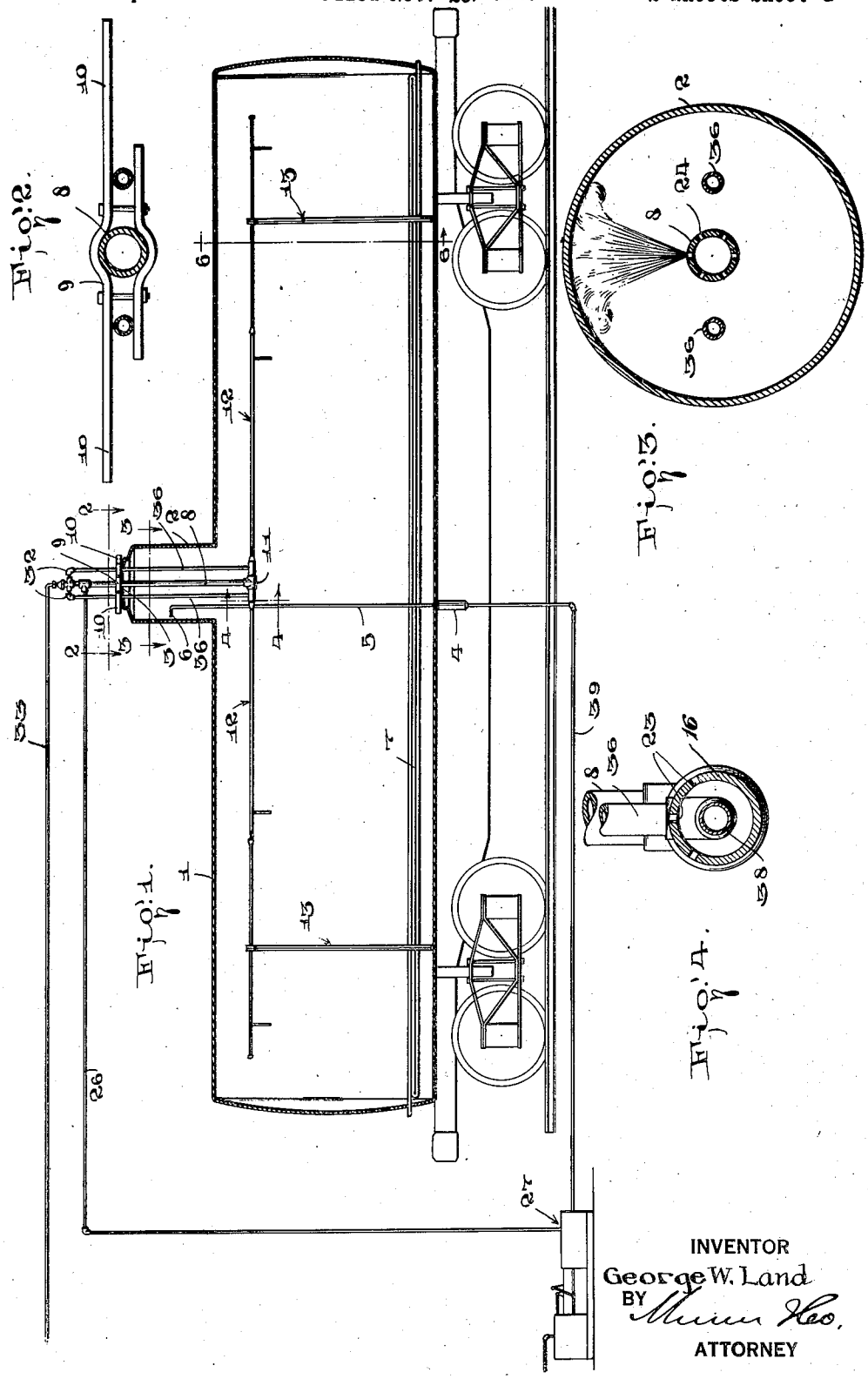
April 10, 1928. 1,666,015

G. W. LAND

TANK CLEANING APPARATUS

Filed Nov. 29, 1926 2 Sheets-Sheet 1



INVENTOR
George W. Land
BY Munn Geo.
ATTORNEY

April 10, 1928. 1,666,015

G. W. LAND

TANK CLEANING APPARATUS

Filed Nov. 29. 1926 2 Sheets-Sheet 2

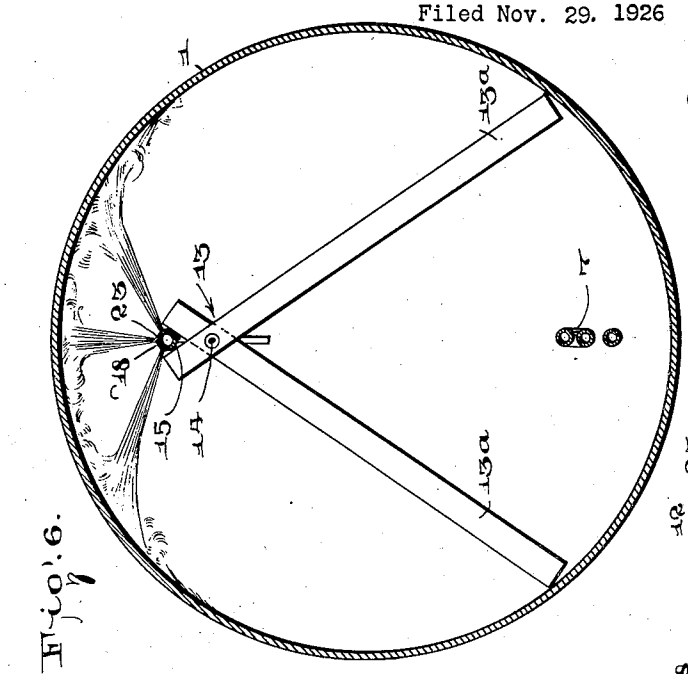


Fig. 6.

