Dec. 27, 1927. 1,654,359

H. W. ASH

APPARATUS FOR HEATING AND EMPTYING ASPHALT TANKS

Filed Aug. 10, 1926 2 Sheets-Sheet 1

Fig. 1.

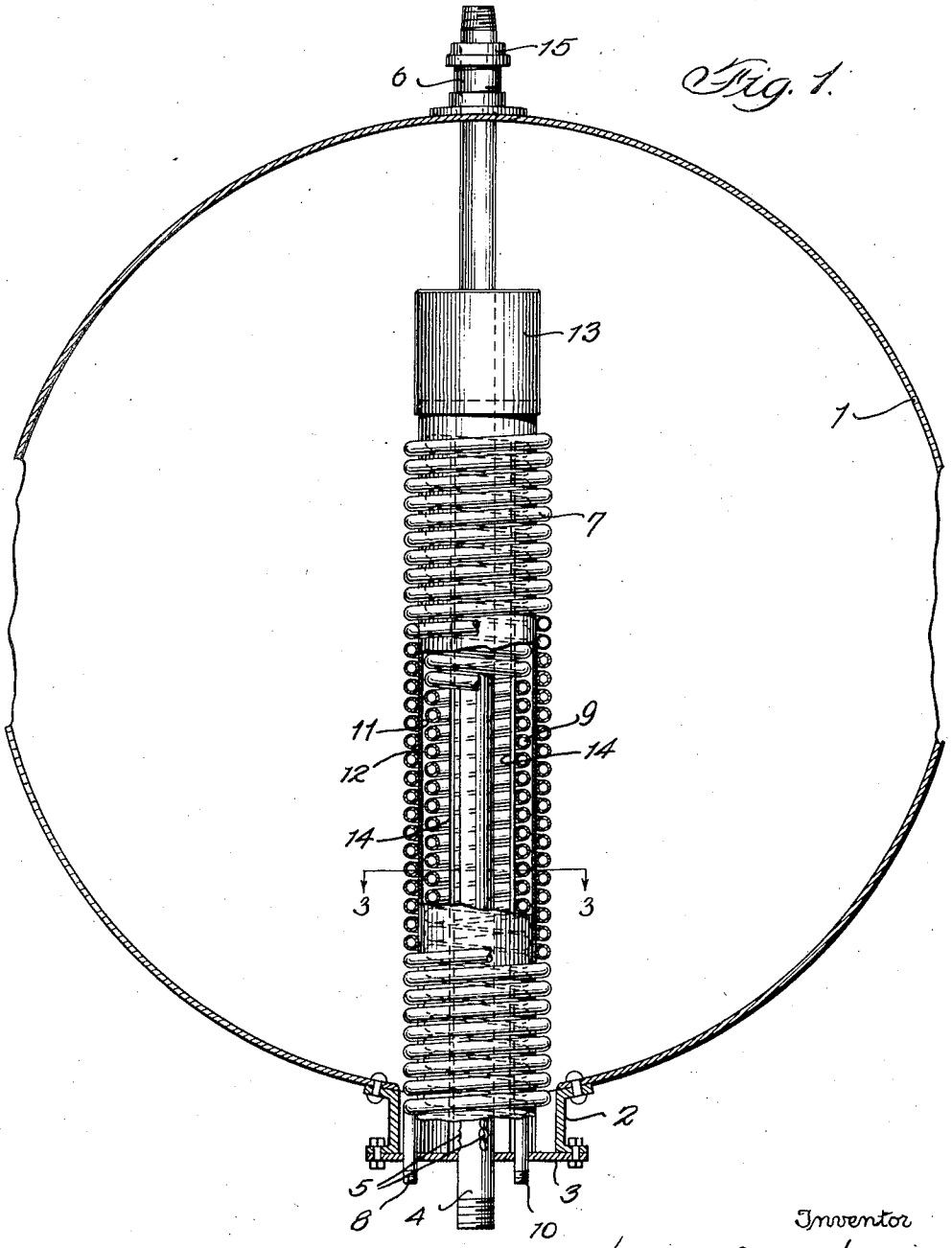


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Fig. 2.

