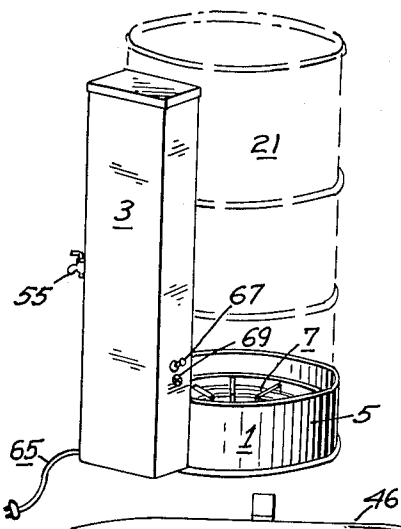
Nov. 29, 1955 F. CURRIER ET AL 2,725,459

REPLACEABLE-TANK DEGREASER

Filed Nov. 3, 1952

2 Sheets-Sheet 1

Fig. 1.



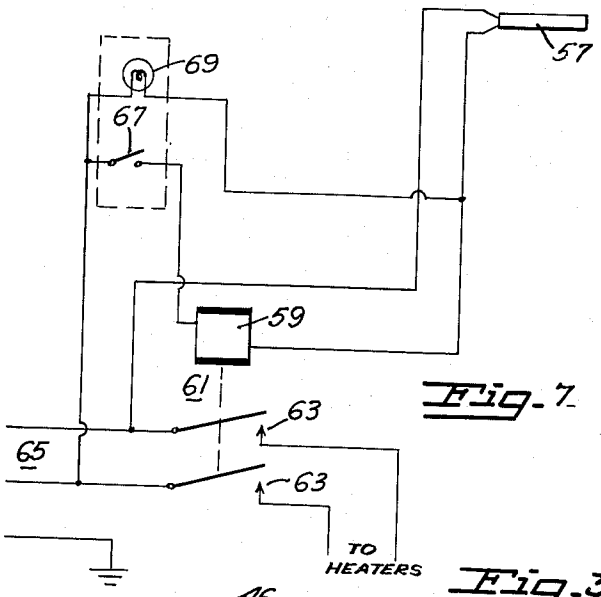


Fig. 7.

Fig. 2.

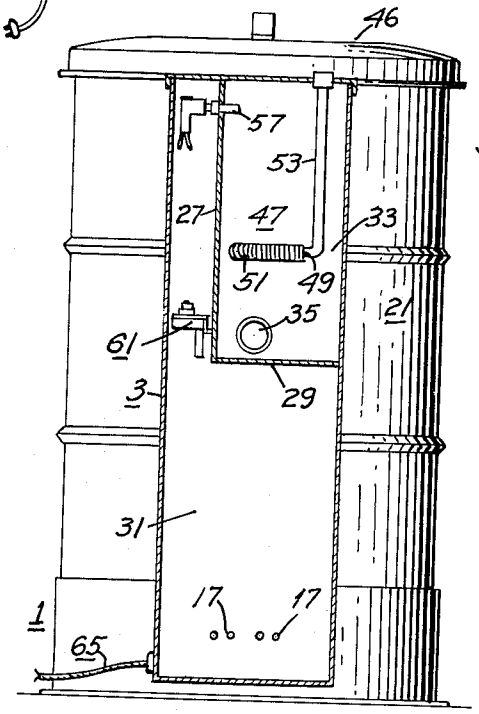
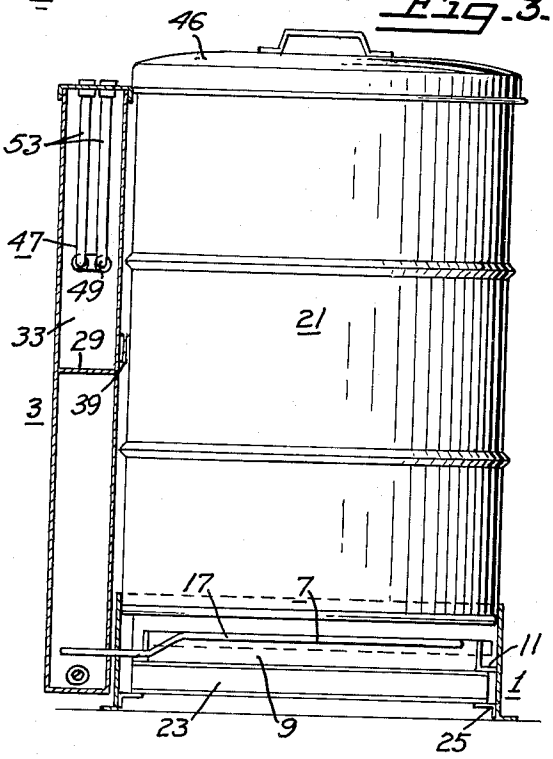


Fig. 3.



