

[54] **PRESSURE SPRAYING APPARATUS**
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Attorney, Agent, or Firm—Stein and Orman

[52] **U.S. Cl.**..... **222/178, 222/318, 239/127,**
 239/142, 230/148, 239/172
 [51] **Int. Cl.**..... **B05b 9/00**
 [58] **Field of Search** 239/127, 130, 142, 148,
 239/172, 302; 222/178, 318, 333; 141/18,
 21; 137/565, 596, 596.12, 608, 627

[57] **ABSTRACT**

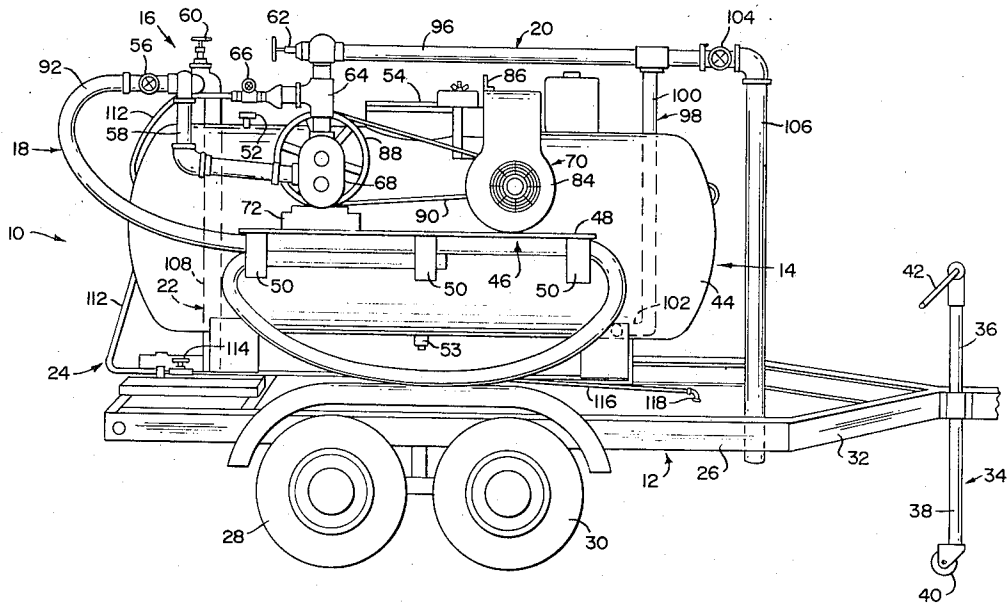
A pressure spraying apparatus for spraying fluids comprising a fluid reservoir tank and a fluid handling assembly including a pump assembly attached in fluid communication therewith, fluid transfer assembly and fluid supply assembly each communicating with the fluid reservoir tank through the fluid handling assembly. The fluid transfer assembly and fluid supply assembly are coupled to one another through a plurality of selectively controlled valves and attached conduits comprise the fluid handling assembly to control the intake and dispensing of fluid into and from the pressure spraying apparatus through the pump assembly.

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11 Claims, 4 Drawing Figures



