A. E. OSTRANDER.

TANK HEATER.

APPLICATION FILED MAR. 5, 1915.

1,292,365.

Patented Jan. 21, 1919.

2 SHEETS—SHEET 1.

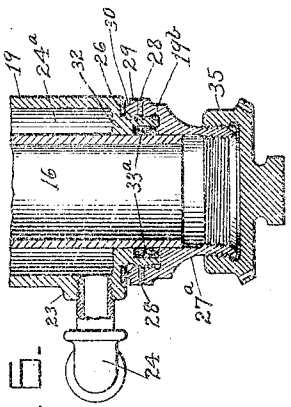


Fig. 6.

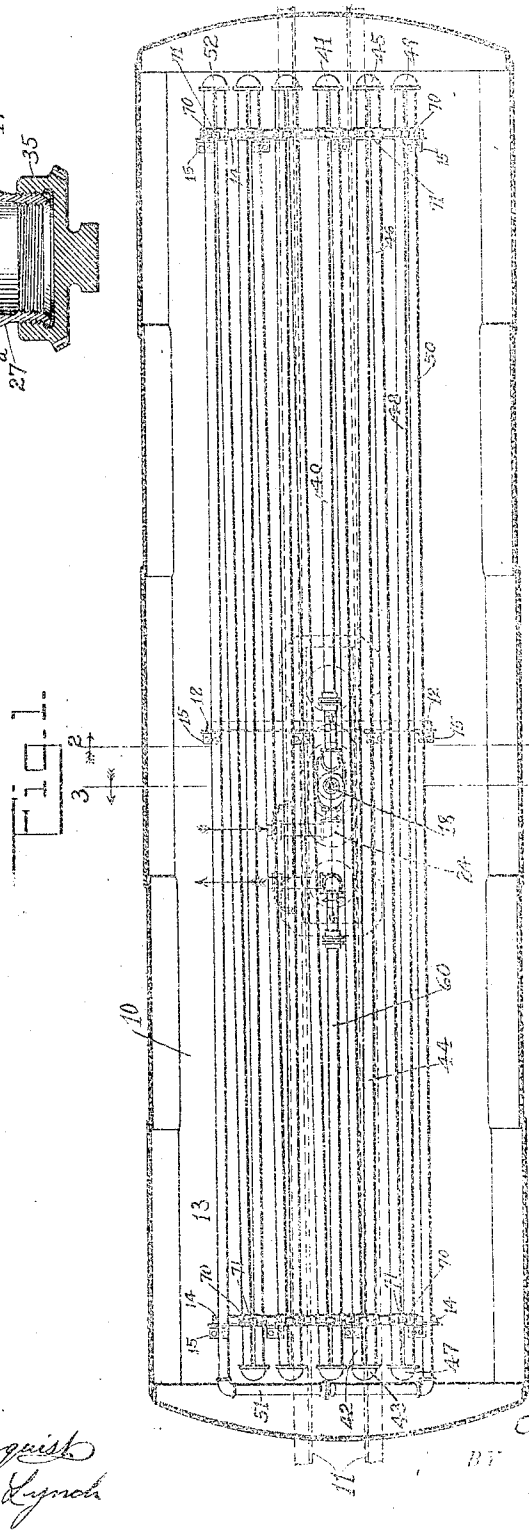


Fig. 1.

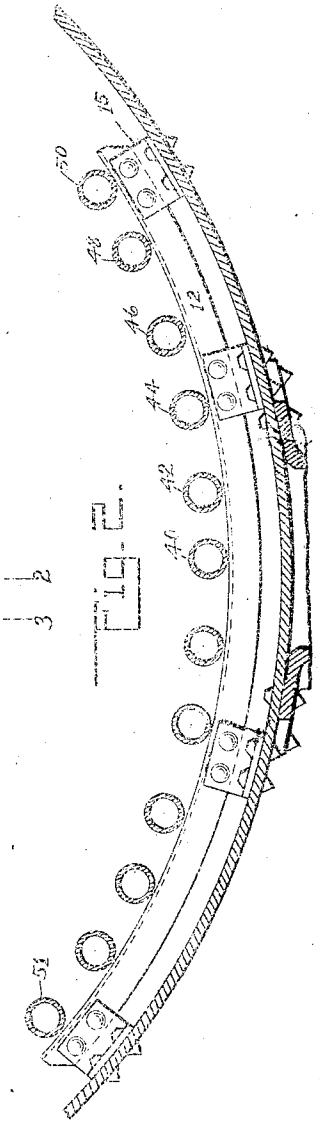


Fig. 5.