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2 Sheets-Sheet 2

Fig. 4.

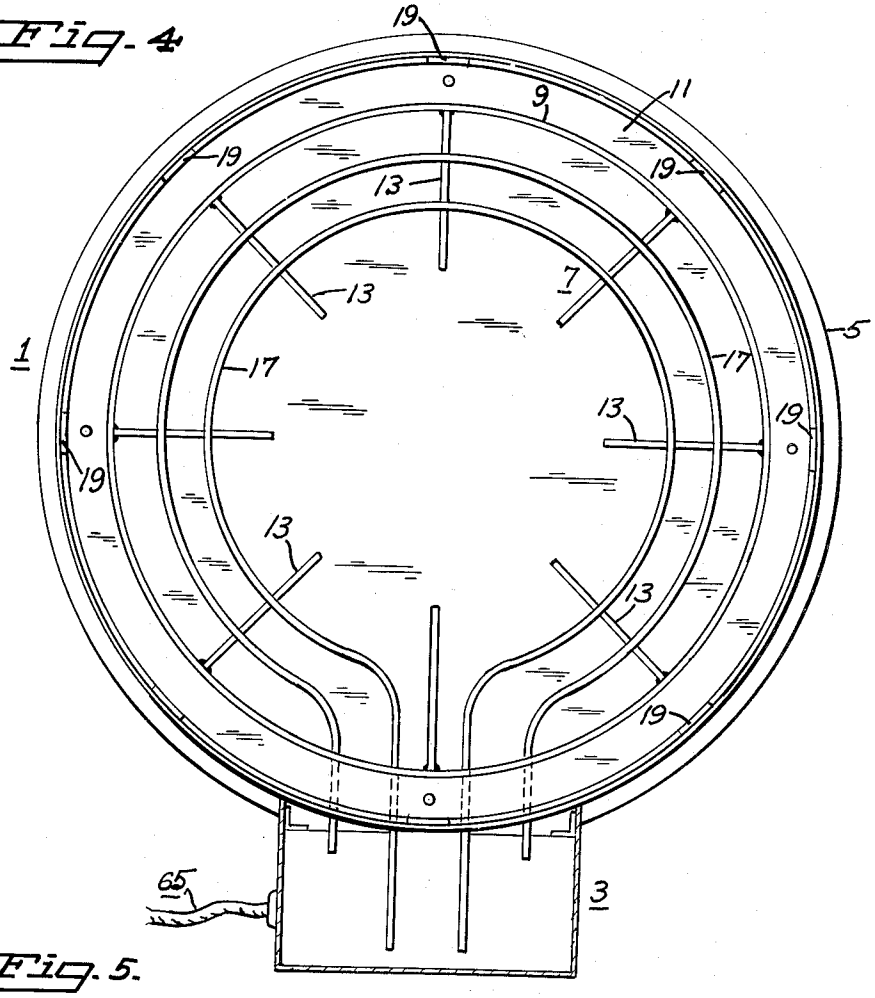


Fig. 5.

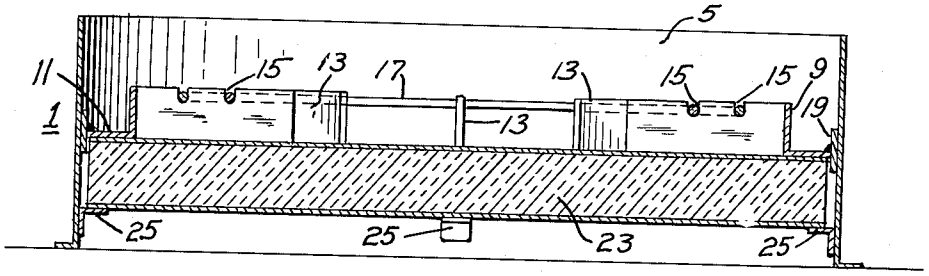
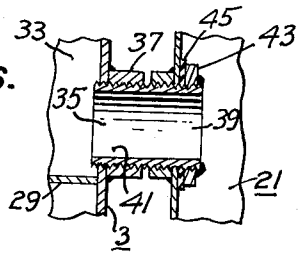


Fig. 6.



