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STORAGE TANK

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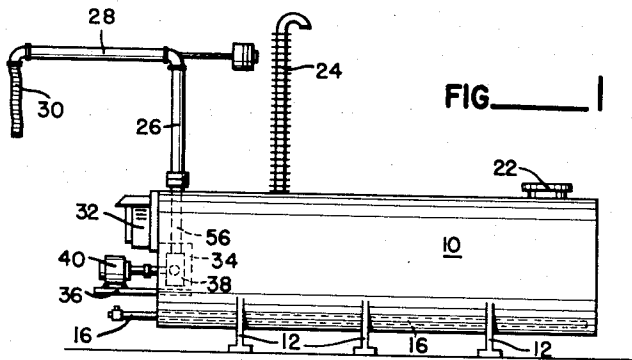


FIG. 1

FIG. 2

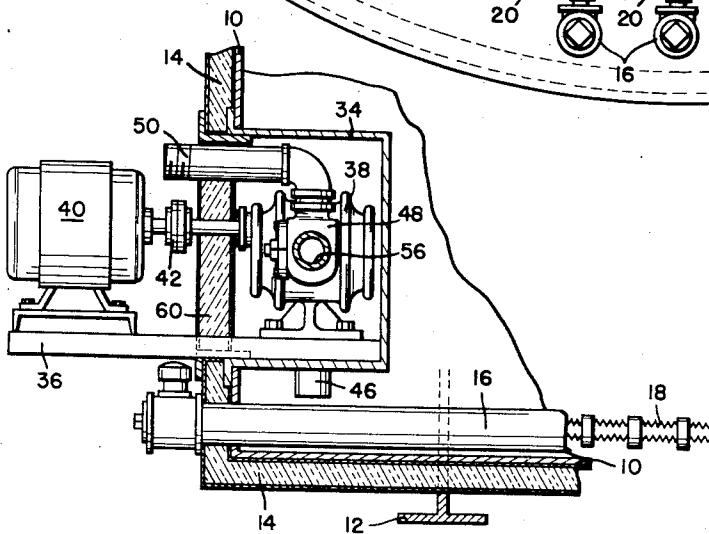
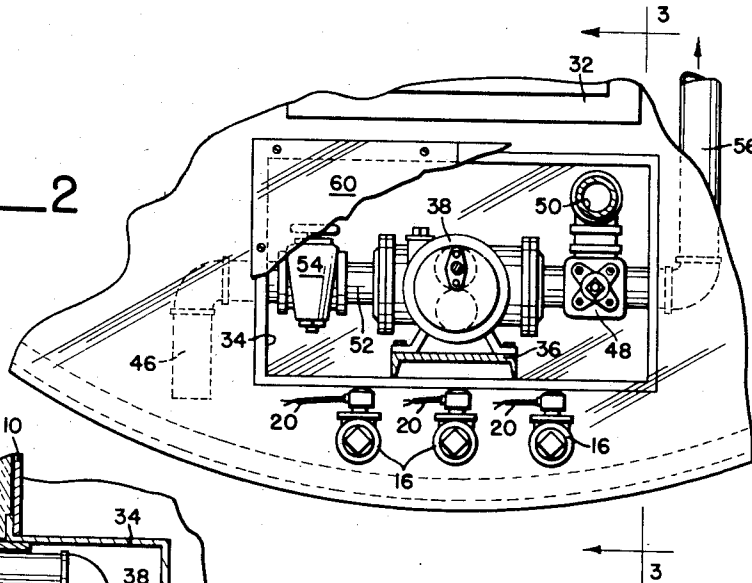


FIG. 3

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STORAGE TANK

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4 Claims. (Cl. 219—39)

This invention relates to a storage tank for viscous heat-responsive material and, more particularly, this invention relates to a vessel to contain heavy fuel oils, asphalt, tar and heavy road oils, and adapted to be heated to reduce viscosity of the contents. The vessel includes a chamber open outwardly to receive pumping apparatus useful in conveying the contained materials.

Heavy viscous materials in a vessel exposed to the weather normally are difficult to handle due to the tendency, under conditions of cold, of the material to become so viscous as to be practically unpumpable. To a degree the problem has previously been overcome by supplying the storage vessels with heater means which may take the form of steam or hot water coils, or electrical resistance elements, usually located in the bottom of the vessel. It has been customary to rely upon heavy duty pumps and unnecessarily large and powerful electric motors to move the fluid from the tank when it is being discharged for use. A common difficulty encountered has been the failure of the pumps to operate properly because viscous material which they contain and which is quiescent during non-pumping periods tends to set-up so stiff that the pump can scarcely operate. Of course shafts and gears break, motors are overloaded and innumerable difficulties of this nature are encountered unless elaborate auxiliary heating means is supplied.

It is among the more important objects of this invention to provide a storage tank which includes chamber means for containing a suitable pump, valves and related equipment, in such a manner that the pump is maintained at a temperature quite close to that of the contents of the vessel, and operable immediately upon the heated contents.

Other objects include the provision of a simple and an efficient apparatus which can be made inexpensively and is built into a tank or vessel with ease and dispatch. Other objects of the invention will be more apparent during the course of the following specification.

In the accompanying drawing illustrating this invention I have shown a preferred form of the invention. Like reference numerals identify like parts throughout the drawing.

Figure 1 is a side elevation view of a storage tank equipped according to my invention;

Figure 2 is an enlarged view of a face portion of the tank of Figure 1, with portions broken away for convenience of illustration; and

Figure 3 is a vertical fragmentary sectional view taken on line 3—3 of Figure 2.

A typical vessel 10 to which my invention pertains may be a horizontally disposed cylindrical tank, usually provided with legs 12 for mounting the same on any suitable foundation, so that the tank axis is disposed in a horizontal plane. Exteriorly the tank is provided with an insulative jacket 14 to prevent undue outward radiation of heat. Heater tubes 16 are provided in the bottom of the tank.

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As shown in Figure 3 the tubes 16 contain electrical resistance heaters 18 to which current is supplied by conduits 20 at one end of the tank. In the upper portion of the tank is a manhole 22, a breather pipe 24, and a discharge pipe 26 provided with a counterbalanced swing-spout 28 and a flexible discharge nozzle 30.

Cabinet 32 houses electrical switching equipment, thermostatic controls and the like for switching and regulating the operation of heaters 16.

In the lower portion of tank 10, preferably in an end wall, is formed a right rectangular housing 34 which is inset into the body of the tank, and normally is secured in place by welding about the margin of the chamber mouth. The wall means forming chamber 34 are immersed in the liquid material contained in tank 10 and derive heat therefrom so that the outwardly open space in chamber 34 may likewise be heated.

A base member 36 extends outwardly from the bottom wall of chamber 34 and supports pump 38, located within chamber 34, as well as motor 40, located outward of chamber 34. The driven and drive shafts of the pump and the motor are operatively connected by coupling 42.

An inlet conduit 46 passes through a side wall of the chamber 34 to provide communication between the interior of tank 10 and pump 38. Preferably conduit 46 has a down-turned end arranged to pick-up fluid from a level slightly above the heaters 16. Valve 48 in conduit 46 is associated with a secondary inlet 50 useful in pumping fluid from sources other than internally of tank 10. On the discharge side of pump 38 is conduit 52 and valve 54. Conduit 52 extends through a second side wall of chamber 34 and is connected with a riser 56 that conveys material to the swing-spout 28 shown in Figure 1.

It will be apparent from the foregoing description that when the pump 38 is operating and conduit 46 is open to the interior of tank 10 fluid will be withdrawn therefrom and, under the pressure produced by pump 38, forced through conduit 56 to the swing-spout for delivery to a tank truck or other suitable conveyance. The operation of pump 38 under cold weather conditions will be had at temperatures substantially identical with the temperature of the fluid being pumped. This insures that the material contained in the pump has the same order of viscosity as the material contained in the tank being heated by the heater 16. The same temperature condition prevails for the material that may be contained in the discharge conduit 52 and the riser 56. In order to insure maintenance of such a condition during periods of extreme cold the front of chamber 34 is closed by an insulated hatch or cover 60, which is ported to fit over the power shaft between motor 40 and the pump 38 and also to fit over and around the secondary suction tube 50.

It is also to be noted that motor 40 by this arrangement is disposed in the open air outward of the heated chamber 34 to provide the ideal circumstance of operating the motor in an atmosphere where it may readily dissipate heat generated internally through its own operation or received by conduction from the heated pump 38 and chamber 34.

Having thus described my invention, I claim:

1. A storage tank for viscous, heat-responsive materials, comprising: wall means forming a closed vessel, heater means associated with said vessel to elevate the temperature of the materials contained therein, wall means integral with said vessel wall means forming an outwardly open chamber inset into the vessel for immersion of said chamber in the materials contained in the vessel to derive heat therefrom, an encased pump fully accessible from external of said vessel and mounted in said chamber and having inlet means to draw pumpable

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material from the vessel, outlet means from said pump, power means to activate said pump, and means to close the outwardly open mouth of said chamber to reduce loss of heat therefrom.

2. The structure according to claim 1 in which the outlet means from said pump comprises a riser conduit that passes through the vessel and upward through the contents to deliver pumped material at an elevated position relative said vessel.

3. The structure according to claim 1 in which the power means comprises an electric motor and the same is disposed outward from the closure means of said chamber.

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4. The structure according to claim 1 in which the pump inlet is provided with a valve within the chamber and an alternate inlet is associated therewith to draw material from an alternate source.

References Cited in the file of this patent

UNITED STATES PATENTS

2,228,906	Bowen	Jan. 14, 1941
2,522,652	Von Haase	Sept. 19, 1950

FOREIGN PATENTS

250,483	Switzerland	June 1, 1948
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