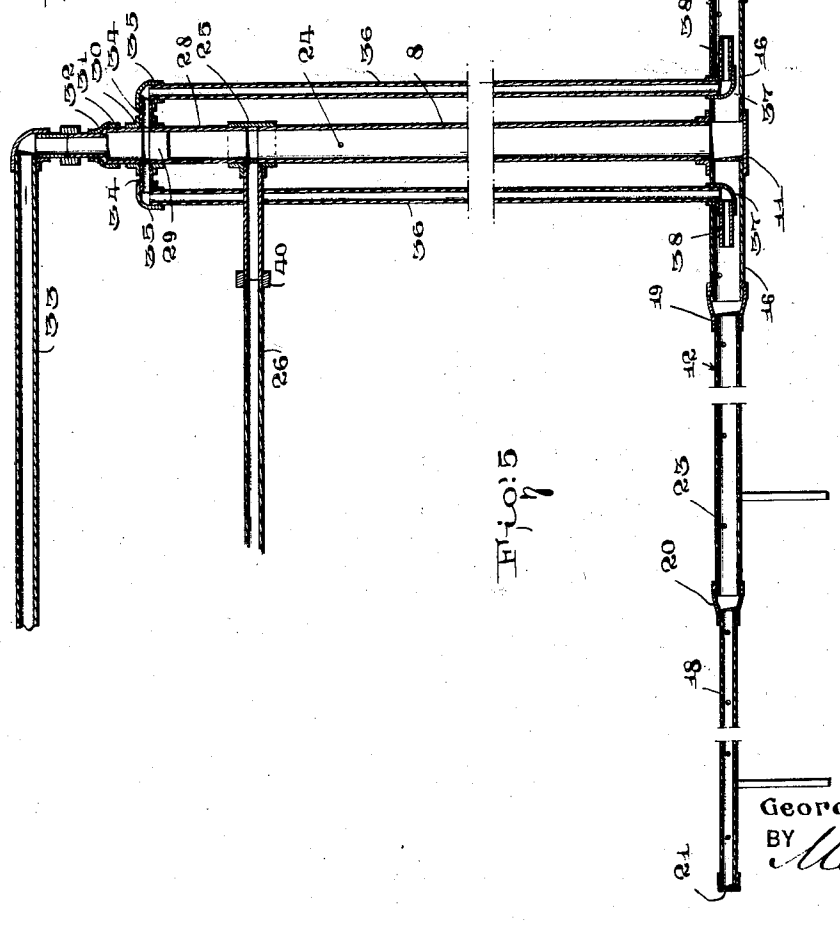


Fig. 5.

INVENTOR
George W. Land
BY Munn & Co
ATTORNEY

Patented Apr. 10, 1928. 1,666,015

UNITED STATES PATENT OFFICE.

GEORGE W. LAND, OF VANCOUVER, WASHINGTON.

TANK-CLEANING APPARATUS.

Application filed November 29, 1926. Serial No. 151,576.

My invention relates to the cleaning of tank cars, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of the invention is the provision of an apparatus for cleaning tanks which permits the use of a relatively small quantity of cleaning fluid to effect the thorough cleaning of the interior of a tank car and which assures the repeated circulation of the cleaning fluid under pressure and in a heated condition through the tank.

A further object of the invention is the provision of tank car cleaning means which affords facilities for circulating the cleaning fluid through the tank car and for mixing the cleaning fluid with a heating fluid and for then discharging the heated mixture forcibly against the inner walls of the tank car.

A further object of the invention is the provision of a tank car cleaning means which will include sections adapted to be lowered into a tank car through the usual opening at the top of the dome of the tank car and then assembled within the tank car to effect a desired distribution of the cleaning fluid through the space within the tank car.

Other objects and advantages of the invention will be apparent from the following description, considered in conjunction with the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section through a tank car having a heating mechanism embodying the invention applied thereto,

Figure 2 is a relatively enlarged section along the line 2—2 of Figure 1,

Figure 3 is a similar section along the line 3—3 of Figure 1,

Figure 4 is a similar section along the line 4—4 of Figure 1,

Figure 5 is a longitudinal vertical section through associated spray or discharge members and supply members of the cleaning mechanism, and

Figure 6 is a relatively enlarged section substantially along the line 6—6 of Figure 1.