WITNESSES.

L. Almquist

Frank J. Lynch

INVENTOR.

Asten E. Ostrander

BY T. H. Lee

ATTORNEY

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2 SHEETS—SHEET 2.

Fig. 3.

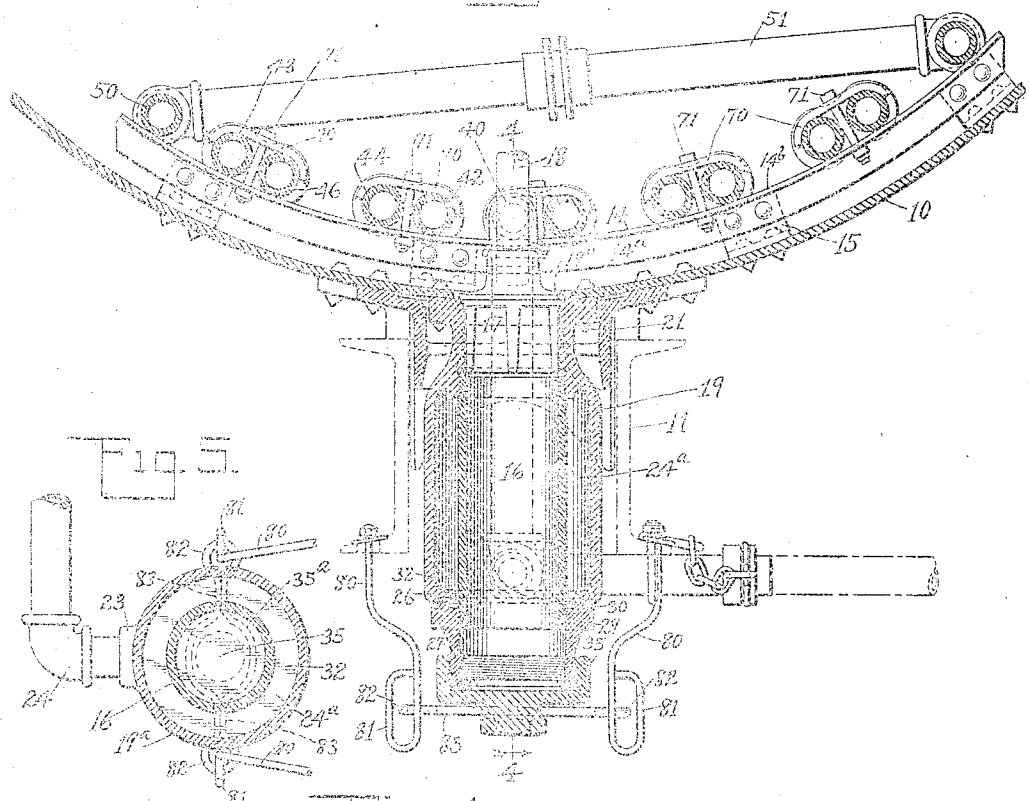
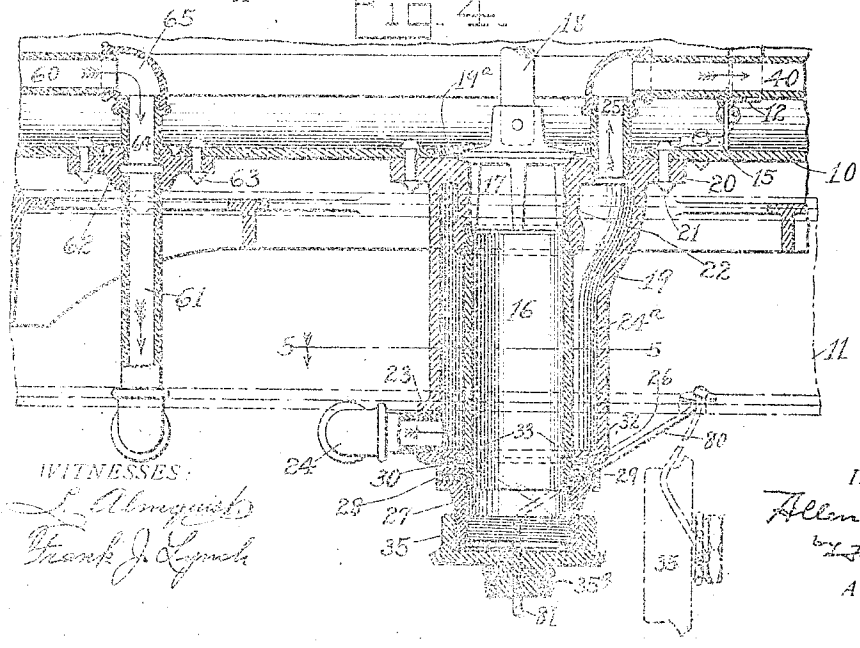