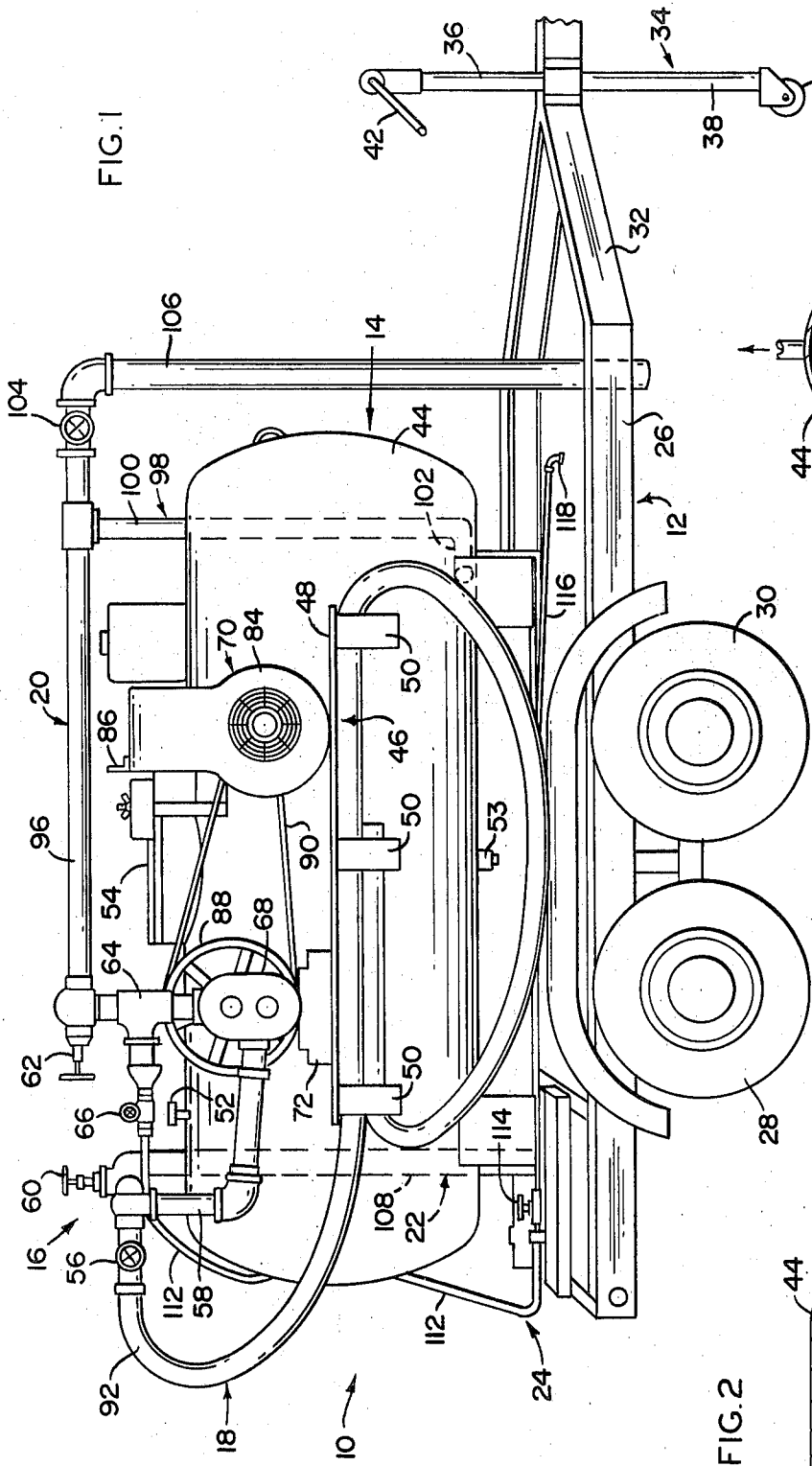


FIG. 1

FIG. 2

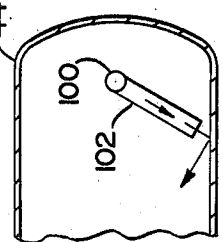


FIG. 3

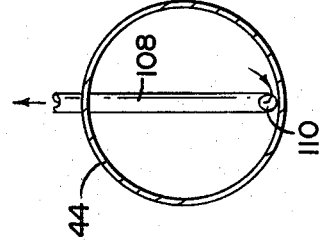
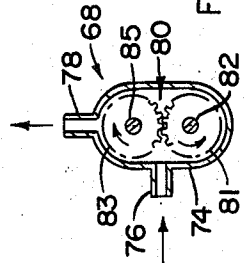


FIG. 4



PRESSURE SPRAYING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

A pressure spraying apparatus for spraying substantially viscous fluids comprising a fluid transfer means and fluid supply means coupled to one another through a fluid handling means to control the intake and dispensing of fluid from the apparatus.

2. Description of the Prior Art

Coal tar pitch and coal tar pitch emulsion sealers are widely used in finishing and sealing asphalt surfaces such as parking lots, drive ways and the like. Due to the generally large surface areas involved, mechanized applicators are highly desirable to reduce labor and material costs. As a result, a number of pressure spraying apparatus to apply asphalt, asphalt coal tar pitch and coal tar pitch emulsion sealers have been developed.

A large number of mechanized applicators have been successfully developed for applying asphalt and the like.