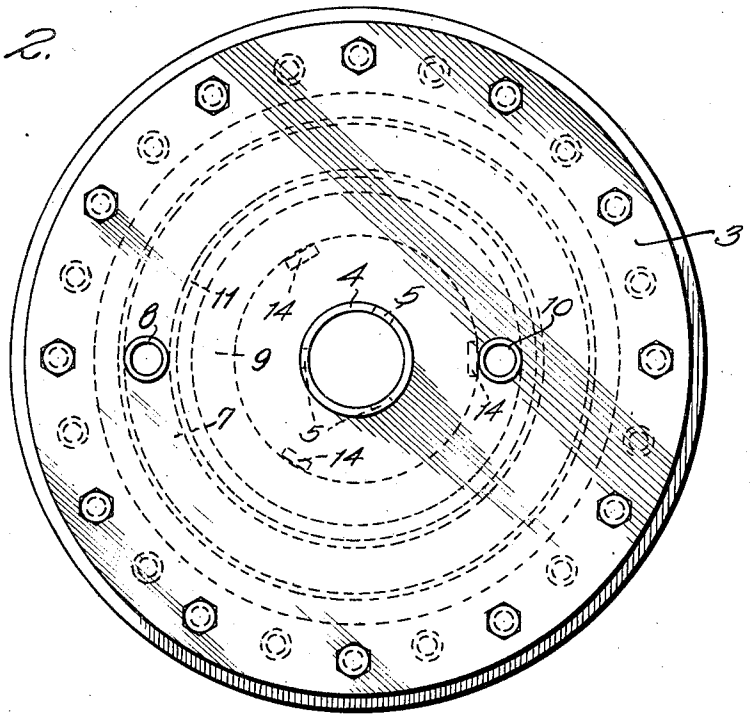
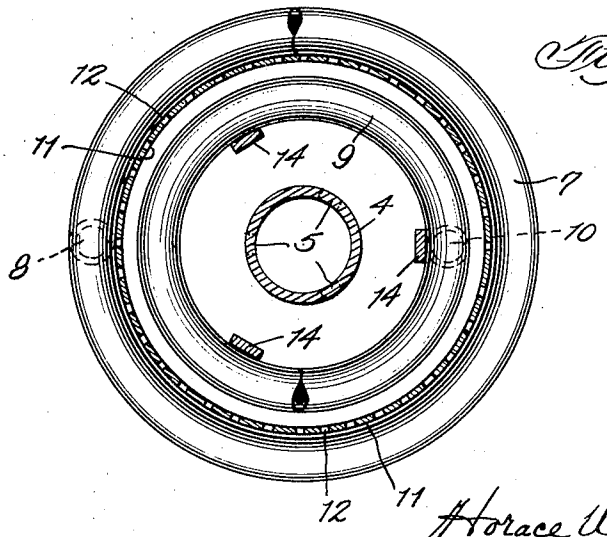



Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR HEATING AND EMPTYING ASPHALT TANKS.

Application filed August 10, 1926. Serial No. 128,508.

This invention relates to devices for heating and emptying asphalt storage tanks or the like. The invention is applicable particularly to steel storage tanks which are usually set above the ground, although the same may be used with equal advantage on tanks which are buried in the ground. As best suited for the description and disclosure of this invention, the following explanation is made setting forth its combination with a tank supported upon or above the ground.

