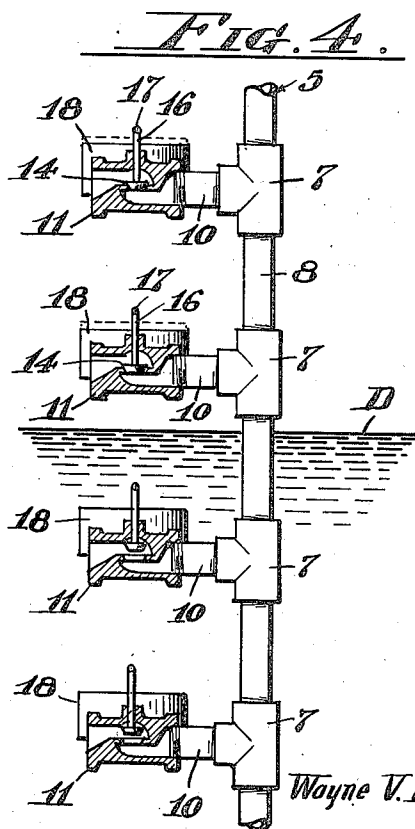
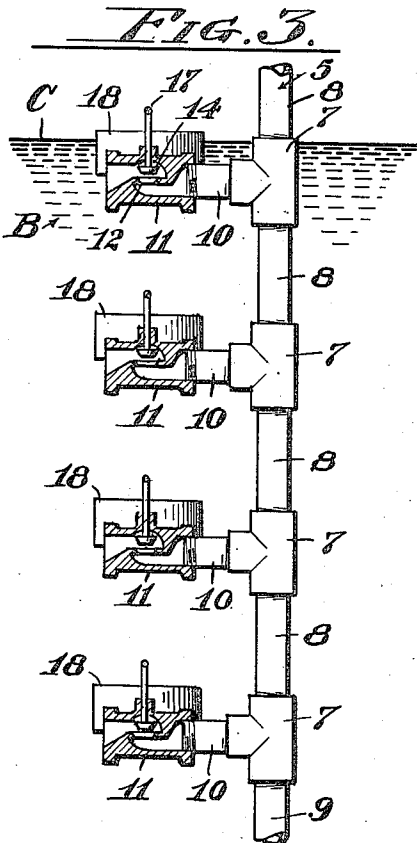
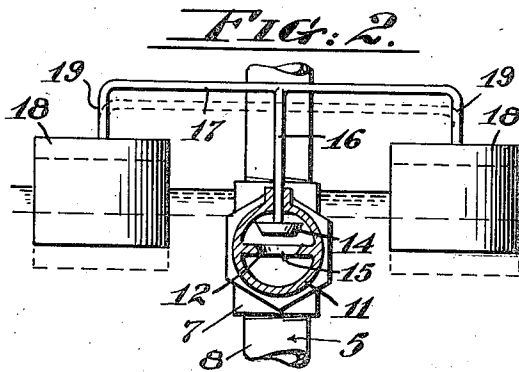
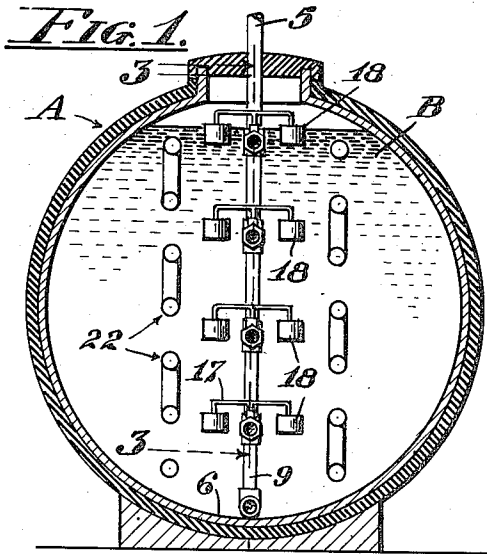


Aug. 3, 1948.

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ASPHALT PUMP INTAKE

2,446,384

Filed Nov. 26, 1943



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2,446,384

ASPHALT PUMP INTAKE

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Application November 26, 1943, Serial No. 511,879

2 Claims. (Cl. 137-21)

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This invention relates to an improved float valve controlled conduit structure for the delivery conduits of tanks containing viscid substances which are thin and highly fluid at high temperatures and are thick, gummy and even solid at normal or moderate temperatures, such as asphalt.

