is provided with eccentrics 28 and 29 which are fixed thereto and which engage with the respective eccentric rods 26 and 27.

The fuel or liquid passes from the storage tank or other source of supply (not shown) through a pipe 30 and strainer 31 to the pump intake pipe 32. This pipe is connected by branches 33 and 34 with the intake orifices of the cylinders 19 and 20. The cylinders are provided with intake valves 35 and outlet valves 36, as shown particularly in Figures 3 and 4. The outlet orifices or passageways 37...
lead directly from the cylinders to the chamber 15, as shown particularly in Figure 3. The motor is controlled by a switch of any suitable type (not shown) which is preferably mounted in a switch box 38 on the cover 7. The switch actuating rod 39 passes through a pipe 40 which is screwed or fitted tightly in a boss 41 on the cover 7 and which extends downwardly to a point below the lowest level of the liquid in the tank. The rod 39 engages with one end of a lever 42 which is pivoted at 43 in a bracket 44 on the pipe 40. The opposite end of the lever 42 is engaged by a float rod or stem 45 to which is secured a float 46. The stem is guided by passing up through a hole 47 in the bottom of the crank case.

The tank 6 has an outlet 48 and is also preferably provided with an overflow pipe 49 which leads back to the storage tank. When the motor is in operation, the liquid will be drawn in through the inlet pipes to the cylinders in the well known manner, it being understood that, as the pistons are drawn inwardly, they tend to create a vacuum in the cylinders which is broken at the time they pass the inlet ports so that the liquid is quickly drawn into the cylinders. With this arrangement it is possible to operate the pump without inlet valves, but I have found it advisable to use them to insure proper operation of one pump in the event that the other pump fails to operate on account of failure of its exhaust valve to seat properly, as when held open by dirt or the like. On the discharge stroke of the pistons, the fluid will be forced around the projections 22 and out through the outlet orifices or exhaust ports 37 and during this discharge movement, I have found that the grooves 23 assist in preventing noise or pounding during the discharge. The liquid or fuel is pumped directly into the chamber 15 which extends upwardly at some distance beyond the cylinders so that this chamber is always full of oil or fuel and consequently the pistons and driving connections are submerged or operate in oil so that they are at all times independently lubricated and are also cooled by the flow of oil through the chamber. On account of the balanced arrangement of the cylinders and the operating of the parts under oil in this manner, I am enabled to drive the pump at an exceedingly high speed and practically without noise or vibration. As illustrating such speed, it may be noted that these pumps are now being operated with motors running at seven hundred and fifty revolutions per minute.

The switch and connections are arranged so that when the oil reaches a predetermined upper level in the tank 6, the float will be raised and will open the switch to stop the motor. When the float has moved down to the lower level, the switch will again be closed to start the motor, and if desired, the switch may be so arranged that a further drop of the float will again open the switch to stop the motor as in the case of undue discharge from the supply tank. The parts however are arranged so that the lower end of the pipe 40 will be submerged in liquid so that the pipe is sealed and no vapors or gases from the tank 6 may escape through the opening necessary for the switch operating rod. This is a particularly important feature, as when liquid fuel of certain grades is being pumped, some air is usually drawn therethrough and vapors or gases formed, which is apt to be of an explosive character, so that if they are permitted to escape around the switch, or motor, there will be a possibility of their becoming ignited by sparks or arcs.

From this description it will be seen that I provide a simple and compact pumping apparatus together with a storage tank, all of which may be readily mounted on legs or other supports and which will occupy but little room. Furthermore, on account of the direct drive and few parts, the pump is particularly efficient and is not likely to get out of order. As some of the structural features may be modified or the details of construction may be changed in order to adapt the pump for different conditions or uses, I do not wish to be limited to the particular form or arrangement herein shown and described, except as specified in the following claims, in which I claim:

1. A pumping apparatus comprising a tank, a casing mounted in said tank and having oppositely disposed integrally formed cylinders, pistons for said cylinders, a motor having its shaft projecting into the casing, eccentrics on said shaft, eccentric rods from the eccentrics to the pistons, inlet pipes from a source of supply to the cylinders, discharge passageways from the cylinders to the casing, said casing being adapted to hold a predetermined amount of liquid and discharging over the top into the tank.

2. In an apparatus of the character set forth, the combination of a supply tank having a cover, a pump casing secured to the cover and projecting downwardly into the tank, a motor mounted on the tank with its shaft projecting downwardly into the casing, oppositely disposed cylinders on said casing, pistons for said cylinders, means for driving the pistons from the shaft, inlet connections for said cylinders, and outlets from the cylinders to the casing, the lower portion of the casing being adapted to hold a predetermined amount of liquid and the balance of the liquid overflowing from the casing into the tank.

3. The combination with a supply tank having a cover, of a pump casing secured to the inside of the cover and having a crank chamber which is closed at the bottom and
open at the top, cylinders projecting outwardly from said crank chamber, said cylinders being provided with inlet pipes and inlet valves, pistons in said cylinders, a driving shaft projecting inwardly through the cover, means for driving the pistons from the driving shaft, said cylinders having outlet valves and having outlet passageways leading to the crank chamber, the arrangement being such that the liquid will be pumped into the crank chamber and will overflow into the tank, the pistons and driving parts being submerged in said liquid.

4. In an apparatus of the character set forth, the combination of a supply tank having a tightly fitting cover, a motor mounted on said cover with its shaft projecting downwardly into the tank, a double pump having opposed cylinders, driven by said shaft, a strainer, a pipe leading from a source of supply to said strainer, passageways from the strainer to the cylinders, a switch mounted on the cover for controlling the motor, a pipe projecting downwardly from the cover to a point below the level of the liquid, a switch rod from the switch which passes freely through the pipe, a lever having one end connected with said rod, a float connected with the other end of the lever, and a discharge pipe from said tank.

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