In Figure 1, I show a railway tank car having a tank body 1 of conventional form and provided at its top intermediate its length with the usual dome 2. The dome 2 is provided at its top with the usual filler opening or man-hole 3. The tank body 1 is provided directly under the dome 2 with the usual valved drain outlet 4 and an operating handle 5 for the valve of the outlet 4 extends upwardly through the tank body into the dome and may be provided at its upper end with a lateral grip or actuating portion 6. The tank car body also may have the usual heater coils 7 which may have portions protruding from the opposite ends of the car body and adapted for connection with any suitable source of heating fluid supply.

The parts which have been described so far are ordinary in construction and form no part of the present invention except in so far as they cooperate with the parts which will be hereinafter described.

In carrying out the invention in the form now preferred by me, I provide a spray structure which includes a distributor pipe 8 that is adapted to be supported in vertical position in the dome 2 with the upper end portion of the pipe 8 extending above the dome and the lower end portion of the pipe 8 depending from the dome into the tank car body. The means for supporting the pipe 8 in the position just described may comprise a pipe clamp 9 which embraces the pipe 8 and has extending end portions 10 resting on the top of the dome 2. The lower end of the pipe 8 is connected with the vertical branch of an inverted T 11 and the lateral branches of the T 11 are turned toward the opposite ends of the tank car body and are connected with the inner ends of a pair of alined tubular nozzles or spray pipes 12. The tubular nozzles 12 are of sufficient length to extend horizontally in the tank car body from the T 11 nearly to the opposite ends of the tank car body and are located above the longitudinal median line of the tank car body and relatively close to the top wall of the tank car body. The spray pipes 12 may be supported adjacent to their outer ends by supports 13, each of which may comprise a pair of elongated supporting members 13^a crossed and connected adjacent to their upper ends by a fastening device 14 so that a seat is produced at 15 between the upper end portions of the members 13^a in which the outer end portion of the associated spray pipe may rest as shown to advantage in Figure 6, the lower ends of the members 13^a resting on the bottom of the tank car body. The fastening device 14 may be a bolt and nut, as shown, and is adapted to be loosened sufficiently to permit

