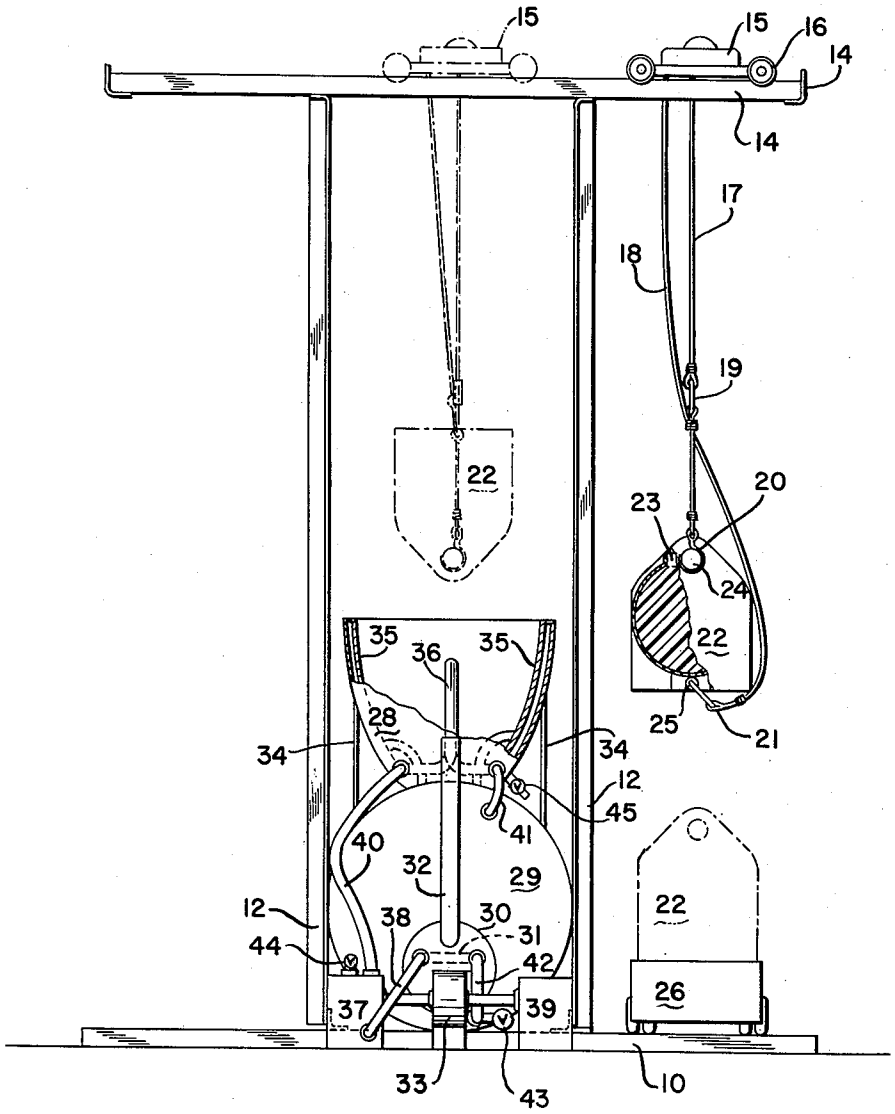
Oct. 2, 1956 W. J. MILLER 2,764,973

APPARATUS FOR HANDLING AND LIQUEFYING ASPHALT

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FIG. 1



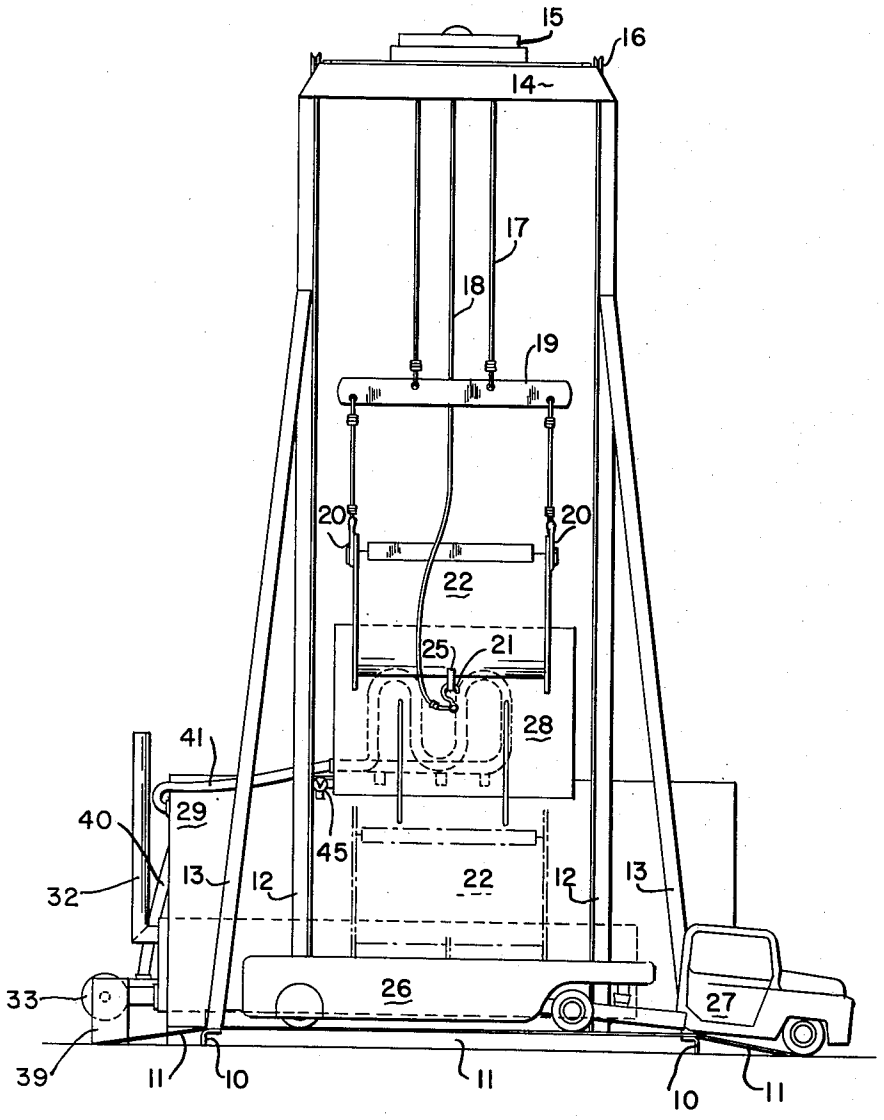
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FIG. 2



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APPARATUS FOR HANDLING AND LIQUEFYING ASPHALT

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Application January 7, 1954, Serial No. 402,627

5 Claims. (Cl. 126—343.5)

This invention relates to apparatus and liquefying equipment usable in handling asphalt and liquefying the same. The apparatus is capable of handling asphalt and similar bituminous materials which are originally processed in a refinery and shipped to a point of use.

The principal object of the invention is the provision of apparatus for handling and liquefying asphalt.

A further object of the invention is the provision of apparatus for handling and liquefying asphalt so devised that it can be transported on a portable basis, as, for example, to new job locations, erected in a minimum of time and with a minimum of effort and subsequently used for handling containers of asphalt or the like, liquefying the asphalt in the containers rapidly and effectively and temporarily holding the liquefied asphalt.

A still further object of the invention is the provision of an asphalt container handling device capable of elevating and inverting an asphalt container.

A still further object of the invention is the provision of an asphalt container handling device capable of rapidly liquefying asphalt in an inverted container and receiving the liquefied asphalt therefrom and retaining the same in liquid condition.

A still further object of the invention is the provision of apparatus for heating and handling asphalt in containers so that the same may be quickly liquefied and removed therefrom without damage to the containers to permit the reuse thereof.