However, due to the viscosity of coal tar pitch emulsion sealers, mechanized applications to spray these substances have met with limited success. Specifically, these substances are often heated or diluted to reduce their viscosity and permit ease of pumping. The additional equipment, material and effort attendant with these techniques is, of course, costly and time consuming. In addition, these apparatus generally include manual means for loading the product into the apparatus or some separate pressurized product source. In either instance, the technique is inefficient. Furthermore, the necessity of a separate pressurized source further inhibits the use of such apparatus at various remote sites.

Due to the ineffectiveness of existings apparatus, coal tar pitch and emulsion sealers are often applied manually by squeezees. This is both inefficient and ineffective. That is, manual application is extremely time consuming and tends to cover only the lower points of the surface being treated.

In view of the present state of the art, a need for a self-contained pressure spraying apparatus for applying highly viscous fluids exists.

SUMMARY OF THE INVENTION

This invention relates to a pressure spraying apparatus. More specifically, the pressure spraying apparatus includes a fluid handling means to control the flow of fluid into and out of the pressure spraying apparatus.

The pressure spraying apparatus comprises a reservoir means mounted on a portable support frame for transporting the apparatus from site to site. Fluid is drawn into the reservoir means by a fluid handling means through a fluid transfer means and sprayed from the reservoir means by the fluid handling means through a fluid supply means.

The fluid transfer means comprises a fluid inlet transfer means and a fluid outlet transfer means. The fluid supply means comprises a fluid inlet supply means and a fluid outlet supply means.

The fluid handling means comprises a pump assembly coupled between the fluid inlet transfer means and fluid outlet transfer means and between the fluid inlet supply means and fluid outlet supply means by a fluid inlet control means and fluid outlet control means respectively. The fluid inlet control means and fluid outlet control means each comprise a plurality of valve

means to control the flow of fluid through the fluid handling means. By coordinating the positions of the valve means, fluid may be drawn into or sprayed from the apparatus through the fluid handling means. Alternately, fluid may be sprayed from the apparatus and recirculated through the reservoir means simultaneously.

The fluid outlet transfer means further includes an auxiliary fluid outlet transfer means to transfer fluid from the reservoir means to a receiving tank or the like.

To operate, the valve means are set to draw fluid into the tank through the fluid transfer means and fluid handling means. To spray, the valve means are reset to draw from the tank through the fluid supply means and fluid handling means.

Alternately, the valve means may be set to draw fluid from the tank through the fluid inlet supply means, fluid handling means, fluid outlet transfer means and out the auxiliary fluid outlet transfer means.

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention to be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a side view of the spraying apparatus of the present invention.

FIG. 2 is a detailed top view of the tank of the apparatus of FIG. 1.

FIG. 3 is a detailed end view of the tank.

FIG. 4 is a schematic of the pump of the apparatus. Similar reference characters refer to similar parts throughout the several views of the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIG. 1, a pressure spraying apparatus generally indicated as 10 comprises portable support means 12, reservoir means 14, fluid handling means 16, fluid transfer means including fluid inlet transfer means 18 and fluid outlet transfer means 20 and fluid supply means including fluid inlet supply means 22 and fluid outlet supply means 24.

Portable support means 12 comprises support frame 26 mounted on two sets of wheels 28 and 30 arranged in tandem on a pair of axles (not shown) extending the width of frame 26. Extending from the forward portion of support frame 26 is attachment means or yoke 32 for coupling apparatus 10 to a propelling vehicle (not shown). Mounted on yoke means 32 is nose parking wheel 34. Nose parking wheel 34 comprises a fixed upper member 36 and extendable lower member 38 telescopingly disposed therein. Attached to the lower end of lower member 38 is wheel 40. Lower member 38 is extended and retracted from upper member 36 by adjustment means or crank 42 by a gear and tooth arrangement (not shown). Lower member 38 is extended such that wheel 40 engages the ground or other supporting surface to support apparatus 10 in a substantially horizontal position when in use and movable upward relative to yoke 32 when the apparatus 10 is to be moved from site to site by a truck, car or other suitable motorized vehicle.