In plants where asphalt is mixed with sand and gravel preparatory to being used in the construction of road-beds, it is customary to heat the asphalt in a reservoir to maintain it in a well liquefied condition by circulating steam through a pipe immersed in the asphalt; it being necessary to maintain the mass of asphalt in the reservoir in a completely fluid, free-flowing condition in order to effect pumping it to the mixing devices. It is now common practice to maintain the circulation of the steam through heating coils continuously in order to maintain the mass in a pumpable condition throughout its entire depth, since cessation of the heating operation will allow the asphalt to cool and consequently thicken especially at the lower portion of the mass which cools first and where the intake to the pumping mechanism is located, such as to cause clogging of the pump.

The asphalt reservoir usually employed comprises an insulated tank car or similar structure which when filled will contain a body of the asphalt several feet in depth such for example as six feet or more. When this body of asphalt is heated to render it highly fluid throughout a considerable period of time will be required for the mass to cool to the temperature of the surrounding atmosphere by reason of slow radiation or conduction of heat therefrom. However, such cooling action commences at the bottom of the mass and progresses upwardly so that a condition may exist where the lower portion of the asphalt will be thick and unpumpable while the upper portion will be thin and capable of being pumped. Obviously if a pump inlet were to be manipulated to maintain it in the zone of pumpable fluidity of the partially cooled body of asphalt such fluid portion could be pumped, but such operation is not satisfactory since it involves the exercise of great care in preventing the intake from being lowered into a portion of the asphalt which is too thick to pump resulting in clogging the pump and necessitating melting out the asphalt in the pump in order to condition it for operation.

An object of the present invention is to provide a float valve controlled pump intake means located in the asphalt reservoir and communicating therewith at various liquid depths so as to render it unnecessary to maintain a continuous circulation of steam through the heating coil or manipulation of a pump inlet, but which will insure a satisfactory delivery from the reservoir of the upper portion of the liquefied asphalt therein even though the lower portion thereof

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may require a certain amount of re-heating before being pumped. Hence, by this invention the necessity is avoided of maintaining continually a circulation of steam through the tank heating coils, and consequently the necessity is avoided of day and night attention by a workman to the operation of the heating apparatus as is now commonly practiced.

More specifically speaking the invention relates to the provision of a vertically extending series of float-controlled valves which are combined with intake extensions of an upstanding delivery conduit connectable with a pump for the purpose of delivering the asphalt from the reservoir.

Additional objects of the invention are to provide for automatically closing in downward succession the inlets of the upstanding delivery conduit as the liquid level of the liquid viscous substance being pumped out continues to fall; to provide the float-controlled valve structure of a balanced dependable character; to provide a valve controlled multiple inlet means better adapted for use in reservoirs containing large quantities of viscid substances; and to provide for more rapid and convenient installation in the reservoir of a multiple inlet control means of the kind to which the invention pertains.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, the invention resides in the parts and in the combination, construction and arrangement of parts hereinafter described and claimed, and illustrated by way of example in the accompanying drawing, in which:

Fig. 1 is a view in cross section of an asphalt tank showing the invention as applied;

Fig. 2 is a detail in section and elevation of one of the float controlled intake valves;

Fig. 3 is a diagram in section taken on the line 3-3 of Fig. 1 depicting the valves as positioned when the tank is filled;

Fig. 4 is a diagram similar to that of Fig. 3 showing the valves as positioned when the tank is partly emptied.

Referring in detail to the drawing, 5 indicates an upstanding delivery conduit arranged in a tank or reservoir A and extending upwardly from the floor 6 of the latter and out through the top thereof and leading to any suitable type of pump used to withdraw the contents of the tank through said conduit.

The conduit 5 is here shown as made up of a series of T fittings 7 and intervening pipe sections 8 and a lower section 9 opening to the tank adjacent the bottom thereof. Into the side of each of said T fittings is screwed a nipple 10 which carries an open-ended valve cage 11 having a horizontal seat portion 12 with the upper face of which cooperates a poppet valve 14 that opens and closes the port 15 through said seat. The valve 14 has a vertical stem 16 attached to the

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mid-length portion of a horizontal float rod 17 to each end of which is attached a float 18 by means of a downwardly directed stem 19.

The pair of floats for each valve 14 is so positioned as to keep the valve open when the liquid level in the tank is above the inlet which the valve controls and to allow the valve to move to its closed position when the liquid level falls, the closing of each valve taking place in time to prevent the pump from sucking air through the port controlled thereby.