the members 13a to be swung toward each other so that they can be inserted into the tank car body through the opening in the dome and removed from the tank car body in the same manner.

As illustrated in Figure 5, each of the spray pipes or nozzles 12 is formed of sections sufficiently short to permit said sections to be inserted or passed into the tank car body and removed from the tank car body through the opening at the upper end of the dome and, to this end, the spray pipes 12 may comprise a relatively short and diametrically large inner end section 16, a diametrically smaller intermediate section 17, a still smaller outer end section 18, a reducing fitting 19 between the adjacent ends of the sections 16 and 17, a reducing fitting 20 between the adjacent ends of the sections 17 and 18 and an imperforate screw cap 21 on the outer end portion of the section 18. The two sections 16 at the inner ends of the spray pipes have a combined length slightly less than the diameter of the opening at the top of the dome 2 so that the lower end of the pipe 8 with the sections 16 of the spray pipes connected therewith may be lowered as a unit through the opening at the top of the dome 2. The sections 17 and 18 of the spray pipes may have handles 22 rigidly connected therewith to facilitate the attachment and detachment of such sections to and from the adjacent elements of the spray pipes, respectively.

The spray pipes or nozzles are provided with longitudinally spaced series of circumferentially spaced discharge orifices 23 which are formed in the sections 16, 17 and 18. Preferably, I provide three of the orifices 23 in each series and so space such orifices that the jets of spray therefrom will be directed against the inner wall of the tank car body above the longitudinal median line of the tank car body and in fact, above the level of the spray pipes as shown in Figure 6 when the respective sections of the spray pipe are connected together, as shown in Figures 1 and 5.

The distributor pipe 8 is provided within the dome 2 and adjacent to its upper end with a series of lateral discharge orifices 24 which are spaced regularly about the circumference of the pipe 8. Preferably, six discharge orifices 24 are provided.

The upper end of the pipe 8 is connected by a T 25 with a horizontal portion of a delivery pipe 26 which leads to the pipe 8 from the delivery side of a pump 27. The T 25 also connects the upper end of the pipe 8 with a vertical connecting pipe 28 which is closed at its upper end by a plug 29 and is connected at its upper end with the lower vertical branch of a four-way pipe fitting 30. The upper vertical branch of the four-way fitting is connected by a nipple 31 and a reducing coupling 32 with the downturned vertical portion of a steam pipe line 33 which may lead from any suitable source of heated steam supply. The lateral branches of the four-way fitting are opposite each other and are connected by short nipples 34 with elbows 35, from which depend a pair of steam delivery pipes 36. The steam pipes 36 depend through the dome 2 and are connected at their lower ends with upturned branches of elbows 37 which are disposed in the inner end sections 16 of the hereinbefore described spray pipes and have their upturned branches firmly secured by solder or in any other suitable known manner in openings in the upper sides of the inner end portions of the sections 16, so that the other branches of the elbows 37 are turned toward the outer ends of the sections 16 and are located concentric with the sections 16. Relatively short open tubular discharge pipes 38 are connected with the out turned end portions or branches of the elbows 37 and extend within the sections 16 for part of the length of the latter as clearly shown in Figure 5.