The apparatus for handling and liquefying asphalt disclosed herein comprises a continuation-in-part of my co-pending application, Serial No. 393,409, now Patent No. 2,729,209, on Apparatus for Handling Asphalt, filed November 20, 1953, and which application relates to apparatus similar in some respects to that disclosed herein with the exception of the portions thereof utilized in liquefying the asphalt in the containers.

The present invention comprises an improvement over the disclosure of the said co-pending application and specifically in that the containers of asphalt are more readily handled thereby and the asphalt therein liquefied more rapidly due to the more compact and unitary nature of the present apparatus as compared with that of the co-pending application.

The apparatus for handling and liquefying asphalt as disclosed herein is primarily intended for use at a remote point with respect to the location of the asphalt source. For example, in constructing various air bases and the like in remote parts of the world it has been heretofore customary to ship asphalt in drums which were cut away and destroyed at the point of use in order to remove the asphalt therefrom and thereby considerably increase the cost of the asphalt. The present apparatus permits asphalt to be shipped in reusable containers which are inverted at the point of use by the apparatus disclosed, positioned in and on heating apparatus that rapidly liquefies the complete contents of the containers and thereby effects the speedy removal of the asphalt therefrom and without damaging the containers in any way.

Inasmuch as a considerable volume of asphalt and similar bituminous material is employed in making asphaltic concrete payments in air base and other constructions, the solution of the problem of speedy and inexpensive removal of asphalt from the shipping containers is important to the asphalt industry as well as the successful construction of the projects themselves.

The present apparatus will effectively solve the several problems in that relatively inexpensive reusable containers are provided in which the asphalt may be shipped from refininery to the point of use and the apparatus disclosed in connection therewith is capable of effectively and rapidly handling the containers and liquefying the asphalt therein for quick removal therefrom. The apparatus includes relatively large containers adapted for shipping and handling and for inversion and positioning in and on the heating means provided together with the apparatus for handling the containers and means for supplying a suitable heating medium to the apparatus itself.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being the intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a front view of the asphalt handling and liquefying apparatus, broken lines illustrating an alternate position of the handling apparatus and container and with parts broken away and parts in cross section.

Figure 2 is a side elevation of the apparatus shown in Figure 1 with broken lines indicating the positioning of the container in an alternate location.

By referring to the drawings it will be seen that a structural frame including base members 10—10, portions of which are covered by ramps 11—11, serve to support a vertical frame structure 12—12 including diagonally positioned bracing members 13—13 and horizontally positioned frame members 14—14 arranged in a rectangle, the longer sides of which comprise rails upon which a remotely controlled crane 15 is positioned for movement therealong.

The crane 15 includes spaced pairs of flanged wheels 16—16. The crane 15 also includes a winch having operating cables 17 and 18, the lower ends of the cables 17 supporting a beam 19 which in turn is provided with depending hooks 20—20 and the cable 18 has a hook 21 on its lowermost end. It will thus be seen that the crane 15 adapted for travel along the rails of the rectangular frame members 14 is provided with means for engaging, elevating and inverting a container 22.

The container 22 is essentially a cylindrical container having an elongated opening 23 in its uppermost portion, the heads of the container 22 being of modified rectangular shape and provided with engagement means in the form of projecting bosses 24 on which the hooks 20—20 may be attached. The bottom of the container 22 is provided with secondary engagement means 25 in which the hook 21 may be positioned, as best shown in Figure 1 of the drawings.

It will be observed that the ramps 10 are so positioned that a tractor trailer unit (the trailer of which is indicated by the numeral 26 and the tractor by the numeral 27) may be driven thereon alongside the frame structure 12, the trailer 26 being adapted to carry one or more of the asphalt containers 22, as shown in broken lines thereon.

The crane 15 will thus be seen to be capable of engaging the container 22 on the trailer 26, lifting the container vertically in upright position through the cables 17 and moving the same sidewardly into the area of the frame structure 12 where the container 22 may be inverted, as shown in broken lines in Figure 1 of the drawings and in solid lines in Figure 2 of the drawings as by motion imparted the cable 18.