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REPLACEABLE-TANK DEGREASER

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Application November 3, 1952, Serial No. 318,406

10 Claims. (Cl. 219—43)

Our invention relates to degreasers, and more particularly to a degreaser for small volume operations.

Among the objects of our invention are:

(1) To provide a novel and improved degreaser;

(2) To provide a novel and improved degreaser which is particularly adapted for small volume operation and can be manufactured economically;

(3) To provide a novel and improved degreaser in which the tank may be conveniently and readily replaced;

(4) To provide a novel and improved degreaser adapted for the utilization of a conventional shipping drum as its tank;

(5) To provide a novel and improved degreaser which is structurally simple but efficient;

(6) To provide a novel and improved degreaser in which the heating and condensing units are outside the tank;

(7) To provide a novel and improved degreaser in which the work capacity of the tank is a maximum;

(8) To provide a novel and improved degreaser in which the tank may be readily and economically replaced;

(9) To provide a novel and improved degreaser in which the solvent may be quickly distilled from the tank and the tank readily cleaned of accumulated sediment;

(10) To provide a novel and improved degreaser in which the heating elements are never exposed to damage from falling objects, contact with solvent, or caking of sediment thereon with its resulting burn-outs of the heating elements.

Additional objects of our invention will be brought out in the following description of a preferred embodiment of the same, taken in conjunction with the accompanying drawings wherein—

Figure 1 is a three-dimensional view of a degreaser unit embodying the features of the present invention, and adapted to receive a conventional type drum, shown in phantom;

Figure 2 is a front view in elevation of a degreaser assembly of the present invention, depicting the housing portion in section;

Figure 3 is a side view in elevation of the assembly of Figure 2 and depicting the degreaser unit in section;

Figure 4 is a plan view of the degreaser unit of Figure 1 with the cover to the housing removed;

Figure 5 is an enlarged view in section through the base unit of the degreaser assembly of the previous figures;

Figure 6 is an enlarged view in section of the coupling between the housing and drum of the degreaser assembly of the previous figures;

Figure 7 is a view depicting the electrical circuits involved in the degreaser unit of the present invention.

Referring to the drawings for details of our invention in its preferred form, the same in general comprises a base unit **1** and an associated housing **3**. The base unit comprises a base ring **5** of cylindrical form fabricated from sheet material such as sheet steel or other suitable material.

For installation in such base ring, is a heater unit **7**. Such unit involves a ring **9** of slightly less diameter than the base unit ring and formed with an outwardly directed flange **11**. Directed radially inwardly from such ring and affixed thereto, are a plurality of heater element supports **13**, each being formed in its upper edge with a plurality of notches **15** to receive heater elements **17**.

The heater elements may be of any desired form but are preferably circular for positioning in the notches of the heater element supports.

The heater unit is mounted within the base ring **5** by welding the outwardly directed flange to a plurality of shims **19** welded at spaced points within the base ring. When installing the heater unit, it is preferably disposed a substantial distance below the upper edge of the base ring to permit of the reception of a tank **21** of slightly smaller diameter than that of the base ring.

The heater elements terminate beyond the base unit by bringing the terminal ends thereof into the housing.

Below the heater unit there is positioned an insulating panel **23** preferably in the form of a layer of fiberglass insulation which is supported on angle brackets **25** at spaced points about the inner surface of the base ring.

The housing **3** is preferably of rectangular form and is affixed to the base unit about the region where the terminal ends of the heater elements enter the housing, and extends upwardly a substantial distance above the base unit, such distance being comparable to the height of the drum when positioned in the base unit.

Within this housing there is a partition involving a vertical section **27** extending downwardly from the upper end of the housing and joining a horizontal section **29** approximately at the half-way elevation. This partition creates two chambers within the housing, namely, a control chamber **31** extending from the lower end of the tank and continuing up alongside of a smaller or condenser chamber **33** at the upper end of the housing.

Adjacent to but slightly elevated from the bottom of the condenser chamber, this chamber is provided with an opening **35** fitted with a threaded coupling element **37** for enabling coupling thereto of the tank **21**.