Tanks of the character mentioned for either asphalt or for heavy fuel oils require heating coils on the inside, and on account of the size of the tanks, and the size of the coils which are oftentimes seven feet or more in length and correspondingly heavy, the coils are customarily placed in the tanks at the time the tanks are manufactured. When the tanks are constructed in that manner, the coils are fastened to the bottom and sides of the tank in such fashion that they will not break loose in shipping. As a consequence of such practice in making the tanks, and on account of the number of joints which must unavoidably be made in such heating coils, there is constantly present the probability of leaks occurring when the coils are erected in final position and tested before their actual use begins. When such leaks happen, very shortly and after the tank has been filled, they cause the asphalt or oil to foam, and in the case of some oils, the presence of water causes the oil to thicken in such manner that makes it practically unfit for subsequent uses. Even under conditions when the tanks are built without coils and transported to their destination and erected and the coils then introduced, when the tanks have to be moved the same disadvantage generally follows. Another general objection to the present type of heating coils is due to the fact that the coils have to be located at the bottom of the tank, and when such tanks with coils in them are rolled off the car carrying them to the place where they are to be employed and upon their foundations, the weight of the heavy coil makes the tank exceedingly difficult to roll when the coil is on the ascending side, and the same weight is very liable to make the tank get out of control when the coil passes over the top and is upon the descending side of the tank. To eliminate the difficulties above explained, I have invented the heating and discharging attachments for a tank as hereinafter disclosed. This apparatus comprises a double spiral coil of pipe, which will afford sufficient heating surface to produce the heating effect desired in the tank, and it is concentrated in the vicinity of the outlet or manhole of the tank. This location results in the condition that the melting of the material takes place at a very rapid rate in the vicinity of the selective, perforated discharge pipe, or other discharge connection, and by means of this selective device the oil or asphalt which is adequately melted is drawn off as rapidly as may be required, through the outlet pipe. In the arrangement of the parts of this invention the heating coil and the outlet connection are all attached to the manhole cover, or an equivalent removable portion of the tank, in such manner that the removal of the cover enables one to remove the whole heating system without disconnecting anything inside the tank. And when the manhole cover is replaced the various heating parts may be introduced into the tank through the manhole. It will now be understood that the tank from which the heavy coil and its associated members and the manhole cover have been removed, can be safely rolled down the skids or inclined platform and into position upon its foundation without danger of becoming beyond the control of the men moving it.

This invention comprises a heating coil formed of a continuous, seamless pipe, which has, therefore, no joints to leak, and can readily be removed when the tank is shipped, making it very much easier to handle the tank on or off the cars.

The preferred construction of this invention is illustrated in the accompanying drawings, of which—

Figure 1 represents a vertical sectional view of a portion of a tank showing this invention also partly in section applied thereto, all parts being drawn assembled.

Figure 2 is an external plan view of the manhole cover, showing the inlet, outlet and discharge connections thereon.

Figure 3 is a cross section on the horizontal broken line 3—3 of Figure 1.

Throughout the drawings and description the same number is used to refer to the same part.

Considering the drawings, the tank 1 of any chosen form has the manhole casting 2 riveted in the usual way to the opening in the tank wall. Bolted to the casting or casing

2 is the manhole cover 3. The manhole and cover may be of any selective size or shape desired within the purview of this invention. Passing centrally through the manhole cover and rigidly attached thereto is the discharge pipe 4, usually provided with a series of openings or perforations 5 made through the wall of the pipe near its junction with the manhole cover so that the perforations lie on the inside and in the tank when the cover is attached. The pipe 4 passes upwardly through the tank and at its upper end on the outside of the tank it is encased in a suitable stuffing box 6 to make a tight but removable joint.

The heating element consists of a continuous length of heavy, seamless steel pipe. It is arranged in two concentric coils. The outer coil 7 has a connection 8 passing through and rigidly secured to the manhole cover, and the inner coil 9 has a like connection 10 also passing through and secured to the cover. Those connections are usually arranged at the opposite sides of the discharge pipe connection and substantially as shown in Figure 2. The coils carry the heating fluid which in practice is steam of suitable temperature.

Within the outer coil 7 and welded to it at about every ten turns of the coil is a perforated sheet bent into a cylindrical form and having one end rigidly secured to the inside of the manhole cover around the inlet, outlet and discharge connections mentioned. The cylindrical sheet is marked 11 on the drawings and is in fact a partial support or stiffening element for the outer coil 7. Throughout any portion of the cylindrical sheet are formed perforations 12, and such perforations may be in any order and of varying size from top to bottom as described in my Patent No. 1,637,889 granted Aug. 2, 1927. The perforations of different size as stated render the cylindrical sheet 11 a selective strainer or separator for melted asphalt as explained in my said application. The sheet 11 may or may not have a cap 13 at the top as illustrated in Figure 1.

The inner coil 9 has arranged lengthwise on the inside of the coil the bars 14, welded to the coil at about every tenth turn. The ends of the bars are rigidly secured to the manhole cover, and constitute in fact a support or stiffening frame for the inner coil.

