United States Patent

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[54] **METHOD FOR KEEPING PAINT TANKS CLEAN**

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[52] **U.S. Cl.**.....**134/22 R,** 21/2, 134/31, 137/15

[51] **Int. Cl.**.....**B08b 7/00,** C23g 5/02

[58] **Field of Search** 134/22, 31, 11, 12; 21/60.5, 21/1, 2; 117/104; 239/142; 137/15, 238

[56] **References Cited**

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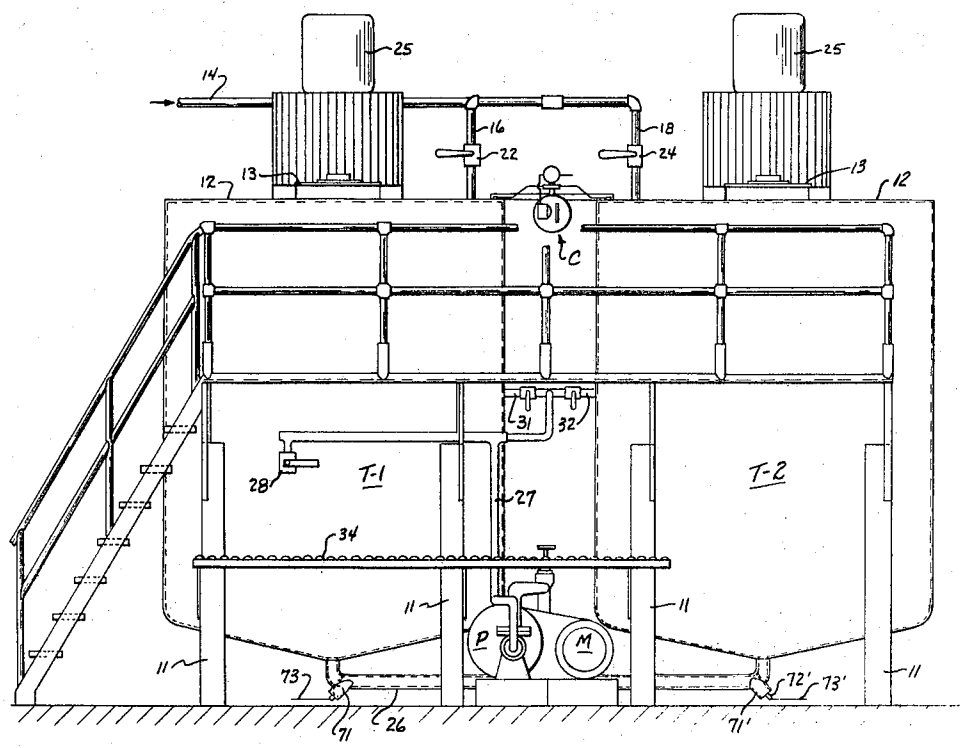
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[57] **ABSTRACT**

Enclosed paint tanks are maintained substantially free of pain residue by heating liquid thinner to vaporize the same, conducting the vapor to the head space of the tank, and causing the vapor to condense on the inside of the tank so that the liquid thinner rinses the side walls and keeps them clean. When the thinner is flammable, an inert gas is fed into the head space to maintain an inert protective atmosphere therein. The disclosed apparatus includes a pair of large, enclosed storage tanks each having an impeller and a common paint supply line. Conduits interconnect the tanks and a pump is provided for discharging the paint from either tank. The lowermost conduit has a storage chamber at either end and a ball is propelled between the chambers to loosen residue in the conduit. At the top of the tanks is a container for the liquid thinner. A float in the container maintains the level of the liquid thinner. A float in the container maintains the level of the liquid thinner. A heating element in the container is adapted to vaporize the thinner. Conduits lead from the container to the tanks to feed the vapor thereto.

6 Claims, 5 Drawing Figures



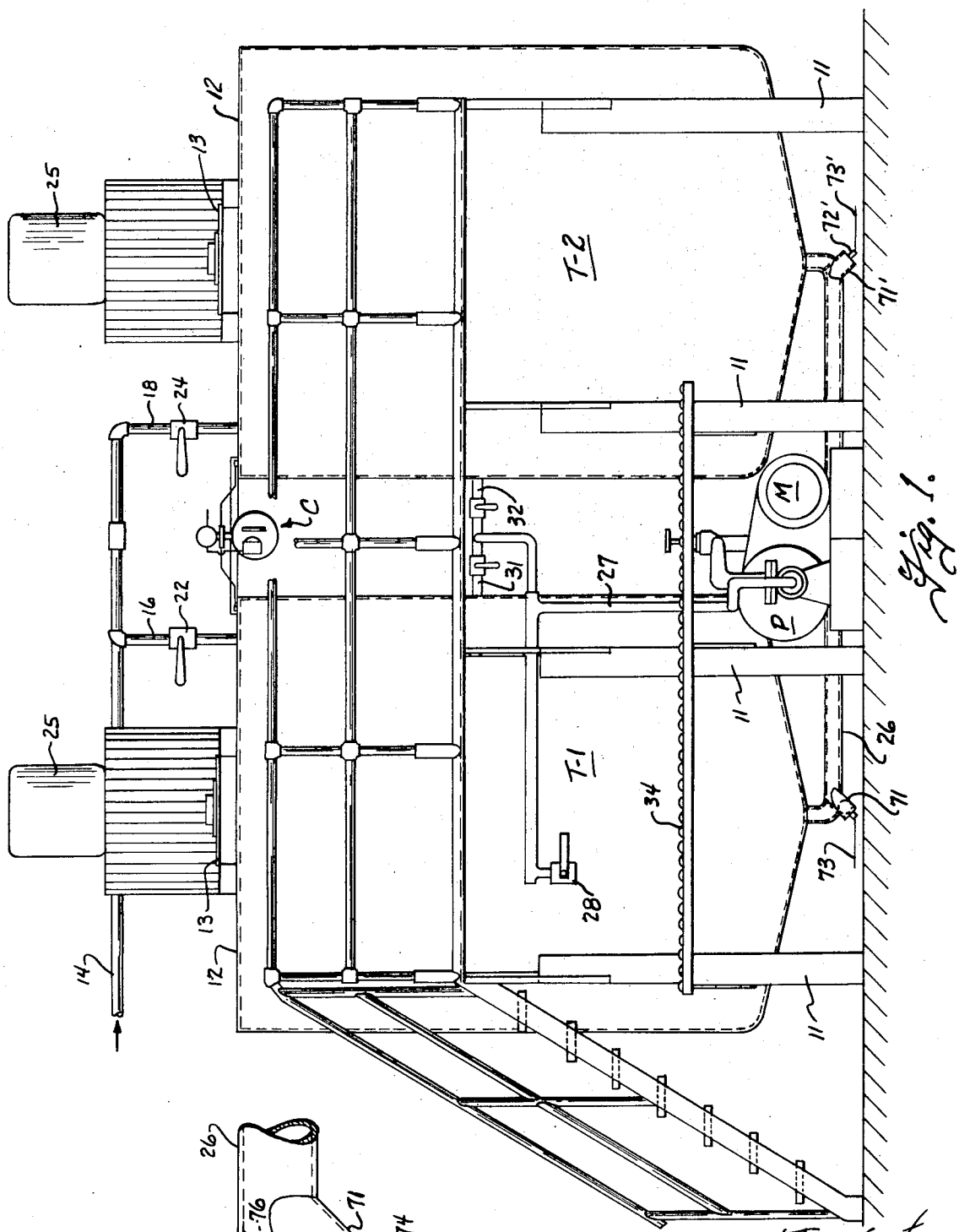


Fig. 1.

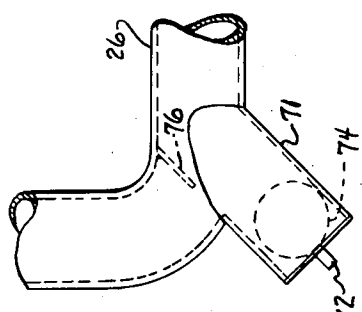


Fig. 2.

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Fig. 3.

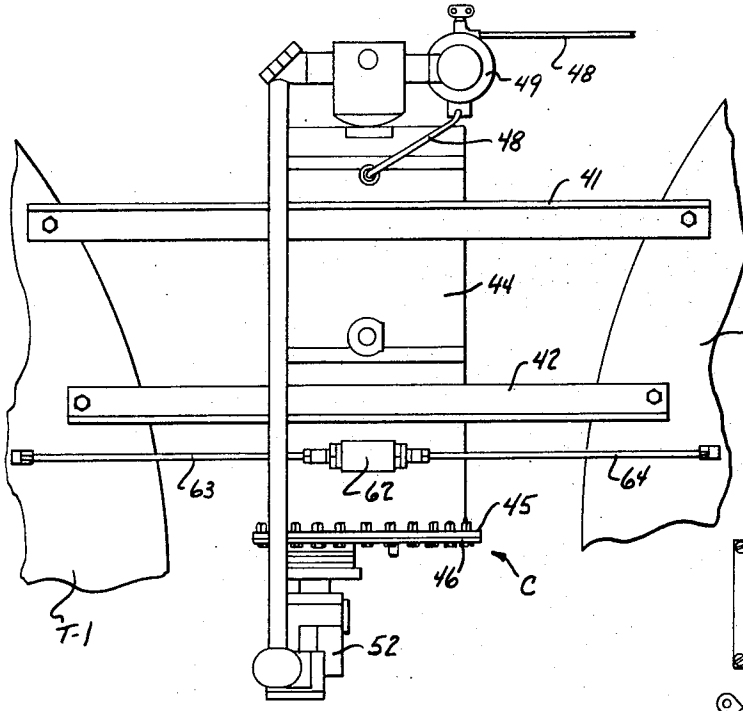
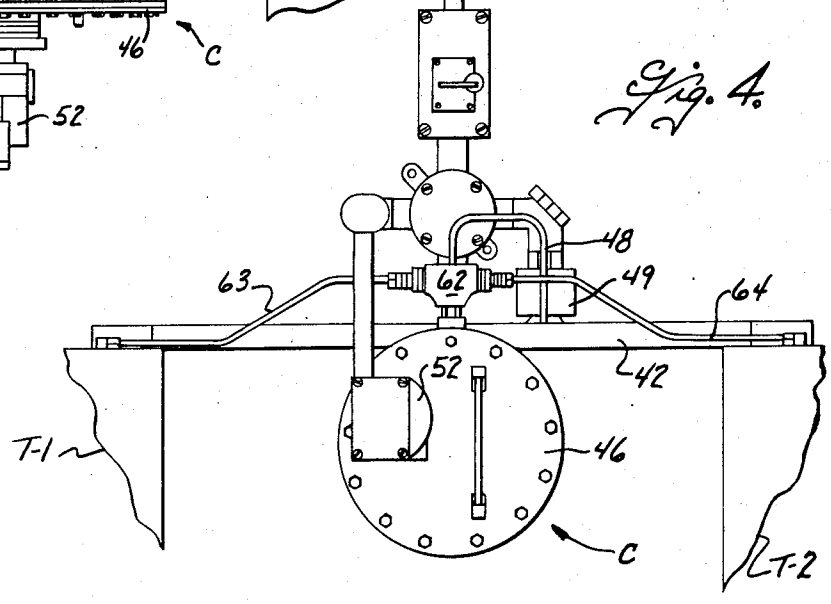


Fig. 4.



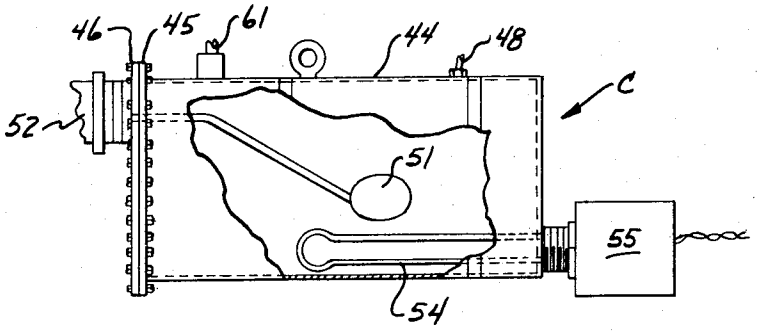


Fig. 5.

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METHOD FOR KEEPING PAINT TANKS CLEAN

BACKGROUND

The invention pertains generally to fluid handling and storage, and more particularly to method for cleaning tanks for paint and the like.

While the invention is herein referred to as being utilized with paint, it is to be understood that the term "paint" is to be taken as including lacquer, shellac, varnish, ink, latex and oil base coatings, and the like. The term is to be limited, however, to materials which leave a residue or coating on metal, and which contain a solvent or diluent. The term "thinner" is a material capable of serving as a solvent or diluent for a particular paint. Additionally, as herein used, the term "thinner" is limited to a material which is ordinarily a liquid but which may be vaporized by the application of heat and later condensed without destroying its characteristics.

In the handling and storage of paint, a coating or residue of the paint will adhere to the walls of the tank and, to a lesser extent, to the walls of the pipes. When the tank is quite large, the deposit adjacent the top of the tank is dry before the tank is emptied; therefore rinsing the empty tank does not clean it. Additionally, it has not been possible to clean the tank while it is partially full. Heretofore, the practice has been to continue use of the tank and allow several layers of dried paint to build up. Thereafter, use of the tank is discontinued while its interior and the paint lines are cleaned. Obviously, this is an expensive operation--both from the difficulty of removing dried paint, and from the loss due to down time of the equipment.

SUMMARY

The present invention relates to method for cleaning tanks for paint and the like. More particularly, the present invention relates to a method for maintaining the interior of such a tank substantially free of residue of paint and the like.

It is a general object of the present invention to provide a method for maintaining the interior of a tank substantially free of residue of paint and the like, and which is operative while the tank holds the material.

Another object is to provide a method which prevents build up of residue in the tank by condensing thinner on the interior of the tank.

Still another object is to provide a method in accordance with the foregoing in which liquid thinner is first vaporized by heating the same.

Yet another object of the invention is to provide a method in accordance with the general object and which is economical, simplified, and capable of use with all types of paints.

These, and other objects and advantages of the present invention, will become apparent as the invention becomes better understood from the following description when taken with the drawings.

DRAWING

FIG. 1 is a front elevational view of a storage system, including tanks and feed and discharge pipes, and incorporating the present invention;

FIG. 2 is an enlarged fragmentary elevational view of a pipe and apparatus for freeing residue therein;

FIG. 3 is a top plan view of apparatus for vaporizing the thinner and feeding the vapor to the tanks and on a larger scale than FIG. 1;

FIG. 4 is a front elevational view of the apparatus shown in FIG. 3; and

FIG. 5 is a side view of the apparatus of FIG. 3 and having a portion broken away for better illustration of the parts.

DESCRIPTION

Reference is now made more particularly to the drawings wherein the same reference characters indicate the same parts throughout the several views.

In the embodiment illustrated, there are two storage tanks T1 and T2 for storing paint. These tanks are about 7 feet in diameter and 10 feet in height and are conveniently supported on legs **11**. In accordance with the present invention, the tanks are preferably enclosed, and each have a top wall **12** for this purpose. Each tank also has an opening in the top wall which is closed by a cover **13**. If the paint includes a flammable material, the tank is preferably sealed; however, the term "enclosed tank" is not limited to a sealed tank construction.

A feed conduit **14** conveniently leads from a paint mixing tank and is divided into branches **16** and **18** leading to tanks T1 and T2, respectively. Valves **22** and **24** are interposed in the branch conduits **16** and **18**, respectively to control the flow of paint into the tanks. Each tank has an impeller (not shown) driven by motor **25** for stirring the paint stored in the respective tank.

As shown, each tank has an outlet adjacent the bottom thereof and these outlets are connected by pipe **26**. Valves (not shown) may be disposed at the outlet of each tank to control flow therefrom. A pump P, driven by a motor M is adapted to pump the paint from the tanks through a discharge conduit **27** to a valved outlet **28**. The discharge outlet **28** is conveniently disposed above a roller conveyor **34** to fill receptacles disposed on the conveyor. In the alternative, the paint can be pumped through branch conduits **31** and **32** back into the tanks to recirculate the paint.

As previously stated, successive layers of paint will accumulate in the tanks as paint is stored therein and discharged into other containers. The present invention provides a method and apparatus for maintaining the interior of the enclosed tanks substantially free of residue of the paint. This is accomplished by providing a quantity of liquid thinner of a type which is capable of thinning the paint, vaporizing the liquid thinner by heating the same, conducting the vaporized thinner into the head space of the tank, and causing the thinner to condense on the inside of the tank so that the liquid rinses the side walls. When a water-thinned latex paint is in the tank, the liquid thinner to be used is water. When an oil-based paint is in the tank, the liquid thinner can be any of the various materials ordinarily utilized for thinning oil-based paint so long as it is compatible with the ingredients in the paint.

When the liquid thinner is a flammable material, it is necessary to feed an inert gas into the head space to maintain an inert protective atmosphere in the tank. One suitable inert gas is carbon dioxide. Under this circumstance, it is preferable that the tank be sealed.

Whatever type thinner is used, it is preferable that the vapor be fed into the head space of the tank at a rate to maintain the head space at a temperature at least a few degrees above the temperature of the paint. It has been found that 2° or 3° Fahrenheit is sufficient for this purpose. Under most circumstances, if the side walls of the tank surrounding the head space are maintained at ambient temperature, the liquid thinner will condense on the interior and adequately perform the desired function. It has been found that the method of the present invention is effective to keep the side walls of the storage tank substantially free of any build up of residue. Additionally, the small amount of thinner added to the paint in performing the method has no adverse effect on the quality of the paint.

One apparatus for performing the above-described method is illustrated in FIGS. **3–5**. A separate container, generally designated C, is disposed between the tanks and supported by brackets **41** and **42**. The container includes a generally cylindrical hollow body **44** having an outwardly-extending peripheral flange **45** at one end thereof, and a closure plate **46** bolted to the flange **46** and in sealing relation thereto. Thinner is fed into the container C by means of an inlet line **48** in which is interposed a valve **49** to control flow through the inlet line. A float **51** is disposed in the container C and controls a mercury switch **52** which, in turn, controls the actuation of the valve **49**. In this manner, the liquid level in the container is maintained within preselected limits.

A heating element **54** is also located in the container C below the liquid level of the thinner. As one example, latex paint was stored in a tank of the size described, and water was utilized as the thinner. It was found that a heater of about 500 watts capacity was sufficient for vaporizing thinner at a rate required to maintain the head space of the tank at about 2° to 3° above the temperature of the paint in the tank. The heater may have a control **55** which includes a thermostat.

An outlet line **61** leads from the container to a distributor **62** from which lead branch lines **63** and **64** to the tanks T1 and T2, respectively. These branch lines **63** and **64** communicate with the head space of the tanks above the level of the paint therein. In the embodiment illustrated, an opening is provided in the top **12** of each tank for this communication.

Referring now to FIG. **2**, there is shown the aforedescribed pipe **26**. A storage chamber in the form of a branch pipe **71** is laterally offset from the pipe **26**. A second storage chamber **71'**, of similar construction, is disposed at a point spaced from the first storage chamber. The portion of pipe **26** between the two storage chambers is, in accordance with the invention, free of any abrupt changes in direction. The pipe **26** and the storage chambers **71** and **71'** have generally identical inside diameters. A ball **74** is disposed in one of the storage chambers and may be propelled from one storage chamber to the other. For this purpose, each storage chamber has an inlet **72** connected to a source of gas under pressure by line **73**. A deflector **76** is located in the pipe **26** adjacent each chamber to deflect the ball from the pipe portion into the storage chamber.

In use, a charge of gas is introduced through the inlet **72**. The ball **74** is propelled into the line **26** and along the said portion of it until it contacts the opposite deflector and is deflected into the opposite storage chamber. In this manner, any residue that may build up in that pipe portion is freed by the travel of the ball **74** and can thereafter be flushed from the system.

The invention in its broader aspects is not limited to the specific steps and apparatus shown and described, but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

I claim:

1. A method of preventing build-up of paint on the interior side wall of an enclosed paint tank, above the level of paint in the paint tank, to keep it substantially free of residue of paint comprising the steps of:

providing a quantity of liquid thinner which is capable of thinning the paint in the paint tank;

heating the liquid thinner to vaporize the same and conducting the vaporized thinner into the head space of the paint tank; and

maintaining the side walls surrounding the head space of the paint tank at a temperature to condense the thinner on the inside thereof so that the liquid thinner rinses the side walls above the level of paint and prevents build-up of paint thereon.

2. A method as set forth in claim **1** wherein the enclosed paint tank contains a latex paint and the liquid thinner is water; and including the step of feeding the water vapor into the head space of the paint tank at a rate to maintain the head space at a temperature at least a few degrees above the temperature of the latex paint.

3. A method as set forth in claim **1** wherein the liquid thinner is a flammable liquid; and including the step of feeding an inert gas into the head space of the paint tank to maintain an inert protective atmosphere therein.

4. A method as set forth in claim **3** including the step of feeding the vaporized flammable thinner into the head space at a rate to maintain the head space at a temperature at least a few degrees above the temperature of the paint in the paint tank.

5. A method for keeping the interior side wall of an enclosed paint tank, above the level of paint in the paint tank, continually free of residue of paint, comprising the steps of:

placing in a separate container a quantity of liquid thinner which is capable of thinning the paint in the paint tank;

heating the liquid thinner to vaporize the thinner while in the separate container;

conducting the vaporized thinner into the head space of the paint tank through a conduit interconnecting the interior of the container with the head space of the paint tank; and

maintaining the side wall surrounding the head space of the paint tank at a temperature to condense the thinner on the inside thereof so that the liquid thinner rinses the side wall of the paint tank above the level of paint and keeps the side wall clean.

6. A method as set forth in claim **5** including the steps of providing a heating element in the separate container below the intended level of liquid thinner; and selectively feeding liquid thinner into the separate container to generally maintain said liquid level.

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