The intake side of the pump 27 is connected by a pipe line 39 with the valved drain outlet 4 of the tank car body.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. When the parts of the cleaning mechanism have been assembled in association with the tank car body in the manner hereinbefore described, a given quantity of any suitable known cleaning solution is placed in the bottom of the tank car body. The valved drain outlet 4 then is opened and the pump 27 is operated so that the cleaning solution will be drawn from the tank car body through the pipe 39 to the pump and then forced from the pump through the pipe line 26 into the distributor pipe 8 and thence into the spray pipes 12. Some of the cleaning solution will pass through the discharge orifices 24 against the inner wall of the dome 2 to effect the cleaning of the dome but the greater part of the cleaning solution will pass from the pipe 8 into the inner end sections 16 of the spray pipes. At the same time, heated steam may be introduced into the sections 16 of the spray pipes to the steam line 33 and the tubular members as hereinbefore described which connect the steam line 33 with the discharge pipes 38 within the sections 16 of the spray pipes. The heated steam will mingle with the cleaning solution and will heat the mixture so that the mixture which is discharged from the spray pipes in jets as shown in Figure 6, will be satisfactorily heated. The condensation of the steam will compensate for any loss by evaporation of the hot solution. It will be manifest that the circulation of the cleaning solution through the tank car body may be

repeated as often as is required to clean the interior of the tank car body, as desired. The delivery line 26 from the pump to the distributor pipe 8 may comprise sections connected in any suitable manner. After the tank has been cleaned, it may be flushed with hot water by connecting a hose with the line 26 at the union 40 and using steam at the same time. The pump, of course, may be operated in any suitable known manner. When the cleaning of the tank car has been effected, the cleaning mechanism may be disassembled and quickly and easily removed from the tank car and applied to another tank car. The apparatus obviously, may be used for cleaning the outside of the tank car by disposing the spray pipes along the top of the tank car body and by catching the solution in a sump under the car with which the intake side of the pump would be connected.

Obviously, the invention is susceptible of embodiment in forms other than that which is illustrated in the accompanying drawings, and I therefore consider as my own all such modifications and adaptations thereof as clearly fall within the scope of the appended claims.

I claim:—

1. Means for cleaning a tank car having a valved drain outlet in its bottom and a dome at its top, said dome being provided with a filler opening at the top of the dome, comprising a distributor pipe depending through the opening at the top of the dome into the tank car, a clamp embracing said distributor pipe and having end portions resting on the top of the dome for supporting said distributor pipe, a pair of tubular spray pipes connected with the lower end of said distributor pipe and extending longitudinally of the tank car within the upper part of the tank car body, supports within the tank car body for the outer end portions of said spray pipes, said supports being foldable for passage through the opening in the top of the dome of the tank car, and a pump having its intake side connected with the outlet in the bottom of the tank car, and having its delivery side connected with the upper end of said distributor pipe.

2. Means for cleaning a tank car having a drain outlet in its bottom and a dome at its top, said dome having an opening in its top, comprising a distributor pipe supported to depend through the opening in the top of the dome into the body of the tank car, sectional tubular nozzles connected with the lower end of said distributor pipe and extending longitudinally within the upper part of the tank car body toward opposite ends of the tank car body, said tubular nozzles being closed at their outer ends and being provided with longitudinally spaced series of circumferentially spaced discharge orifices, and means connecting the drain outlet of the tank car body with the upper end of said distributor pipe for drawing a cleaning solution from the lower part of the tank car body and for forcing solution under pressure into the distributor pipe.

3. Means for cleaning a tank car having a drain outlet in its bottom and a dome at its top, said dome having an opening in its top, comprising a distributor pipe supported to depend through the opening in the top of the dome into the body of the tank car, sectional tubular nozzles connected with the lower end of said distributor pipe and extending longitudinally within the upper part of the tank car body toward opposite ends of the tank car body, said tubular nozzles being closed at their outer ends and being provided with longitudinally spaced series of circumferentially spaced discharge orifices, and means connecting the drain outlet of the tank car body with the upper end of said distributor pipe for drawing a cleaning solution from the lower part of the tank car body and for forcing said solution under pressure into the distributor pipe, said distributor pipe having a series of circumferentially spaced discharge orifices in the portion thereof which depends through said dome.

