

July 5, 1932.

C. D. CHASE

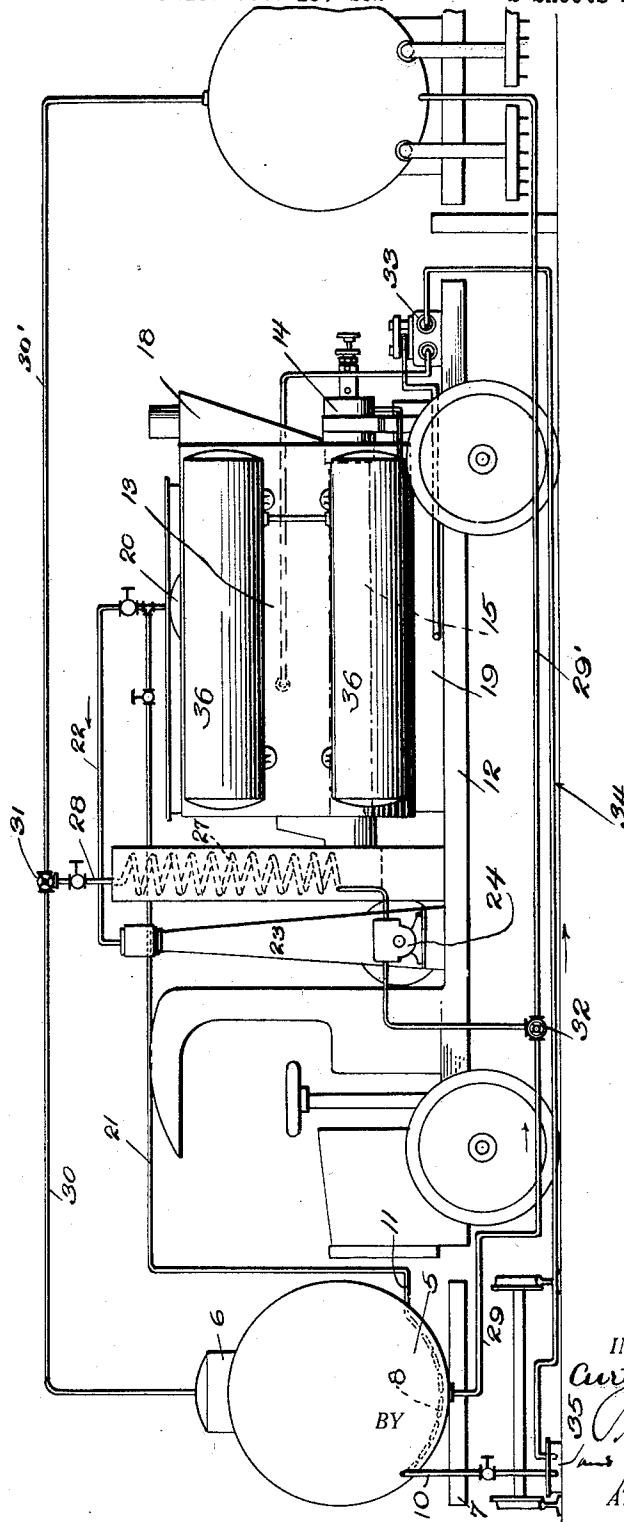
1,865,556

TANK CAR HEATER

Filed Oct. 19, 1927

2 Sheets-Sheet 1

Fig. 1



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Fig. 2