The tank is preferably one in the form of a conventional type drum employed in the shipping of chemicals, the base unit being accordingly designed to receive a drum of that diameter and conveniently support the same therein on the heater unit. Such drum is normally provided with a bung opening **39** at approximately its midpoint, and in constructing the housing, the opening **35** is located at the same elevation as the bung hole, when such drum is resting on the heater unit. This places the drum in a position where it may be quickly and conveniently coupled to the condenser chamber of the housing by a nipple **41** threaded from within the drum. To facilitate this operation and to effect a leak-tight seal at the bung opening of the drum, a nut **43** is welded about the nipple at the drum end thereof, and between such nut and the inner wall of the drum, we place a gasket **45** of material which will seal against leakage of the highly volatile solvents employed in degreaser type equipment, when the nut is drawn up tight. An example of such material is known on the market under the trade-name "Velumoid," and is a fibrous material in the form of heavy kraft paper that is free of oil or grease.

In preparing the drum for such use, the upper end is opened up by removing the head sheet from that end and providing a cover **46** to close off the drum when not in use.

The aforementioned coupling provides communication

between the interior of the drum and the interior of the condenser chamber and, accordingly, vapor rising in the drum will also pass through the bung hole into the condenser chamber. Control of the vapor level in the drum may thus be effected by controlling the vapor level in the condenser chamber, and, by such outside control, we eliminate any necessity for providing vapor condensing means in close association with the drum, which, if placed within the drum, would reduce the available working space or interfer with the handling of items to be cleaned.

Accordingly, in the condenser chamber, there is provided means for controlling the vapor level therein, and this preferably takes the form of a water-cooled condenser unit 47 suspended from the upper end of the condenser chamber and at the vapor level which it is desired to maintain in the equipment. Such condenser unit might involve a horizontally supported U-shaped tube 49 covered on its outer surface with a plurality of cooling fins 51. Water is conveyed to and from the U-shaped cooling element by pipe extensions 53 running to the upper end of the condenser chamber for connection to a suitable source of cooling water.

The action of the vapor condenser in the condenser chamber will serve to maintain a substantially fixed vapor level in the associated drum, despite the fact that the condenser is located outside of said drum and removed therefrom, and is not in direct cooling contact with the vapor in such drum.

Vapor condensed by contact with the condenser unit will, in the normal operation of the degreaser, collect in the bottom of the condenser chamber and drain back into the drum through the bung hole coupling.

During operation of degreaser equipment, a layer of sediment builds up in the bottom of the tank due to an accumulation of grease, dirt, etc. washed off the items in the process of degreasing them. It becomes necessary, therefore, to clean the tank occasionally, and to do this, the solvent must first be removed.

This may readily be accomplished in the degreaser of the present invention, by the provision of a drain spigot 55 in a wall of the condenser chamber at floor level. By opening said spigot, condensed vapor in the condenser chamber will favor flow through the spigot, by reason of the location of the coupling opening at a slight elevation above the chamber floor. Continued application of heat to the solvent in the drum will ultimately boil it all off through the bung hole and into the condenser chamber, where it will be condensed and drawn off through the spigot. The drum may then be thoroughly cleaned and again prepared for service, and without the necessity of uncoupling and removing the same.

When the drum has reached a condition when it is no longer of service, the same may readily be replaced with a similar drum. By the time such change becomes necessary, the owner or operator will have available empty solvent drums which he can employ for such purpose. Under such conditions, it no longer is essential to exercise extreme precautions to preserve the tank against corrosion, though one may, if desirable, apply a preservative coating on the inner surfaces of the tank.

It is significant to note, in connection with the present invention, that the drum is maintained completely free of equipment within itself, such as heater or condenser units, and, therefore, offers the maximum of available space for degreasing operations. The external application of the heat and the remote control of vapor level, furthermore, extremely simplify the application of the conventional type drums to the equipment for use in degreasing, and in like respect simplify the replacement of such drums if and when replacement becomes necessary.