4. Means for cleaning a tank car having a drain outlet in its bottom and a dome at its top, said dome having an opening in its top, comprising a distributor pipe supported to depend through the opening in the top of the dome into the body of the tank car, sectional tubular nozzles connected with the lower end of said distributor pipe and extending longitudinally within the upper part of the tank car body toward opposite ends of the tank car body, said tubular nozzles being closed at their outer ends and being provided with longitudinally spaced series of circumferentially spaced discharge orifices, means connecting the drain outlet of the tank car body with the upper end of said distributor pipe for drawing a cleaning solution from the lower part of the tank car body and for forcing solution under pressure into the distributor pipe, said sections of the nozzles being adapted to be passed separately through the openings at the top of the dome, a pipe adapted for connection with a source of heated steam supply, a pair of steam delivery pipes depending through said dome and having their lower ends disposed within the inner sections of said nozzles, outwardly turned steam discharge nozzles within the inner sections of said first named nozzle and concentric with said first named nozzle, and means connecting the upper ends of said steam delivery branches with said first named steam pipe and supporting said steam delivery branches on the upper end of said distributor pipe.

5. Means for cleaning a tank car having a drain outlet in the bottom and a dome at its top, said dome having an opening in its top, comprising a distributor pipe supported to depend through the opening in the top of the dome into the body of the tank car, sectional tubular nozzles connected with the lower end of said distributor pipe and extending longitudinally within the upper part of the tank car body toward opposite ends of the tank car body, said tubular nozzles being closed at their outer ends and being provided with longitudinally spaced series of circumferentially spaced discharge orifices, and means connecting the drain outlet of the tank car body with the upper end of said distributor pipe for drawing a cleaning solution from the lower part of the tank car body and for forcing solution under pressure into the distributor pipe, said sections of said nozzles being graduated in size with the larger sections at the inner ends of the nozzles.

6. Means for cleaning a tank car having a drain outlet in its bottom and a dome at its top, said dome having an opening in its top, comprising a distributor pipe supported to depend through the opening in the top of the dome into the body of the tank car, sectional tubular nozzles connected with the lower end of said distributor pipe and extending longitudinally within the upper part of the tank car body toward opposite ends of the tank car body, said tubular nozzles being closed at their outer ends and being provided with longitudinally spaced series of circumferentially spaced discharge orifices, and means connecting the drain outlet of the tank car body with the upper end of said distributor pipe for drawing a cleaning solution from the lower part of the tank car body and for forcing solution under pressure into the distributor pipe, said sections of said nozzles being graduated in size with the larger sections at the inner ends of the nozzles, certain of said sections of the nozzles having handles rigid therewith.

7. In a cleaning mechanism for tank cars a distributor pipe, means for connecting one end of said distributor pipe with a source of supply of pressure cleaning fluid solution, a pair of oppositely extending tubular spray pipes connected with the other end of said distributor pipe, and steam delivery pipes discharging into the inner end portions of said spray pipes.

8. A cleaning apparatus for tanks having a man hole at the top and an outlet at its bottom including a spray pipe to be disposed within the tank, a conduit connected with the spray pipe and extending through the man hole, means attached to the conduit and engageable with the man hole for supporting the spray pipe in operative position, and fluid conducting means including a pump communicating with the outlet and conduit, and means for introducing a heating agent into the spray pipe.

9. In a cleaning apparatus, a plurality of spray pipes, a plurality of vertical fluid supply conduits communicating therewith, a clamp embracing the vertical conduits and having oppositely extending end portions adapted to rest upon the man hole of a tank to support the spray pipes within the latter.

GEORGE W. LAND.