Fig. 5.

Fig. 4.



WITNESSES:

L. Almquist

Frank J. Lynch

INVENTOR.

Allen E. Ostrander

by Fox & Lucas.

ATTORNEY

UNITED STATES PATENT OFFICE.

ALLEN E. OSTLANDER, OF RIDGEWOOD, NEW JERSEY, ASSIGNOR TO AMERICAN CAR AND FOUNDRY COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF NEW JERSEY.

TANK-HEATER.

1,292,365. Specification of Letters Patent. Patented Jan. 21, 1919.

Application filed March 5, 1915. Serial No. 12,397.

To all whom it may concern:

Be it known that I, ALLEN E. OSTRANDER, residing at Ridgewood, Bergen county, New Jersey, and being a citizen of the United States, have invented certain new and useful Improvements in Tank-Heaters, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and to use the same, reference being had to the accompanying drawings, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof will occur to persons skilled in the art. In said drawings:—

Figure 1 is a plan view showing steam coils and associated parts with a tank shell shown in section;

Fig. 2 is a transverse sectional view shown on line 2—2 of Fig. 1;

Fig. 3 is a similar view, the section being taken on line 3—3 of Fig. 1;

Fig. 4 is a sectional view, the section being taken on line 4—4 of Fig. 3;

Fig. 5 is a sectional view, the section being taken on line 5—5 of Fig. 4, and

Fig. 6 is a vertical sectional view similar to Fig. 4 showing a modified form of construction.

The object of the invention is to provide means for fluidifying the contents of tanks of tank-cars so that such contents may be readily discharged by gravity from such tanks.

Tank-cars are commonly used to transport tar, lard, heavy road oils and other commodities which are frequently loaded into the tanks while in a more or less fluid condition and are solidified within the tank.

When it becomes desirable to discharge the lading, steam is admitted to steam coils within the lower part of the tank, thereby heating the lading, and when it becomes sufficiently fluid, the lading is discharged through a suitable conduit forming part of a discharge valve leading from the bottom of the tank.

However, due to the fact that such material only slowly becomes fluid in the near vicinity of the valve, time is lost, this being due to the fact that the valve plug and the discharge conduit are located below the steam coils, and the solid contents in the vicinity of the valve plug heat slowly.

A disadvantage in the ordinary arrangement of steam coil used in tank-cars is that the pipes expand and, where fixed in position, disrupt the fastening means by which such coils are commonly held.

An object of the invention is to provide an arrangement of steam coils, supports and connections therefor, which will permit expansion without destroying their connection with the supports for such coils.

Another object is to provide means for heating the discharge valve so as to facilitate discharge of the lading.

Another object is to utilize the discharge valve structure as a part of the general heating system, thereby making the jacket of the discharge valve a part of the steam conduit, preferably at the ingress end of such conduit, so that lading in the near vicinity of the valve will be first heated, thereby making it possible to open the valve within a very short time after steam is admitted to the steam coils.