Reservoir means 14 comprises an air-tight tank 44 fixedly mounted on support frame 12. Attached to one side of tank 44 is platform means 46. Platform means 46 comprises a substantially horizontal support shelf 48 extending outwardly from the side wall of tank 44 and supporting members 50 extending outwardly from tank 44 to support shelf 48. Platform means 46 supports fluid handling means 16 as more fully described hereinafter. Pressure relief means 52 and access means 54 are also arranged on tank 44. Pressure relief means 52 comprises a vacuum relief valve having an "open" and "closed" position to provide pressure equalization to prevent a vacuum from developing within tank 44. Access means 54 comprises a hatch or cover pivotally attached to tank 44 to permit access to the interior of tank 44 for cleaning or adding various ingredients. Removal drain plug 53 is attached to the lower portion of tank 44 for cleaning and draining the interior of tank 44.

Fluid handling means 16 comprises a fluid inlet control means, fluid outlet control means and a pump assembly. Fluid inlet control means includes inlet transfer control means comprising first valve means 56, inlet handling conduit means 58 and inlet supply control means comprising second valve means 60. Fluid outlet control means includes fluid outlet transfer control means comprising third valve means 62, fluid outlet conduit means including manifold 64 and outlet supply control means comprising fourth valve means 66.

The pump assembly comprises pump means 68 and drive means 70. Pump means 68 is attached to shelf 48 by base means 72. As shown in FIG. 4, pump means 68 comprises housing 74 including inlet port 76, outlet port 78 and propelling means 80 disposed therein. Propelling means 80 comprises gears 81 and 83 mounted on drive shafts 82 and 85 respectively. As shown in FIG. 1, drive means 70 comprises motor 84 including clutch 86 and pulley 88 operatively coupled by pulley belt 90. Pulley 88 is attached to drive shaft 82 such that pulley 88 and gear 80 rotate together in response to motion of pulley belt 90 when motor 84 is activated. The fluid is "captured" between the teeth and carried clockwise through housing 74 to outlet port 78. This structure permits the pumping of highly viscous fluids. Although a motor/pulley arrangement is shown other motorized pump assemblies may be suitable.

Fluid inlet transfer means 18 includes inlet transfer conduit 92 comprising a flexible hose coupled to inlet transfer control means 56. Fluid outlet transfer means 20 comprises outlet transfer conduit 96 coupled to fluid outlet transfer control means 62 and a substantially L-shaped conduit 98 having a substantially vertical conduit 100 and substantially horizontal lower conduit 102. As best shown in FIG. 2, lower conduit 102 is disposed relative to the side of tank 44 to provide agitation of the fluid therein. Fluid outlet transfer means 20 further includes fluid auxiliary outlet transfer means including auxiliary transfer control means comprising valve means 104 and auxiliary transfer conduit 106.

Fluid inlet supply means 22 comprises substantially vertical supply conduit 108 coupled to fluid inlet supply control means 60. As shown in FIG. 3, supply conduit 108 extends to the bottom of tank 44. At least one aperture 110 is formed in the lower portion of supply conduit 108 to permit fluid flow from the interior of tank 44 into and through supply conduit 108 as more fully described hereinafter.

Fluid outlet supply means 24 includes outlet supply conduit 112, outlet supply control means comprising valve means 114, spray wand 116 and outlet supply nozzle means 118.

Initially, clutch 86 is disengaged. To transfer fluid into tank 44, valve means 56 and 62 are open while valve means 60 and 66 are closed. Inlet transfer conduit 92 is inserted into the fluid to be transferred. With motor 84 operating and clutch 86 engaged, fluid is drawn through inlet transfer conduit 92, valve means 56, inlet handling conduit 58, pump 68, manifold 64, valve means 62, fluid outlet transfer means 20 and into tank 44. The level of fluid in tank 44 may be visually checked through access means 54. Clutch 86 is then disengaged and inlet transfer conduit 92 is removed from the fluid and filled with water. Clutch 86 is then engaged for a few seconds to suck the water into tank 44.

To spray or apply the fluid, valve means 56 is closed while valve means 60, 62 and 66 are open. Fluid outlet supply means 24 is removed from frame 12. To prevent an internal vacuum, relief valve 52 is opened. Motor 84 is then started with clutch 86 disengaged. As clutch 86 is engaged, fluid is drawn through fluid inlet supply means 22, valve means 60, inlet handling conduit 58, pump 68 to manifold 64. With valve means 114 open, a portion of the fluid is fed through valve means 66 and fluid outlet supply means 24, and a portion recycled into tank 44 through fluid outlet transfer means 20. Valve means 62 is adjusted or partially closed to control the spray pressure. Valve means 104 is closed during the transferring and spraying operations.