In order that the asphalt in the container 22 may be rapidly and completely removed therefrom, a double walled open top vessel 28 is provided within the area of the vertical frame 12 for the reception of the inverted container 22 and more particularly the asphaltic contents thereof. The vessel 28 is of a size greater than that of the container 22 so that the same may be received therein when lowered thereinto by the crane 15. The vessel 28 is mounted on and directly supported by a hot oil tank 29 which is also positioned in the frame work of the vertical frame 12 and on the base members 10—10.

The hot oil tank 29 comprises part of an oil heating and circulating unit such as heretofore known in the art and disclosed in my co-pending patent applications Serial Nos. 288,608, now Patent No. 2,729,200, and 345,418, now Patent No. 2,690,172 and Patents Nos. 2,607,337, 2,613,665, and 2,636,490. As disclosed in these several patents and patent applications oil heating equipment such as used in the present disclosure comprises the tank 29 in which a secondary smaller tank 30 is partially positioned. An end portion of the secondary smaller tank 30 extends outwardly of the tank 29.

The tank 29 normally contains a fluid heating medium such as oil and the secondary tank 30 defines a combustion chamber which may incorporate the heat exchanger illustrated in several of the above mentioned patents and patent applications, and preferably includes a combination baffle and heat exchanger 31 positioned transversely of the secondary tank 30 between its upper and lowermost portions and extending inwardly thereof from the front end thereof to a point spaced with respect to the rear end thereof.

The front wall of the secondary tank 30, which is positioned outwardly of the end of the front wall of the tank 29 has a pair of vertically spaced openings, the upper one of which is connected with a flue stack 32 and the lower one of which is connected with an oil burner 33. Thus, products of combustion taking place within the secondary tank 30 pass around the horizontally disposed heat exchanger 31 and into the flue stack 32. The majority of the heat released by the combustion of fuel within the combustion chamber defined by the secondary tank 30 is transferred to the fluid heating medium within the combination heat exchanger and baffle 31 and in the tank 29.

The tank 29 has supporting members 34 on its uppermost surface which help to position the vessel 28 thereon, it being observed that the lowermost portion of the vessel 28 is of an arcuate shape corresponding with the arcuate shape of the hot oil tank 29 so that the vessel 28 is supported directly thereon.

The vessel 28 has double walls, the inner one of which is indicated by the numeral 35 and which defines the actual receiving vessel for the asphalt from the containers 22. The vessel 28 also has an upstanding coil 36 positioned centrally thereof and adapted to enter into the opening 23 of the inverted container 22 and directly engage the asphalt therein.

The coil 36 is in series communication with the hollow walls of the vessel 28 and with the hot oil tank 29 and a pump 37 in association therewith. As best shown in Figure 1 of the drawings, the combination heat exchanger and baffle 31 in the secondary tank 30 is placed in communication with the pump 37 by way of a pipe 38 so that actuation of the pump 37 as by a motor 39 (which also actuates the oil burner 33) will move the

fluid heating medium from the heat exchanger 31 through the pipe 38 and into the hollow walled vessel 28 and the heat exchanger 36 by way of a pipe 40. Return flow from the vessel 28 and heat exchanger coil 36 is by way of a pipe 41 and directly into the hot oil tank 29. The circulating cycle is completed by a fourth pipe 42 which interconnects the hot oil tank 29 and the heat exchanger 31.

In this connection it will be observed that the pipe 42 is provided with a valved T fitting 43 while the pump 37 is provided with a valved outlet 44. Thus, the hot oil from the apparatus may be, and usually is, conveyed to other equipment such as storage tanks, mixing equipment and the like which are adjacent the apparatus herein disclosed but not a part thereof, the hot oil heating unit comprising the tank 29, the secondary tank 30, etc., forming the basic source of fluid heating medium for the entire asphalt handling, storing and mixing operation.

By referring again to the drawings, it will be seen that the vessel 28 is provided with a valved outlet 45 by means of which liquefied asphalt as received from the containers 22 may be withdrawn. In actual practice, a heated transfer line is connected with the outlet 45 and the liquefied asphalt is pumped therethrough to a storage tank (not shown).

Still referring to the drawings and Figure 1 in particular, it will be seen that the vessel 28 is so arranged that it receives a considerable amount of heat directly from the hot oil tank 29 by conduction betweeen the engaging surfaces thereof. Additionally, it receives hot oil comprising the fluid heating medium by way of the circulating pipes 40 and 41 so that it is maintained at a desirable temperature as is the upstanding heat exchanger coil 36 therein.

In operation, the crank 15 lifts a container 22 of asphalt from the trailer 26, as shown in solid lines in Figures 1 and 2 of the drawings, and by reason of the elevation of the cables 17. The crane moves the elevated container into the area shown in broken lines in Figure 1 of the drawings within the vertical frame 12 whereupon the crane elevates the cable 18 and inverts the container 22. It will occur to those skilled in the art that such covering members as have been provided on the longitudinal opening 23 of the container 22 will have been previously removed.

The container 22 in inverted position above the vessel 28, as shown in broken lines in Figure 1, is then lowered by the crane 15 so that the upstanding heat exchanger coil 36 enters the opening 23 and directly engages and liquefies the asphalt in the container 22. The container settles rapidly into the vessel 28 with the heat exchanger coil 36 upwardly into the container 22.

The walls of the vessel 28 correspond with the general shape of the container 22 and, being hollow and heated, they serve to heat the walls of the container 22 both radiantly and by conduction so that all of the asphalt in the container 22 is liquefied rapidly and drains outwardly into the vessel 28. The crane 15 is then actuated to again elevate the container 22, still in inverted position, and the complete contents thereof is thus readily removed therefrom.

The container is then carried by the crane to an offside location from whence it may be re-shipped to the refinery for refilling. The liquid asphalt in the vessel 28 is then removed by way of the valved outlet 45 and additional contents may be rapidly handled and the asphalt therein liquefied as just described.

It will thus be seen that the apparatus disclosed herein meets the several objects of the invention.

Having thus described my invention, what I claim is:

1. In apparatus for handling and liquefying asphalt, a container having an access opening in the top thereof and means on said container for receiving lifting devices, an elevated structure, a lifting and inverting device on said

structure for lifting said container, an open top vessel and a heating coil positioned on the bottom of said vessel and extending vertically within said vessel, a tank having a built-in combustion chamber in said structure and comprising a source of a fluid heating medium for said heating coil, said vessel being mounted on said tank and above the same, said lifting and inverting device acting to lift and invert said container and lower the same into said vessel with said heating coil engaging the contents of said container to liquefy the same.

2. The improvement in asphalt handling apparatus set forth in claim 1 wherein the vessel comprises a double walled construction and wherein said fluid heating medium is in communication with said double walled construction.

3. The improvement in asphalt handling apparatus set forth in claim 1 wherein the container is of cylindrical shape having end portions with apertured flanges extending beyond the sides of the container and defining said means by which said container is handled, and wherein said access opening is formed in the upper longitudinal surface of said cylindrical container.

4. Apparatus for handling asphalt comprising a container having an access opening in the top thereof extending substantially the width thereof and a tank for a fluid heating medium, an internally heated open top vessel on said tank and communicating with said tank for the circulation of said fluid heating medium therethrough, means for lifting, inverting and lowering said container into said vessel, auxiliary heating means for said container

comprising a heat exchanger coil positioned vertically in said vessel centrally thereof and engageable in said access opening of said container, and means establishing communication between said heating coil and said tank.

5. The improvement in apparatus for handling asphalt set forth in claim 4 wherein the convolutions of the heat exchanger coil are arranged in in-line relation to one another for engagement in said access opening of said container.

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