Other objects and advantages will appear in connection with the detail description of the parts, of which: 10 indicates the shell of a tank car, 11 the draft members above which the tank is carried in any suitable manner and between which the discharge pipe extends whereby said discharge pipe is protected by said draft members when the car is in service, and 13 is a coil of heating pipes supported near their ends on transversely disposed angles 14, which are in turn supported by chairs 15 riveted to the inner face of the tank shell and to the depending legs 14^a of said angles.

16 is the conduit of a jacketed discharge pipe, through which conduit the contents of the tank may be discharged. 17 is a valve plug lifted by means of the stem 18 from its seat 19^a when it is desired to discharge the lading.

The jacketed discharge pipe is of peculiar construction and comprises a jacket portion 19, having radial outstanding flanges 20, through which rivets 21 extend for connecting the discharge pipe to the bottom of the tank shell. Within the jacket 19 and formed integrally therewith is a depending portion 22, internally screw-threaded at its

lower end for connection with the conduit 16 so that said conduit may be properly supported.

The conduit 16 is of less diameter than the internal diameter of the jacket 19 and jacket 19 is provided, near its lower end, with an offset internally screw-threaded lug 23, to which is connected steam pipe 24. The upper part or top wall of the jacket 19 is perforated and provided with an internal screw-thread, with which is connected a short length of steam pipe 25, connected in turn with the coils 13 within the tank.

The lower end of the jacket part 19 of the discharge pipe is provided on its bottom face with a recess in which is positioned an annular packing 26 of lead or other suitable material.

The lower end of the conduit 16 is externally screw-threaded, and a collar 27 is connected by a screw-threaded means with the lower end of said conduit 16, said collar being locked in position by set-screws 28 which pass through the thickened portion 29 of said collar 27 and bear against the screw-thread at the bottom end of conduit 16.

Projecting upwardly from said thickened portion 29 of collar 27 is an annular flange 30, said flange being relatively sharp at its upper edge to adapt it to seat itself in the lead packing, before referred to.

To assist in forming a steam-tight joint between conduit 16 and the jacket 19 at the lower end, the space between the flange 32, forming the bottom end of the jacket, and the conduit 16, is caulked with suitable packing as lead or oakum, as at 33. The collar 27 is provided at its lower end with both external and internal screw-threads so as to adapt it for receiving a cap 35, or a plug, which may engage the internal screw-thread of said collar.

Referring specifically to the steam coil within the tank, it will be noted that the pipe 40, which is connected through member 25, before referred to, with the steam jacket of the outlet valve, extends from the middle portion of the tank to a suitable return bend 41, from which return bend 41 a pipe 42 leads to a similar return bend 43 near the opposite end of the tank. Tracing pipe 44, leading from return bend 43, it will be noted that it terminates in the return bend 45, and the pipe 46, leading from return bend 45, terminates in a return bend 47; a pipe 48, leading from return bend 47 to another return bend 49; another pipe 50, leading from return bend 49, to the transversely extending pipe 51, which extends to the return bend 52 and thence through suitable pipes to the discharge pipe 60, which latter is relatively in axial alignment with pipe 40, before referred to.

The pipe 60 connects with the discharge pipe 61, which latter is screw-threaded into the cap 62, which cap is secured by rivets 63 with the lower portion of the tank shell, a short length of pipe 64 and an elbow 65 completing the connection between pipes 60 and 61. The return bends are connected to the pipes 40 to 60, inclusive, by ordinary screw-threaded connections.

The pipes 40 to 50 are loosely held to angles 14 by means of clips 70, which only partly embrace said pipes near their ends, said clips being locked in position by means of bolts 71 passing through the outstanding flanges 14' of the angles 14, before referred to. Intermediate the angles 14, there being one of said angles near each end of the tank, the pipes are supported by suitable means as, for example, the angle 12, which like the angles 14, is held in position by supporting chairs 15.

As the pipes comprising the steam coil within the tank are of considerable length and are flexibly connected near their ends with the supporting angles 14, they are free to move vertically and transversely, when expanded, due to the admission of live steam within said heating coils and it is for this reason that the pipes are arranged in the staggered relation shown in the drawings.

