Nov. 15, 1938. J. GIORDANO 2,136,738

RAILWAY TANK CAR HEATING APPARATUS

Filed Sept. 4, 1937

FIG. 1.

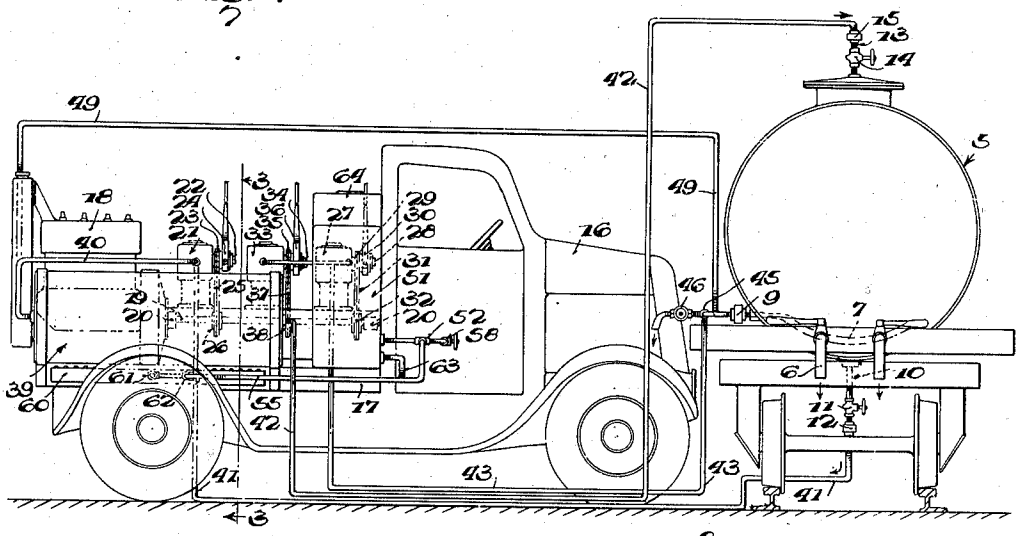


FIG. 2.