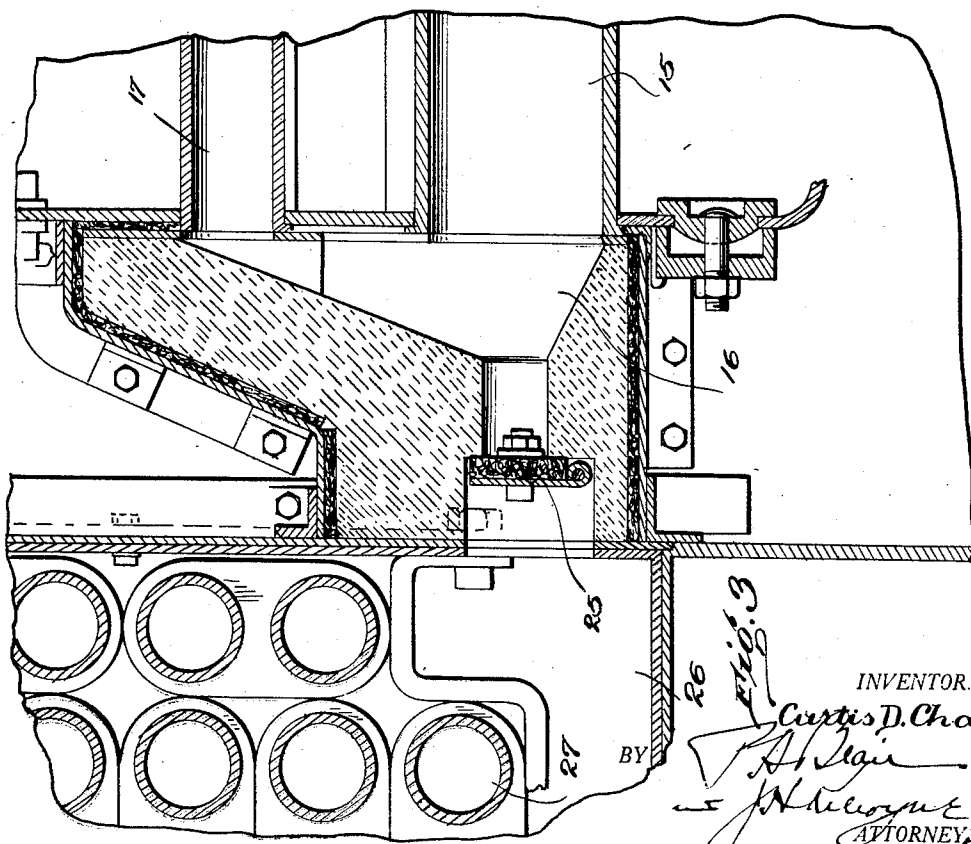
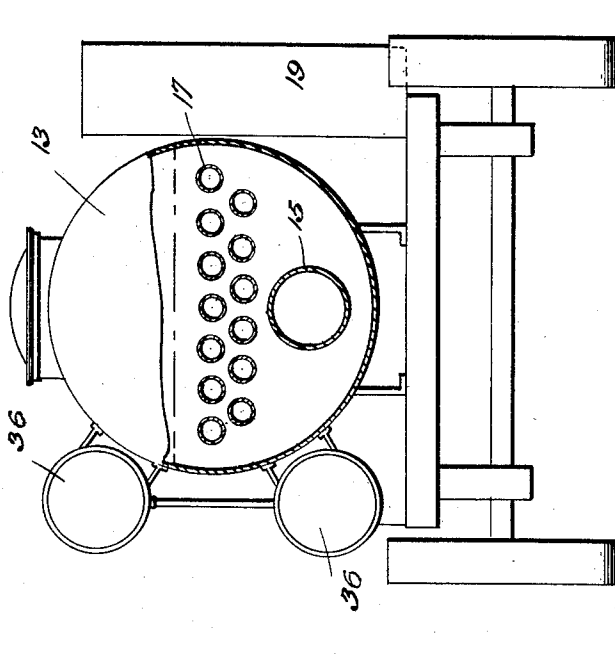


Fig. 3

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TANK CAR HEATER

Application filed October 19, 1927. Serial No. 227,340.

This invention relates to that type of apparatus generally known as tank car heaters and to a method of heating the contents of tank cars which permits of ready delivery to distributing units. To those familiar with the art, it is well recognized that railway tank cars containing certain materials, such as asphalt or the like, must be heated to restore the contents of the tank to a fluid condition before such contents can be entirely and effectively removed. The tank cars for containing such materials are generally equipped with a heating coil in their interior adapted to be connected with any suitable source of steam for melting the asphalt prior to its delivery to distributing units. The present invention deals more particularly with a portable, self-contained apparatus adapted to be connected with such heating coil and tank car, and with the process for melting the asphalt in a rapid and efficient manner and delivering the same to the spray wagons or distributing units. While the term "asphalt" will be used in the following description of the invention, it is, of course, to be understood that the apparatus is equally applicable to other materials which have to be heated or melted prior to their removal from the shipping container.

One of the objects of the present invention is to provide an apparatus of this general character of simple and practical construction, which will be reliable and efficient in use and operation.

A further object is to provide a portable, self-contained, and compact heating plant particularly adapted for the purpose herein set forth.

A further object is to provide an apparatus of the last above mentioned character which will have a high degree of efficiency and rapidity in operation, and being portable, may be coupled directly with a tank car and the distributing units, such as carts, for quickly melting the asphalt and delivering it to the carts in the shortest possible time.

A further object is to provide an improved method of heating the contents of a tank car or the like which may be inexpensively

practiced and which will be highly efficient and rapid in operation.

Other objects will be in part obvious from the annexed drawings and in part hereinafter indicated in connection therewith by the following analysis of this invention.

This invention accordingly consists in the features of construction, combination of parts and in the unique relation of the members and in the relative proportioning and disposition thereof, all as more completely outlined herein.

To enable others skilled in the art so fully to comprehend the underlying features thereof that they may embody the same by the numerous modifications in structure and relation contemplated by this invention, drawings depicting a preferred form of the invention have been annexed as part of this disclosure, and in such drawings, like characters of reference denote corresponding parts throughout all the views, in which—

Fig. 1 is a diagrammatic elevation, partly in section, showing the complete equipment;

Fig. 2 is a rear end elevation, also in section, showing the manner in which the principal parts are mounted; and

Fig. 3 is a detail of part of the heating plant.

Referring now to the drawings in detail, and more particularly to Fig. 1, 5 indicates a tank car of usual standard construction provided with a supply dome 6 and supporting frame and wheels 7 mounted upon a siding, for example, as indicated. The tank car is provided at its inner, lower portion with a longitudinally disposed heating coil 8 provided with an outlet line 10 and an inlet 11. The heating plant is preferably mounted upon an automobile frame or chassis 12 of any desired type provided with the usual supporting wheels, driving means, etc. Mounted upon the chassis is a boiler 13, preferably of fire tube type, and heated by means of an oil burner 14 supplied in any desired manner with fuel oil and compressed air, these details not being material to the herein invention, and for that reason are not shown other than herein indicated.

The flame from this oil burner passes thru

a tube 15 to a header chamber 16, and the larger part of the flame and products of combustion return thru one or more tubes 17 to an outlet flue or stack 18. In this manner, the water supplied primarily from a tank 19, Fig. 2, is heated to produce steam which is taken off thru the steam dome 20 thru pipe 21 connected to the inlet 11 of the tank car heating coil 8. A portion of this steam, however, is by-passed thru pipe 22 to a steam engine 23 which drives a pump 24, the purpose of which will be hereinafter more fully explained.

The chamber 16 is of sheet metal construction lined with asbestos and fire brick and is provided with a swinging damper 25, whereby a portion of the products of combustion may be diverted from the said chamber and directed into a super-heater stack or chamber 26. This super-heater chamber is provided with a coil 27 of any desired type, but preferably one in which the pipes are positioned relatively close and extend throughout the entire chamber and gradually progress upwardly towards an outlet connection 28. This super-heater mechanism is designed for heating melted asphalt drawn thru a line 29 connected with the bottom of the tank car by means of pump 24 and delivering this hot, melted asphalt thru the super-heating coil 27 and outlet connection 28 therefrom, thru a return pipe 30 to the top of the tank car, where it falls on the upper surface of the unmelted asphalt solidified within the car. In this manner, the unmelted asphalt is forced downwardly upon the coil 8 in the bottom of the tank and simultaneously heated on its upper part by the incoming super-heated asphalt.

It will be noted that the pipes 28 and 29 are provided with three-way valves 31 and 32 respectively, which may be actuated to draw off the hot asphalt from a distributing tank thru line 29', or to deliver the super-heated asphalt from super-heater chamber 26 directly to said distributing tank thru line 30'.

It will also be noted that the present equipment contemplates the use of a feed water pump 33 delivering water from the tank 19 directly into the boiler, or it may communicate thru pipe 34 with a condensate collecting tank 35 placed under the tank car for collecting the condensed steam after it has passed thru the coil 8 and steam outlet 10. As shown in Fig. 2, the water tank 19 is preferably placed at one side of the boiler 13, while at the opposite sides are mounted the fuel oil tanks 36 for supplying the burner 14.

It is advisable that one source of heat, such as a single burner 14, be used, from which the flame is used to generate steam only, and the hot gases from the same pass into the super-heating stack 26 to directly heat the asphalt coil 27. This feature is important, as a high temperature flame will quickly carbonize the

asphalt, unless great care is used in the heating.

While the construction and operation will doubtless be clear to those familiar with apparatus of this character, it may be briefly stated that in use, the tank car heater is positioned adjacent a tank car and connected in substantially the manner diagrammatically shown in Fig. 1. Live steam is first passed thru the line 21 to the coil 8, and as soon as the asphalt begins to melt, the pump 24 is started to draw off the melted asphalt from the bottom of the tank car. The damper 25 is simultaneously opened to admit a portion of the hot exhaust gases to the interior of the super-heater chamber 26, thereby to thoroughly heat the coil 27, and thus render the asphalt passing thru the coil highly fluid, due to its relatively high temperature. The melted asphalt is then discharged back thru the pipe 30 on to the top of the unmelted asphalt which is forced down into proximity with the heating coil in the bottom of the car. After a time, the valve 31 may be actuated to discharge the melted asphalt from the coil 27 directly to the distributor cart.

In describing the invention, attention has only been given to the more essential features of the invention, and those minor details, such as the oil burner, its source of supply of air and oil, pressure gauges, valves, pump control, etc., have been eliminated as the desirability and use of these parts may vary under different circumstances and are furthermore perfectly obvious. It is, therefore, to be understood that these parts, which are conventional equipment, will be used according to circumstances.

From the above, it will be seen that the present invention contemplates a practical, self-contained, and compact tank car heating plant, which may be easily and quickly moved about from one car to another, as desired, as a single unit. The entire equipment is carried by one supporting frame and may be easily and quickly connected with a tank car or a distributing tank, as desired. The control of the asphalt super-heater may be easily and efficiently accomplished according to circumstances and the degree of heat admitted to the super-heater varied and controlled as necessary. It is thus seen that the present invention is adapted to accomplish among others all of the objects and advantages herein set forth.

I claim:

1. In an apparatus of the character described, in combination, a portable support, a steam generator mounted thereon including a single source of heat, a tank car provided with a coil for heating the contents thereof, steam connections from said generator to the heating coil, a chamber adjacent said generator, a coil mounted in said chamber subjected to said source of heat and communicat-

ing with the upper and lower parts of the interior of the tank car and thru which the contents of the car is adapted to be forced, and means for by-passing a portion of the heat from the generator thru said chamber.