In this application there has been shown the discharge pipe 4 running clear through from the bottom through the top of the tank, this pipe being perforated with three slots in the lower portion of the pipe through which the heated and fluid asphalt or oil enters the discharge pipe. If it is desired to draw off the heated material from the bottom of the tank, a cap 15 is screwed on the top of the discharge pipe as shown in Figure 1. If it is desired to draw off the heated material from a point above the tank, the cap 15 is placed upon the lower end of the discharge pipe 4, both ends of the pipe being suitably threaded for that purpose.

In the operation and as shown in the drawings, the stuffing box 6 shown on the top of the tank is merely a device that will enable the heating members to be easily installed and to make the connection between the discharge pipe and the tank perfectly tight, after the manhole cover is bolted in place upon the casing 2. It is believed to be apparent that this device could be used without running the discharge pipe out through the top, and this invention is not limited to a discharge pipe of any particular size or length, excepting that there shall be a discharge connection extending through the manhole cover or other removable portion of the tank as stated. The essential feature of this invention resides as described in the construction enabling the entire heating and discharging means to be removed or introduced and handled as one piece, and in the employment of a continuous seamless, jointless tube for conveying the steam of the necessary temperature during the time required to render the asphalt fluid and keep it so.

Having now described this invention, I claim:—

1. In apparatus of the character described, the combination with a tank provided with an opening affording access to the interior of the tank, of a removable closure for the said opening, a discharge pipe vertically arranged and passing outwardly through the said closure and being attached thereto, the said discharge pipe having an opening in its wall adjacent to the said removable closure, the remaining portion of the discharge pipe within the tank being closed, a tubular member surrounding the discharge pipe and spaced therefrom and extending to the said closure, means passing through the said closure and secured thereto and located in proximity to the said discharge pipe within the said tubular member whereby material flowing downwardly within the said member to the said opening in the discharge pipe is constantly heated, and the said heating means, the said tubular member and discharge pipe being constructed and arranged to be introduced and withdrawn from the tank by the placing or removal of the said closure.

2. In apparatus of the character described, the combination with a tank provided with a manhole, of a manhole cover, heating means including a continuous coiled tube having its inlet and outlet rigidly secured to the said cover for introduction and withdrawal through the manhole, a support for the said tube comprising a perforated sheet formed cylinderically in correspondence with the size of the coil of the

tube, one end of the said sheet being rigidly secured to the said cover, the said sheet being secured to the said tube, and a discharge connection borne by the said cover and opening into the cylinder formed by the sheet.

3. In apparatus of the character described, the combination with a tank provided with a manhole, of a manhole cover, heating means including a continuous coiled tube having its inlet and outlet rigidly secured to the said cover for introduction and withdrawal through the manhole, a support for the said tube comprising a perforated sheet formed cylindrically in correspondence with the internal size of the coil of the tube and arranged within the coiled tube, the said cylindrical sheet being rigidly secured to the said cover and to the said tube, and a discharge connection borne by the said cover and opening into the cylinder formed by the sheet.

4. In apparatus of the character described, the combinatiion with a tank, the said tank having an opening, of a closure for the said opening, the said closure having a discharge connection, a perforated sheet formed cylindrically and secured to the said closure over the said discharge connection terminating at the top within the tank, and means for conveying a heating fluid in proximity to the said cylindrical sheet.

5. In apparatus of the character described, the combination with a tank, the said tank having an opening, of a closure for the said opening, a discharge connection extending through the said closure, a perforated hollow member terminating at the top within the tank and rigidly secured to the said closure around the opening of the said discharge connection, and means for conveying a heating fluid in proximity to and inside and outside of the said perforated member.

6. In apparatus of the character described, the combination with a tank having a removable portion, the said portion being provided with a discharge pipe passing entirely through the tank, the said pipe being in open communication with the interior of the tank and having a removable connection with the tank and a permanent connection with the said removable portion of the tank, and means rigidly attached to the said removable portion for conveying a heating fluid and constructed for introduction into the tank.

7. In apparatus of the character described, the combination with a tank having a removable portion, the said portion being provided with a discharge pipe passing entirely through the said tank, the said pipe being in open communication with the interior of the tank and having a removable connection with the tank and a permanent connection with the said removable portion of the tank, of a perforated member attached to the said removable portion around the opening of the said discharge pipe, and means secured to the said removable portion for conveying a heating fluid and constructed for introduction into the tank.