Heretofore, in many instances, steam coils have been rigidly connected to the tank shell with disastrous results, due to expansion and unexpected distortion of the components of such steam coils, and to permit flexibility both in the pipes of the coils and the several links of the coils in their relation one to the other and their connection to the tank, is one of the objects of the present invention, it being well understood that the bolt 71 will serve as a swivel.

In operation, the tank is loaded in the usual manner and preferably through a dome—not shown—near the top and the lading is transported to its destination whereupon, if the lading is in other than a fluid condition, steam is admitted through the steam pipe 24 into the passage 24' within the steam jacket 19 of the valve, thence through said passage or conduit through the pipe 25, pipe 40 and connected pipes, and discharges at 61, interim, however, passing through all of the pipes of the steam coil and, in due course, fluidifying the solid lading in the tank.

As live steam is first admitted through the jacket of the outlet valve, it is evident that the outlet valve, and the contiguous portion of the lading, will be first affected, whereupon by means of the stem 18, the valve plug 17 may be lifted from its seat, thereby providing an unobstructed passage for the discharge of the lading through conduit 16, after the cap 35 has been removed.

The cap 35 is frequently lost in service and to avoid this it is preferably supported, as shown, by means of a yoke which comprises arms 80—80, each of which is passed through a perforation in one of the flanges of the draft member or sill 11 and there secured, and passes thence downwardly, obliquely, as shown in Figs. 4 and 5 where the arms 80 are looped at 81 for the reception of the interlocking eyes 82 of the loop 83. The loop 83 circumscribes the neck portion 35ª of cap 35 so that the cap is free to rotate. The loops 81 are long enough to permit the cap to be screwed on and off the collar 27, and when the cap is unscrewed from said collar, it will drop by gravity to the position indicated in broken lines in Fig. 4, due to the eccentric relation of the support for the arms 80 with relation to the collar 27 of the outlet valve.

As thus supported, the cap is removed from the discharging fluid passing out of the outlet valve and is also high enough from the track to avoid accidental contact with obstructions tending to release the cap from its fastenings. Referring to the modification of Fig. 6, it will be noted that the collar 27ª is held by screw-threaded connection with the jacket casting 19, and the lead packing, or its equivalent, 33ª rests in position between the depending flange 19ᵇ of jacket 19 and the pipe 16, and the collar 27ª has a head adapted to press into said lead packing to force it into contact with pipe 16 and seal the joint thereat.

An advantage of the modified form just referred to is that the pipe 16 is freed from the weight of the collar 27 and cap 35 and the jacket 19 and collar 27ª may expand independently of the pipe 16.

I am aware that receptacles have been provided with double bottoms formed of spaced sheets of metal between which steam or heating fluid could be admitted, and discharge pipes have connected such spaced sheets; also that suction pipes have been steam jacketed within a receptacle. In the former a double shell is required and in the latter a pump is required, neither of which is necessary with my device which is adapted for connection to the exterior bottom face of a single wall shell of a railway tank car, and all of the lading in said car may flow by gravity through my improved discharge pipe regardless of the temperature of the surrounding atmosphere.

A gravity discharge pipe in a tank car is not new, nor is the plug or valve 17 of the accompanying drawings.

It is broadly new, however, to provide a commercial railway tank car with a steam jacketed gravity-discharge-pipe so connected to the lower exterior face of its tank shell that the discharge pipe can be heated by steam passing to steam coils within such tank and thereby raise the temperature of such discharge pipe and that portion of the lading within the tank which lies in the immediate vicinity of such pipe.

What I claim is:

1. A gravity discharge pipe having an upper end adapted for connection to a receptacle and adapted to extend away therefrom, said discharge pipe comprising a discharge conduit adapted for communication with the receptacle interior and formed for the reception and seating of a valve in said conduit, and a heat jacket adapted for inclusion in a heating conduit internal to said pipe and surrounding said discharge conduit and leading through said upper end.