As a protective feature, in the event of failure of the condenser to function, a thermostat is mounted in a wall of the condenser chamber, toward the upper end thereof. This thermostat is connected in series with the winding 59 of a relay 61 across a suitable power source, the contacts 63 of this relay being in the power supply line 65 connecting the power source to the heater elements 17. A toggle switch 67 or the like, connected in the relay circuit and mounted on a wall of the housing, provides an operator with a simple control for putting the equipment into and out of operation. A signal light 69 connected across the relay winding and mounted in some observable position on the wall of the housing, will serve to indicate which of these two conditions prevails.

So long as the condenser is functioning properly and maintains proper vapor level, the thermostat will maintain a closed circuit through the relay winding and thus hold the heater elements in circuit across the power source.

However, should the condenser fail to function properly, or the operator neglect to turn on the water supply to the condenser, thereby permitting the vapor to rise in the drum toward the open end, the rise in temperature to which the thermostat will be exposed, will cause the thermostat contacts to open the circuit through the relay winding and deenergize the same, whereupon the relay contacts will open and disconnect the heater elements from the power supply.

In lieu of the water condenser unit as a means for controlling the vapor level in the drum, we have accomplished vapor level control by a thermostat in the wall of the condenser chamber, at the desired vapor level, this thermostat being connected preferably in series with the one above. The heating effect of the vapor on this vapor level control thermostat causes disconnection of the heater elements until sufficient cooling of the thermostat occurs to again connect the elements back in circuit. The vapor level, with the thermostat control in operation, will, therefore, fluctuate somewhat but will not exceed the desired elevation.

It will be apparent from the foregoing description of our invention that the same fulfills the many objects attributed thereto, and while we have illustrated and described the same in its preferred form and in considerable detail, it is subject to alteration and modification without departing from the underlying principles thereof, and we, accordingly, do not desire to be limited in our protection to the specific details so illustrated and described, except as may be necessitated by the appended claims.

We claim:

1. A degreaser assembly comprising a base unit, a heater unit in said base unit, a separate and independent tank receivable by said base unit to removably support the same thereon in heat transfer relationship with said heater unit, and means for maintaining a vapor level in said tank when heat from said heater unit is transmitted to a solvent in said tank, said means including a separate and independent housing outside of said tank, means connecting said housing to said base unit independently of said tank and providing a chamber extending above the desired vapor level in said tank, means both coupling the interior of said tank from a point below such desired vapor level to said chamber and mechanically connecting said tank to said housing, said means constituting the only mechanical connection required to restrain removal of said tank from said base unit, and vapor level control means exposed to vapor in said chamber.

2. A degreaser assembly comprising a base unit, a heater unit in said base unit, a separate and independent tank interfittingly receivable by said base unit to removably support the same thereon in heat transfer relationship with said heater unit, and means for maintaining a vapor level in said tank when heat from said heater unit is transmitted to a solvent in said tank, said means including a separate and independent housing outside of said tank, means connecting said housing to said base unit independently of said tank and providing a chamber extending above the desired vapor level in said tank, means both coupling the interior of said tank from a point below such desired vapor level to said chamber and mechanically con-

necting said tank to said housing, said means constituting the only mechanical connection required to restrain removal of said tank from said base unit, and means exposed to vapor in said chamber for holding the vapor level in said tank, said means including a vapor condenser supported in said chamber at the desired level of vapor in said tank.

3. A degreaser assembly comprising a base unit, a heater unit in said base unit, a separate and independent drum receivable by said base unit to removably support the same thereon in heat transfer relationship with said heater unit, said drum having a bung hole in the side thereof, means for maintaining a vapor level in said drum when heat from said heater unit is transmitted to a solvent in said drum, said means including a separate and independent housing outside of said drum, means connecting said housing to said base unit independently of said drum and providing a chamber extending above the desired vapor level in said drum and having a floor below the level of said bung hole, means both coupling the interior of said drum at said bung hole to said chamber at a point above said floor and mechanically connecting said drum to said housing, said means constituting the only mechanical connection required to restrain the removal of said drum from said base unit, means exposed to vapor in said chamber for holding the vapor level in said drum, said means including a vapor condenser supported in said chamber at the desired level of vapor in said drum, and a valve controllable discharge means extending from said housing at substantially the level of said chamber floor and terminating externally of said drum.