8. In apparatus of the character described, the combination with a tank having a removable portion, the said portion being provided with a discharge pipe passing entirely through the said tank, the said pipe being in open communication with the interior of the tank and having a removable connection with the tank and a permanent connection with the said removable portion of the tank, of means for conveying a heated fluid comprising an outer coiled tube and an inner coiled tube in communication with each other, and each of the coiled tubular portions having one end secured to and opening through the said removable portion of the tank.

9. In apparatus of the character described, the combination with a tank having a removable portion, the said portion being provided with a discharge connection, of means for conducting a heating fluid comprising a continuous tube, one portion of the tube coiled about the other portion, the said outer and inner coiled portions of the tube having ends secured to and passing through the said removable portion, and means comprising a cylindrical perforated sheet attached to the said removable portion and arranged between the coils and secured to and adapted to support the outer coil.

10. In apparatus of the character described, the combination with a tank having a removable portion, the said portion being provided with a discharge connection, of means for conducting a heating fluid comprising a continuous tube, one portion of the tube being coiled about the other portion, the said outer and inner coils having ends secured to and passing through the said removable portion, perforated means extending between the coils for supporting the outer coil, and means attached to the said removable portion and to the inner coil to support the inner coil.

11. In apparatus of the character described, the combination with a tank having a removable portion, of a perforated discharge pipe having one end passing through the said removable portion of the tank and secured thereto on one side of the tank, the other end of said discharge pipe passing through the opposite wall of the tank and removable with said portion through the other said of the tank, removable means for making a tight joint between the said pipe and the tank wall, means for conveying heating fluid comprising a coil of pipe having outlet and inlet ends passing through

and secured to the removable portion of the tank, the said coil being arranged adjacent to the said discharge pipe, and a straining member borne by the said removable portion of the tank and enclosing the said discharge pipe.

12. In apparatus of the character described, the combination with a tank having a removable portion, of a perforated discharge pipe having one end passing through the said removable portion of the tank and secured thereto, the other end of said discharge pipe passing through the opposite wall of the tank and removable with said portion through the other side of the tank, removable means for making a tight joint between the said pipe and the tank wall, means for conveying a heating fluid comprising a coil of pipe having outlet and inlet ends passing through and secured to the removable portion of the tank, and a perforated cylinder surrounding the said discharge pipe and being attached to the coil of pipe and to the said removable portion of the tank.

13. In apparatus of the character described, the combination with a tank having a removable portion, of a perforated discharge pipe having one end passing through the said removable portion of the tank and being secured thereto, the other end of said discharge pipe passing through the opposite wall of the tank and removable with said portion through the other side of the tank, removable means for making a tight joint between the said pipe and the tank wall, means for conveying a heating fluid comprising a continuous coil formed into two coils one coil within the other and having their ends passing through and being secured to the said removable portion of the tank, and a perforated sheet arranged between the said coils and being connected with one of the said coils and the said removable portion of the tank.

14. In apparatus of the character described, the combination with a tank having a removable portion, of a perforated discharge pipe having one end passing through the said removable portion of the tank and secured thereto, the other end of said discharge pipe passing through the opposite wall of the tank and removable with said portion through the other side of the tank, removable means for making a tight joint between the said pipe and the tank wall, means for conveying a heating fluid comprising a continuous tube formed into two coils one within the other and having their ends passing through and being secured to the said removable portion of the tank, a perforated sheet in cylindrical form and arranged between the said coils, the said sheet being attached at spaced points to the outer coil and the end of the sheet being secured to the said removable portion of the tank, and rods secured to the inner coil at spaced points and to the said removable portion.

15. In apparatus of the character described, the combination with a tank having a removable portion, of a discharge pipe having one end passing through the said removable portion of the tank and secured thereto, the said pipe being perforated near its junction with the said removable portion, the said pipe passing through the tank and removably through the side wall of the tank opposite said removable portion, means for making a tight detachable joint between the said pipe and the tank wall, means for conveying a heating fluid comprising a continuous pipe formed into two coils one within the other and having their ends passing through the said removable portion of the tank and secured thereto, and each of said coils having means attached to it and to the said removable portion of the tank to support the coil, the said supporting means for the outer coil being constructed as a strainer.

In testimony whereof I affix my signature.

HORACE W. ASH.