2. A gravity outlet pipe for tanks of tank cars, comprising a valve seat at its upper end, a gravity discharge conduit, steam jacketed intermediate its ends, and a flange having an opening therethrough adapting it for attachment directly to the shell of a tank, the steam jacketed portion being communicable with a heating pipe within the tank of a car through said opening.

3. A discharge nozzle provided with a steam-jacketed middle portion having a seat for a valve plug at its upper end, and having further a steam-egress port at said upper end in its top wall.

4. As an article of manufacture, a discharge nozzle adapted for service when connected with the bottom sheet of a tank of a railway tank car and comprising an upper attaching flange of relatively large area adapted to be connected directly to such bottom sheet, said flange being provided with a steam egress port and a combined discharge port and valve plug seat, said nozzle depending below said flange in the form of a steam jacketed member comprising a central discharge conduit and being perforated for connection with a steam pipe at one side of said discharge conduit to permit steam to pass into said member around the discharge conduit and through said egress port.

5. As an article of manufacture, a discharge nozzle adapted for connection to and used in unloading the tank of a railway tank car comprising a cast shell having an attaching flange and being provided with a plurality of ports therethrough, one of which is centrally disposed and adapted to serve as a seat for a valve plug and to discharge lading from said tank and the other passage is an outer passage adapted to serve as a conduit for steam from a source of supply through said nozzle into contact with the wall of said valve plug seat and through a port in said flange.

6. A steam jacketed discharge nozzle for the tank of a railway tank car comprising a casting adapted to be attached to the bottom sheet of the tank and provided with a plurality of ports in its upper end, both of

which ports open through the upper wall of said casting, one port serving as a seat for a valve plug, a lading discharge conduit leading downwardly from said port, and a steam jacket surrounding said discharge conduit and leading downwardly from the other port.

7. As an article of manufacture, a steam jacketed lading discharge nozzle adapted for connection to and use with the tank of a railway tank car, and comprising a top flange adapted for direct connection with said tank, a central discharge conduit leading from a port through said flange downwardly and a steam jacket integral in part with said flange, there being a steam ingress port through the shell of said steam jacket and a steam egress port from said steam jacket leading through said top flange.

8. As an article of manufacture, a steam jacketed discharge nozzle adapted to discharge lading through an opening in the bottom sheet of a tank of a railway tank car and comprising an attaching flange with an inner and an outer conduit leading through said flange, the inner one of which conduits is adapted to communicate directly with the interior of said tank, and adapted to serve as a seat for a valve plug designed to close said conduit and the outer conduit being adapted to serve as a steam jacket to convey steam from an exterior source of supply through said outer conduit and into the interior of said tank.

9. In combination in a railway car, a tank provided with an enlarged opening through its bottom sheet, a discharge nozzle secured thereto and provided with an attaching flange of greater area than said opening, there being a plurality of ports through said attaching flange, one of which is a lading discharge port and one a steam ingress port, a centrally disposed discharge nozzle leading from said discharge port downwardly, a valve plug within the upper end of said discharge nozzle, and a steam jacket surrounding the middle portion of said nozzle and communicating directly with said steam egress port.

10. As an article of manufacture, a device adapted to be connected to the bottom sheet of the tank of a railway tank car and to depend vertically below said bottom sheet, said device comprising a steam jacketed discharge nozzle having a plurality of openings through its top wall and adapted to be so connected with the bottom sheet of such tank that the lading in the tank may flow by gravity therethrough and the discharge nozzle can be heated by steam in contact therewith within the steam jacket of the said nozzle.

11. A discharge nozzle provided with a steam-jacketed middle portion having a seat for a valve plug at its upper end, and having further a steam-egress port, said nozzle having an attaching member through which said egress port extends to coincide with an opening in a tank.

12. A gravity discharge pipe having a transverse top wall with a plurality of fluid openings therein through one of which communication with the interior of an attached tank can be established, a perforated outer shell portion integral with said top wall and a central conduit the wall of which with said outer shell forms a steam jacket.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

ALLEN E. OSTRANDER.

Witnesses:
MAX SCHIRRMACHER,
L. V. JOYCE.