To discontinue spraying operations, valve means 114 is closed, valve means 62 is opened and clutch 86 disengaged. Motor 84 is then shut down. Once fluid outlet supply means 24 is replaced, apparatus 10 is ready for transit and reuse.

When transferring fluid into tank 44, fluid inlet control means and fluid outlet control means are each in the transfer mode. When spraying fluid, fluid inlet control means and fluid outlet control means are in the supply mode.

Auxiliary transfer means may be used to transfer the contents of tank 44 to a receptacle by closing valve means 56 and 66 and opening valve means 60, 62 and 104 which will permit fluid to be drawn through the open valves and from auxiliary transfer conduit 106.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained, and since certain changes may be made in carrying out the above method and article without departing from the scope of the invention it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Now that the invention has been described,

What is claimed is:

1. A pressure spraying apparatus for spraying fluid comprising a support frame, a reservoir means mounted on said support frame, fluid handling means including fluid inlet control means, pump assembly and fluid outlet control means, said fluid inlet control

means having a transfer and supply mode and said fluid outlet control means having a transfer and supply mode, fluid transfer means and fluid supply means, said fluid transfer means disposed in fluid communication with the interior of said reservoir means when said fluid inlet control means is in said transfer mode and said fluid outlet control means is in said transfer mode through said pump assembly, said fluid supply means disposed in fluid communication with the interior of said reservoir means when said fluid inlet control means is in said supply mode and said fluid outlet control means is in said supply mode, said fluid transfer means including a fluid inlet transfer means and a fluid outlet transfer means, said fluid inlet transfer means in fluid communication with the inlet of said pump assembly through said fluid inlet control means, and said fluid outlet transfer means coupled between said fluid outlet control means and the interior of said reservoir means; said fluid supply means including a fluid inlet supply means and a fluid outlet supply means, said fluid inlet supply means coupled between said fluid inlet control means and the interior of said reservoir means, said fluid outlet supply means coupled to the outlet of said pump assembly and in fluid communication with said fluid inlet supply means through said fluid inlet control means.

2. The pressure spraying apparatus of claim 1 wherein said fluid inlet control means comprises a first valve means coupled between said fluid inlet transfer means and the inlet of said pump assembly and a second valve means coupled between said fluid inlet supply means and the inlet of said pump assembly.

3. The pressure spraying apparatus of claim 1 wherein said fluid outlet control means comprises a third valve means coupled between said fluid outlet transfer means and the outlet of said pump assembly and a fourth valve means coupled between said fluid outlet supply means and the outlet of said pump assembly.

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4. The pressure spraying apparatus of claim 3 wherein said third valve means and said fourth means are coupled together by manifold means.

5 5. The pressure spraying apparatus of claim 1 wherein a portion of said fluid transfer means extends into said reservoir means, the outlet of said fluid transfer means arranged relative to the interior of said reservoir means to agitate fluid within said reservoir means.

10 6. The pressure spraying apparatus of claim 1 wherein said fluid transfer means further includes fluid auxiliary outlet transfer means to transfer fluid from said reservoir means to an auxiliary receptacle.

15 7. The pressure spraying apparatus of claim 6 wherein said fluid auxiliary outlet transfer means includes an auxiliary control means to control fluid flow from said auxiliary transfer means.

20 8. The pressure spraying apparatus of claim 3 wherein said fluid outlet supply means includes an outlet supply control means to control fluid flow from said fluid outlet supply means.

25 9. The pressure spraying apparatus of claim 3 wherein fluid is recirculated through said fluid inlet supply means and said fluid outlet transfer means when said first and fourth valve means are closed and said second and third valve means are open.

30 10. The pressure spraying apparatus of claim 1 wherein said reservoir means includes a valve control means to selectively vent the interior of said reservoir means to the atmosphere.

35 11. The pressure spraying apparatus of claim 1 wherein said pump assembly comprises a housing and a pair of gears disposed therein to operatively engage one another, each said gear comprising a substantially circular body having a plurality of teeth formed about the periphery thereof.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,858,761 Dated January 7, 1975

Inventor(s) James R. O'Dell

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 35, delete "existins" and insert
therfor -- existing --. Column 6, line 3, after "fourth"
insert -- valve --.

Signed and sealed this 3rd day of June 1975.

(SEAL)

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks