

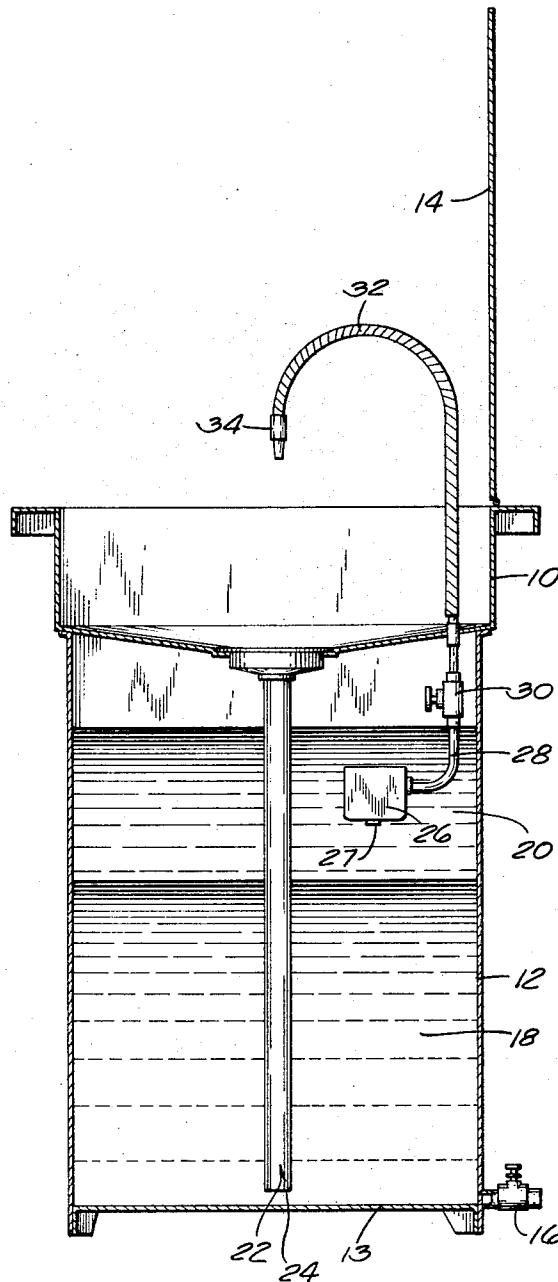
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PARTS WASHER AND METHOD OF SOLVENT CLEANING

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1

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PARTS WASHER AND METHOD OF SOLVENT CLEANING

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10 Claims

ABSTRACT OF THE DISCLOSURE

A parts washing basin is supported by a fluid tank which is partially filled with water and partially with parts washing solvent floating above the water. The drain from the basin extends to the bottom of the tank. A pump immersed in the solvent supplies solvent to a nozzle for washing the parts. Solvent collected by the drain forms a column sufficiently tall to force solvent to the bottom of the drain to bubble upwardly through the water, substantially cleaning it of foreign matter washed from the parts by the solvent.

BACKGROUND OF THE INVENTION

Parts washers are known in which solvent discharged into the drain of a basin is forced through a mechanical filter.

SUMMARY OF THE INVENTION

Our invention lies in providing a parts washer with a tank filled with a heavier fluid, preferably water, to a substantial depth in a lower zone, a supply of a lighter fluid solvent floating on the water in an upper zone, a pump immersed in the solvent remote from floating or sinking impurities, and a drain arrangement from the basin which discharges used solvent directly into the bottom of the water in the tank, rather than into a filter, preferably by gravity. Cleaning of the solvent is effected entirely by its passage through the water. The solvent is lighter than the water and our drain from the basin extends sufficiently above the fluid level in the tank so that the column of solvent in the drain discharges solvent from the bottom of the drain under the weight of the column. It is possible to provide the drain with a pump but any pump in that location would be exposed to uncleaned solvent and consequently this is a less desirable alternative. It is also possible to seal the tank so that the pump provided assists the drain. This may be desirable in some configurations to reduce the height.

The water does an effective job of cleaning the solvent of foreign matter and greatly extends the useful life of a body of solvent placed in the tank above the water before disposal and replacement is necessary. At the same time, the present method completely eliminates the necessity of cleaning or disposing of dirty filters and of the consequent necessity for disassembly of the parts of the device to remove a filter. A valve or drain plug may be provided at the bottom of the tank for draining water, foreign matter, and the solvent from the tank prior to refilling.

DRAWINGS

The figure is a vertical cross-sectional view through the device of our invention.

DESCRIPTION

This description is detailed in order to show the best mode of practicing the invention but is not intended to limit the scope of the invention as defined in the attached claims.

Our device consists of a basin 10 resting on a tank 12 and preferably supplied with a hinged cover 14 which may

2

be raised and secured in any conventional way. It may also be supplied, if desired, with a work light (not shown). The tank 12 preferably has a drain valve 16 adjacent the bottom of the tank, although a drain plug may be used, or both a valve and a drain plug may be provided if desired.

Tank 12 is filled with water 18 to a substantial depth, preferably about two-thirds of the total depth of fluid in the tank. A solvent 20 fills the remainder of the tank up to its working depth. The depth of the two fluids is limited by the height required by the drain, unless the basin is sealed to the tank.

A drain 22 extends from the bottom of basin 10 to terminate at lower end 24 which is adjacent to, but spaced from, the bottom 13 of tank 12. A pump 26 is located within the tank to be above the water, and has an intake 27 open to the solvent. A conduit 28 extends from the discharge opening of pump 26 to a valve 30, and to a flexible conduit 32 terminating in a nozzle 34. Appropriate fittings (not shown) are used to make connections.

Conventional means (not shown) are provided to supply current to pump 26 to operate the pump whenever the operator desires to wash parts.

The parts washing solvent is lighter than water and does not dissolve or mix in water. Desirably the difference in specific gravity between the solvent and the water should be small so that drain 22 may readily be of a height to hold a column of solvent 22 tall enough to cause used solvent to emerge from the lower end 24 of drain 22 whenever the device has been operated long enough to fill drain 22. Heavy particles of foreign matter will fall through drain 22 at their own rate to accumulate at the bottom 13 of tank 12. The end 24 of drain 22 is spaced sufficiently from bottom 13 to allow such matter to be undisturbed by the passage of solvent from the end 24 of the drain into the body of water 18, there to move upwardly under the influence of its lighter density. The passage of solvent 20 through water 18 has been found to clean the solvent as effectively, or more effectively, than passage through a conventional filter element. The solvent returns due to its own buoyancy to the body of solvent 20 about the pump 26 for recirculation through nozzle 34 to wash additional parts. Any light particles are unlikely to have the same weight as water or solvent, and so float either at the surface of the solvent or the surface of the water. In either case they are spaced from intake 27.

The flow from pump 26 may conveniently be adjusted by means of valve 30.

A preferred solvent for use in the system shown is mineral spirits. However, other solvents may be used. It is necessary that the column of solvent in drain 22 be sufficiently tall to discharge solvent at the bottom end 24 of the drain. If it is desired to use a solvent substantially lighter than mineral spirits the relative depths of the fluids or the proportions of the parts may be altered to obtain a drain line 22 having a greater proportion of its length above the surface, always provided that the pump is immersed in the solvent 20 and the body of water 18 is of sufficient depth to clean the solvent as it passes through the water. As shown, the inlet 27 of the pump is not provided with any conduit but it is possible to provide a conduit from inlet 27 to an appropriate level in the tank, which might be either fixed or variable.

Also, if the density of the solvent or the shape of the parts prevents gravity flow, the tank may be sealed except for the drain and the pump connection, so that the pump assists flow from the drain by lowering the pressure in the tank.

When sufficient foreign matter has accumulated in tank 12, body of water 18, and solvent 20, the drain valve 16 or an appropriate drain plug may be used to empty tank

3

12. The emptying of the water and the solvent will tend to remove any foreign matter accumulated at the bottom of tank 12 but it will be understood that conventional provisions may be made for disassembly of the apparatus for cleaning.

We claim:

1. In a parts washing device, a basin for parts to be washed, a tank extending below said basin, a drain from the bottom of the basin to a point adjacent the bottom of the tank, said tank having a first fluid zone extending from the bottom of the tank to a level above the bottom of said drain and a second fluid zone at a higher level to contain an immiscible solvent having a density slightly less than the fluid in the first fluid zone, a pump having an intake in said second zone, and outlet means to deliver solvent from said pump to said basin for washing parts, said basin being adapted to collect said solvent used for washing said parts and direct it into said drain, whereby solvent entering said drain will flow downwardly through said drain into said first zone and upwardly to said second zone of said tank, the passage through liquid in said first zone serving to clean said solvent of foreign matter from said parts.

2. The device of claim 1 in which said conduit includes a flexible nozzle.

3. The device of claim 1 in which the tank supports said basin.

4. The device of claim 1 in which the first fluid zone is filled with water and the second fluid zone is filled with mineral spirits.

5. The device of claim 1 in which the tank is sealed except for said drain and said pump intake.

4

6. A method of cleaning a fluid parts washing solvent comprising collecting said solvent in a parts washing basin, permitting said solvent to flow through a drain into the bottom zone of a tank containing an immiscible fluid heavier than said solvent, and passing said solvent fluid upwardly through said heavier fluid to an upper zone of the tank.

7. The method of claim 6 in which the solvent is mineral spirits and the heavier fluid is water.

8. The method of claim 6 in which flow occurs entirely by gravity.

9. The method of claim 6 further comprising the step of pumping the solvent fluid to a delivery nozzle above the basin for parts washing.

10. The method of claim 9 in which the basin is sealed except for said drain and a connection from said upper zone through a pump to an outlet.

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