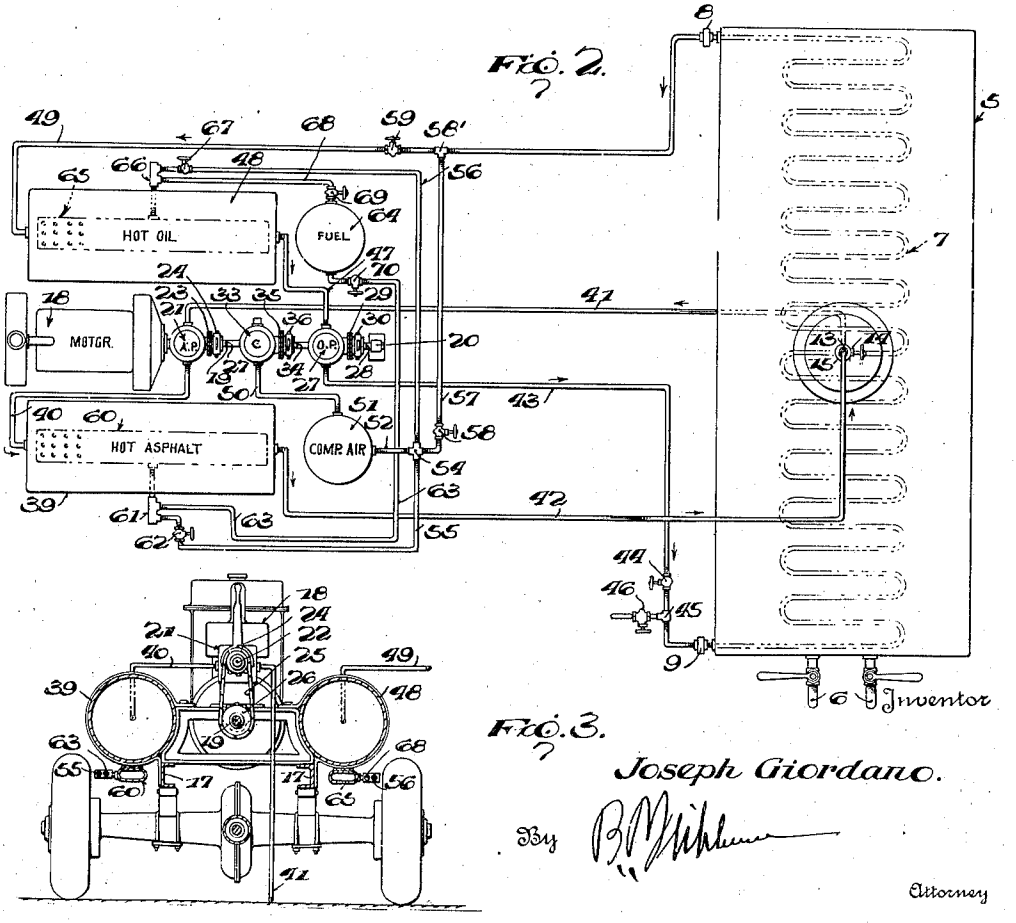


FIG. 3.

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RAILWAY TANK CAR HEATING APPARATUS

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3 Claims. (Cl. 126—343.5)

My invention relates to apparatus for heating the contents of railway tank cars, such as asphalt, bituminous material or the like, to render the same suitably fluid, for proper withdrawal from the tank car.

An important object of the invention is to provide apparatus of the above mentioned character which is in the nature of a portable unit.

A further object of the invention is to provide apparatus for circulating a heating liquid through the usual heating coil in railway car tank, to impart to the contents of the tank some degree of fluidity subsequently to which the material is rendered further fluid by circulating the same between a heating element and the railway car tank.

A further object of the invention is to provide means for supplying air pressure to the burners and also for supplying such compressed air to the railway car tank coil, to blow out the same, prior to circulating the heating medium therethrough.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawing forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of apparatus embodying my invention,

Figure 2 is a plan view of the same, and,

Figure 3 is a transverse section taken on line 3—3 of Figure 1.

In the drawing wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 designates the tank of a railway tank car, for holding asphalt, bituminous material, or other material which must be heated to a certain degree before it becomes sufficiently fluid to be withdrawn from the tank. The tank 5 is equipped with the usual outlet valves 6 for withdrawing the heated fluid material. The railway tank car 5 is equipped with the usual heating coil 7, preferably arranged near its bottom, for receiving a heating fluid, and this coil extends to the exterior of the tank 5 and is equipped with couplings 8 and 9, for connection with conduits or pipes, to be described. The tank 5 has an outlet pipe 10, leading into its bottom, equipped with an outlet cut off valve 11 and a coupling 12, for connection with a pipe or conduit. An inlet pipe 13 leads into the top of the tank 5 and has a cut off valve 14 connected therein and this pipe has a coupling 15 for connection with a pipe or conduit to be described.

The portable unit comprises a truck or automobile 16, including a bottom or platform 17, upon which the mechanism is mounted.

Suitably mounted upon the platform 17 is the prime mover, in the form of an internal combustion engine 18, which continually drives a horizontal drive shaft 19, when the engine is operating. The shaft 19 may be mounted in a suitable bearing or bearings 20, carried by the bottom 17.

The numeral 21 designates a material circulating pump. This pump is operated by a shaft 22, having a sprocket wheel 23 loosely mounted thereon, and adapted to be locked and unlocked to and from the shaft 22 by a clutch device 24. This sprocket wheel is driven by a sprocket chain 25, extending downwardly to engage a sprocket wheel 26, rigidly mounted upon the drive shaft 19. The numeral 27 designates a heating fluid circulating pump, operated by a shaft 28 having a sprocket wheel 29 loosely mounted thereon and this sprocket wheel is locked and unlocked to and from the shaft 28 by a clutch device 30. The sprocket wheel 29 is driven by a sprocket chain 31, extending downwardly to engage a sprocket wheel 32, rigidly mounted upon the drive shaft 19. The numeral 33 designates an air compressor, operated by a shaft 34 having a sprocket wheel 35 loosely mounted thereon and locked and unlocked to and from the shaft 34 by a clutch device 36. This sprocket wheel is engaged by a sprocket chain 37, extending downwardly to engage a sprocket wheel 38, which is rigidly mounted upon the drive shaft 19. It is thus seen that the two pumps and the air compressor are all driven from the common drive shaft 19, so that they may operate simultaneously, or each may be operated while the other is idle.

The numeral 39 designates a material heating tank, for receiving asphalt or the like, and this tank may be horizontally arranged upon the bottom 17, near and upon one side of the motor 18. An inlet pipe 40 leads into one end of the tank 39 and this pipe 40 leads to the outlet side of the pump 21. The inlet side of the pump 21 is connected with a pipe 41, connected with the pipe 10 through the medium of the coupling 12. The tank 39 has an outlet pipe 42 connected therewith at its end remote from the pipe 40 and the pipe 42 is connected with the pipe 13 through the medium of the coupling 15. It is thus apparent that when the material in the tank 5 becomes sufficiently fluid that it may be moved

by the action of the pump 21, that this pump will circulate such material between the tank 5 and the tank 39. The heating fluid medium pump 27 has its outlet side connected with a pipe 43 and this pipe is connected with the inlet end of the heating coil 7 by the coupling 9. The pipe 43 has a cut off valve 44 connected therein, and also has a T-coupling 45 connected therein, and leading to the atmosphere. A cut off valve 46 is connected in the T-coupling 45, as shown. The inlet side of the pump 27 is connected with a pipe 47, leading into a tank 48, at one end thereof. This tank is preferably horizontally arranged upon the bottom 17 near and upon one side of the engine 18. The tank 48 receives the circulating heating medium to heat the same. Connected with the opposite side of the tank 48 is an inlet pipe 49, connected with the outlet end of the heating coil 7 through the medium of the coupling 8. The air compressor 33 has a pipe 50 connected with its outlet side which leads into a compressed air storage tank 51, mounted upon the bottom 17. The tank 51 has an outlet pipe 52. This pipe has a T-coupling 54 connected therein which connects the same with pipes 55 and 56. Pipe 52 extends beyond the coupling 54 and is connected with a pipe 57, having a cut off valve 58 therein. Pipe 57 is connected with the pipe 49 by a coupling 58' and pipe 49 has a cut off valve 59, as shown.

Arranged beneath the material heating tank 39 is a burner 60, receiving a vaporized or carburetted charge from a mixer or carbureter 61, of any well known or preferred type. Air is supplied to the carbureter 61 through the compressed air supply pipe 55, having a valve 62 connected therein to regulate the supply of air. The liquid fuel, such as oil, is supplied to the carbureter 61 through a pipe 63, leading to an oil supply tank 64, vertically arranged upon the bottom or platform 17. A burner 65 is arranged beneath the heating fluid heating tank 48 and receives a vaporized or carburetted charge from a carbureter 66 of any well known or preferred type. Compressed air is supplied to the carbureter 66 through the pipe 56 having a valve 67 connected therein. The oil or other liquid fuel is supplied to the carbureter 66 through a pipe 68 leading from the tank 64, both pipes 68 and 63 leading into the bottom of the tank 64 and equipped with valves 69 and 70 respectively, for controlling the flow of the oil.

The operation of the apparatus is as follows:

The portable unit is driven to a position in proximity to the railway tank car 5, and the pipe 43 is connected with the heating coil 7 by the coupling 9 and the pipe 49 with the coil 7 by the coupling 8. The pump 27 is now connected with the drive shaft 19 of the motor 18 which is operating, and compressor 33 may also be operating while pump 21 may now be idle. The liquid fuel, with the proper amount of air, is now supplied to the burner 65 which will heat the oil within the tank 48. This oil will now be withdrawn from the tank 48 through the pipe 47, passes through the pump 27 and through the pipe 43 into and through the heating coil 7 and back through the pipe 49 into the tank 48. The heated oil is thus continuously circulated through the heating coil which will now heat the asphalt or the like material within the tank 5 so that it becomes sufficiently fluid to be manipulated by the pump 21. When the pump 21 is set into action, it withdraws the asphalt or like material from the tank 5 through the pipe 41 and discharges the same into the heating tank 39 in which the asphalt is heated and rendered suitably fluid, the same passing through the pump 21, pipe 40, tank 39 and pipe 42 back into the top of the tank 5. The asphalt is thus circulated between the tanks 5 and 39 and heated within the tank 39. After the asphalt has been heated to a temperature which will permit of its circulation through the tank 39, the pump 27 may be stopped, if desired. The circulation of the asphalt through the tank 39 is continued until the entire mass becomes suitably fluid whereby it will pass from the valves 6, or be pumped from the tank by any suitable means. Before the starting of the heating apparatus, it may be desirable to clean or blow out the heating coil 7, to remove deposits or the like which tends to prevent free circulation of the oil. To accomplish this, the valves 62 and 67 are closed and the valves 44 and 59 are closed, while the valves 58 and 46 are open. Compressed air from the tank 51 will therefore pass through the pipe 57, a portion of pipe 49, through the coil 7 and out to the atmosphere through the coupling 45 and valve 46.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the size, shape, and arrangement of parts, may be resorted to, without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, what I claim is:

1. Apparatus for heating material within a railway car tank having a heating coil therein, comprising a support, a heating liquid tank mounted upon the support, conduits connecting the heating liquid tank with the heating coil, a pump connected in one conduit to circulate the heating liquid between the heating liquid tank and coil, a burner arranged near the heating liquid tank, a carbureter leading to the burner, a material heating tank mounted upon the support, conduits connecting the material heating tank and the car tank, a pump connected in one of the last named conduits and serving to circulate the material between the car tank and the material receiving tank, a burner arranged near the material receiving tank, a carbureter leading to the last named burner, a liquid fuel supply tank mounted upon the support, conduits connecting the liquid fuel supply tank and the carbureters, a compressed air storage tank mounted upon the support, conduits connecting the compressed air storage tank and the carbureters, an air compressor connected with the compressed air storage tank, a prime mover mounted upon the support, a drive shaft driven by the prime mover, separate driving connecting means between the drive shaft and the first named pump, separate driving connecting means between the drive shaft and the second named pump, and separate driving connecting means between the drive shaft and air compressor, the arrangement being such that each pump and the air compressor may be driven independently.

2. Apparatus for heating material within a railway car tank having a coil therein, comprising a wheeled support, a heating liquid tank and a material heating tank arranged upon the support in spaced relation, conduits connecting the ends of the heating liquid tank with the opposite ends of the coil, conduits connecting the ends of the material heating tank with the upper and lower portions of the car tank, a motor mounted

upon the support between the tanks and having a drive shaft extending longitudinally of the wheeled support, a pump connected with one of the first named conduits, a pump connected with one of the second named conduits, said pumps being arranged in a group disposed between the tanks, separate adjustable driving means between the driving shaft and each pump so that the pumps may be separately operated, and burners arranged exteriorly of the tanks for heating the same.

3. Apparatus for heating material within a railway car tank having a coil therein, comprising a wheeled support, a heating liquid tank and a material heating tank mounted upon the support and spaced from each other forming a passage therebetween, conduits connected with the opposite ends of the heating liquid tank and connected with the ends of the coil, conduits connected with the opposite ends of the material heating tank and with the top and bottom of the car tank, a fuel tank and a compressed air tank mounted upon the wheeled support near corresponding ends of the first named tanks and arranged upon opposite sides of the passage, a motor mounted within the passage and having a driving shaft extending longitudinally of the passage, a pump connected with one of the first named conduits, a pump connected with one of the second named conduits, an air compressor connected with the compressed air tank, the pumps and air compressor being arranged in a longitudinal group disposed within the passage, separate driving means between the driving shaft and each pump and between the driving shaft and the compressor, burners arranged exteriorly of the tanks and near the same, carburetors discharging into the burners, pipes connected with the fuel tank and leading to the carburetors, and pipes connected with the compressed air tank and leading to the carburetors.

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