2. In an apparatus of the character described, in combination, a tank provided with the heating coil for heating the contents thereof, a support, a steam boiler mounted upon said support and adapted to be connected with the heating coil, a source of heat for the boiler, tubes extending from said source of heat thru said boiler for heating the same, a chamber adjacent the boiler, means to divert a portion of the products of combustion from said tubes to said chamber, a coil in said chamber adapted to be heated by the diverted gases, and means for pumping the contents of the tank thru said last named coil.

3. In an apparatus of the character described, in combination, a tank provided with the heating coil for heating the contents thereof, a support, a steam boiler mounted upon said support and adapted to be connected with the heating coil, a source of heat for the boiler, fire tubes extending from said source of heat thru said boiler for heating the same, a chamber adjacent the boiler, means to divert a portion of the products of combustion passing thru said tubes to said chamber, a coil in said chamber adapted to be heated by the diverted gases, means for pumping the heated contents of the tank thru said last named coil, and means connected with the discharge end of said last named coil for leading the heated contents thereof back to the tank or to another destination as desired.

4. In an apparatus of the character described, in combination, a tank having a heating coil adjacent its bottom portion for heating the contents of the tank, a supporting frame, a steam boiler mounted on said frame, fire tubes extending thru said boiler, a source of heat for the boiler, a chamber adjacent the boiler, a coil in said chamber, an opening communicating with the boiler for conducting a portion of the gases from said fire tubes to said chamber, means for controlling the passage of gases thru said opening, said boiler being in communication with the heating coil of the tank, and means to draw off the heated contents of the tank from the bottom thereof, and to pass said contents thru the coil in said chamber and back upon the contents at the top of the tank.

5. In an apparatus of the character described, in combination, a tank car provided with a heating coil for heating the contents thereof, a vehicle frame, a boiler mounted on said frame and having a source of heat therein, a connection from the top of the boiler to the heating coil for conducting steam thereto, a chamber upon said frame, a coil in said chamber, a pump for drawing off the heated contents of the tank car adjacent its

heating coil and passing the same thru the coil in said chamber and thence back to the tank car, and means for directing a part of the products of combustion from said heat source to said chamber.

6. In an apparatus of the character described, in combination, a tank car provided with a heating coil for heating the contents thereof, a vehicle frame, a boiler mounted on said frame and having a source of heat therein, a connection from the top of the boiler to the heating coil for conducting steam thereto, a chamber upon said frame, means to direct heat to said chamber from said heat source, a coil in said chamber, a pump for drawing off the melted contents of the tank car adjacent its heating coil and passing the same thru the coil in said chamber and thence back to the tank car, and means for controlling the temperature of said chamber, said means including a swinging damper whereby a portion of the products of combustion from the heat source may be diverted to said chamber in desired quantity.

7. In an apparatus of the character described, in combination, a tank car provided with a heating coil for heating the contents thereof, a vehicle frame, a boiler mounted on said frame, a source of heat for the boiler, a connection from the top of the boiler to the heating coil, a chamber upon said frame, a coil in said chamber, a pump for drawing off the heated contents of the tank car adjacent the heating coil therein and passing the same thru the coil in said chamber and thence back to the tank car, means for directing the products of combustion to said chamber from said heat source, and means to control the passage of the products of combustion from said heat source to the chamber.

8. In an apparatus of the character described, in combination, a tank car provided with a heating coil adjacent its bottom portion for heating the contents of the car, a vehicle frame carrying a boiler, water and fuel tanks mounted on the frame adjacent the boiler, a source of heat for said boiler, means for withdrawing steam from said boiler and passing the same to the heating coil, a chamber adjacent the boiler, means to divert a portion of the products of combustion from said heat source to the chamber, a coil in said chamber having its discharge end connected to the top of the tank car, a pump mounted on said frame, and connections between the pump, the coil in said chamber and the lower part of the tank car for drawing off the heated contents of the car adjacent the heating coil and passing the same thru the coil in said chamber, and thence to the top of the tank car.

Signed at Washington, District of Columbia, this 9th day of September, 1927.

CURTIS D. CHASE.