Within the tank is a heating coil 22 designed to keep the body B of asphalt therein in a sufficiently fluid condition for being pumped. Ordinarily the body of asphalt in the tank is maintained in a pumpable state of fluidity throughout the mass thereof by continuously flowing steam through the coil 22. However, it is not necessary as has heretofore been usual, continuously to steam heat the tank providing the delivery conduit 5 is equipped with inlets furnished with the float-controlled valves provided by this invention. This will be understood when it is noted that hitherto the delivery conduit has been provided with a single inlet located near the bottom of the tank so as to make it possible to completely empty the tank, and if the steam were turned off from the heating coil over night the lower part of the body of asphalt therein would become too viscid for pumping, even though the upper portion thereof were in a pumpable condition.

In the operation of the invention when the tank is full of fluid asphalt each of the valves of the series will be maintained open by the floats, but as the level of the asphalt is lowered on removing it such as to cause the floats to lower the valve controlled by such floats will be closed so that unwanted air will not be delivered to the pump which would not only prevent pumping of the asphalt but would create a hazardous condition since admixture of air with the pumped hot asphalt would be liable to set up combustion.

Figures 1 and 3 of the drawings show the manner in which the several valves 14 of the series are maintained open by the action of the floats 18 when the reservoir A is sufficiently full of asphalt to hold the uppermost of the valves open. The level of the asphalt will then be above the inlet of the upper valve as indicated at C in Fig. 3. All of the valves of the series will then be open so that on operating a pump connected to the conduit 5 fluid asphalt will be pumped from the reservoir through at least one of the open valves.

In event the asphalt is allowed to cool such as would be occasioned by shutting off the flow of steam through the coil 22 the body of asphalt would gradually thicken progressively upward from the bottom of the reservoir until the entire mass of asphalt would become so thick as to be unpumpable, but on again applying steam to the coils the mass would become liquified gradually and progressively downward. However, it is contemplated that ordinarily the asphalt would not be allowed to cool long enough to render the entire mass unpumpable, only the lower portion usually thickening while the upper portion remains sufficiently fluid for pumping.

In any event the valves that are held open by the floats will remain open regardless of the state of consistency of the mass, so that on operating the pump any portion of the mass that is fluid may flow to discharge through the uppermost open valve.

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On lowering the level of the asphalt as indicated at D in Fig. 4 the floats above the level will move down to close the valves controlled thereby. In this fashion the valves of the series are progressively closed downward. When the lowermost valve is closed pumping may be continued through the open lower end of the conduit 5.

After a quantity of the asphalt has been removed from the reservoir the supply is replenished by delivering a requisite amount of asphalt to the reservoir in a highly heated and fluid state, the heat of which will act to free any valves that may be stuck in their closed positions by reason of cooling of the asphalt on the valves when the latter are unsubmerged.

While I have shown and described a specific embodiment of my invention I do not limit myself to the exact details of construction set forth, and the invention embraces such changes, modifications and equivalents of the parts and their formation and arrangement as come within the purview of the appended claims.

I claim:

1. In a float valve controlled conduit structure, an upstanding conduit having when mounted in a filled tank a series of open inlets communicating with the conduit at different points along its length and arranged so that the contents of the tank may be pumped out through said conduit in an upward direction, a float controlled valve for each of said inlets supported by said conduit and arranged successively to close the inlets of said series in a direction opposite to the flow of the contents through said conduit in time to prevent air from entering said conduit as said inlets are successively exposed to the air by a lowering of the liquid level in the tank, the lower end of said conduit being constructed to rest on the bottom of the tank and having a laterally opening intake which is open at all times.

2. In combination, with a tank, a vertically extending conduit mounted in said tank and provided with a vertically extending series of inlets which are submerged when the tank is filled with a liquid the lowermost of said inlets being on the bottom of the tank and open on the side of the conduit at all times, a valve supported by said conduit adjacent to each of the other inlets to control the entrance of liquid through them to said conduit, and independent float means for each of said valves connected therewith and acting in opposition to gravity normally to maintain each of said valves open, said valves, from above downwardly, automatically successively gravitating to closed positions as a result of the fall of the liquid level in the tank, to prevent the air from being entrained through any of said valve controlled inlets when the liquid level falls below such inlet.

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