4. A degreaser unit comprising a base unit adapted to removably receive the lower end of a separate and independent drum, said base unit involving a cylindrical ring of sheet material; a heater unit adapted to fit within said cylindrical base ring, means supporting said heater unit within said base ring, and a pad of heat insulation disposed within said base ring and below said heater unit; a housing defining a chamber; means connecting said housing to said base unit in offset relationship thereto to permit of the installation of such drum on said base unit; means for coupling to said chamber, a drum when supported on said base unit; and means extending into said chamber and responsive to a vapor condition therein for controlling vapor level in such drum when coupled thereto.

5. A degreaser unit comprising a base unit adapted to receive the lower end of a separate and independent drum, said base unit involving a cylindrical ring of sheet material; a heater unit adapted to fit within said cylindrical base ring, means supporting said heater unit within said base ring and below the upper edge thereof to permit of the reception in said base ring of a drum of slightly less diameter than said base ring, and a pad of heat insulation disposed within said base ring and below said heater unit; a housing defining a chamber; means connecting said housing to said base unit in offset relationship thereto to permit of the installation of such a drum on said base unit; means in the wall of said chamber at a point above the lower end thereof, for coupling thereto a drum when supported on said base unit; means in said chamber and responsive to a vapor condition therein for controlling vapor level in such drum when coupled thereto; and a discharge spigot in the wall of said condenser chamber below the level of said coupling means.

6. A degreaser unit comprising a base unit adapted to receive the lower end of a separate and independent drum, said base unit involving a cylindrical ring of sheet material of greater diameter than such drum, a heater unit adapted to fit within said cylindrical base ring, said heater unit including a ring of less diameter than said cylindrical base ring and having an outwardly directed flange, a plurality of heater element supports affixed to and directed inwardly of said heater unit ring, each of said supporters having heater element receiving notches in the upper edge thereof, and heater elements supported on said supports in the notches thereof and terminating externally of said base ring, means supporting said heater unit within said base ring and below the upper edge thereof to permit of the reception in said base ring of such drum, and a pad of heat insulation disposed within said base ring and below said heater unit; a housing, means connecting said housing to said base unit in offset relationship thereto to permit of the installation of such a drum on said base unit, said housing having a partition therein including a vertical section extending to an intermediate level in said housing from the upper end thereof, and a horizontal section at its lower end, said partition dividing said housing into a condenser chamber and a control chamber; means in the wall of said condenser chamber at a point slightly above the lower end thereof, for coupling thereto a drum when supported on said base unit; a condenser supported in said condenser chamber at a level establishing a desired vapor level in such drum when coupled thereto; and a discharge spigot in the wall of said condenser chamber below the level of said coupling means.

7. A degreaser unit comprising a base unit adapted to receive the lower end of a separate and independent drum, said base unit involving a cylindrical ring of sheet material of greater diameter than such drum, a heater unit adapted to fit within said cylindrical base ring, means supporting said heater unit within said base ring and below the upper edge thereof to permit of the reception in said base ring of such drum, and a pad of heat insulation disposed within said base ring and below said heater unit; a housing, means connecting said housing to said base unit in offset relationship thereto to permit of the installation of such a drum on said base unit, said housing having a partition therein dividing said housing into a condenser chamber and a control chamber with said condenser chamber in the upper portion of said housing; means in the wall of said condenser chamber at a point slightly above the lower end thereof, for coupling thereto a drum when supported on said base unit; a condenser supported in said condenser chamber at a level establishing a desired vapor level in such drum when coupled thereto; a discharge spigot in the wall of said condenser chamber below the level of said coupling means; a thermostat mounted in a wall of and projecting into said condenser chamber at its upper end, and electrical circuit means connecting said thermostat in series with said heater unit.

8. A degreaser unit comprising a base unit including a heater unit, said base unit being adapted to receive the lower end of a separate and independent tank having a bung opening in the side thereof, and thereby removably support such tank thereon; a housing defining a chamber; means connecting said housing to said base unit in offset relationship thereto, to permit of the installation of such a tank on said base unit and adjacent said housing, with said chamber extending to a point above the elevational position of the bung opening of such a tank when installed on said base unit; and means for coupling such tank at its bung opening to said chamber to provide both a vapor flow passage between such tank and chamber and a mechanical connection between such tank and said housing.

9. A degreaser unit comprising a base unit including a heater unit, said base unit being adapted to receive the lower end of a drum having a bung opening in the side thereof, and thereby removably support such drum thereon; a housing defining a chamber; means connecting said housing to said base unit in offset relationship thereto to permit of the installation of such a drum on said base unit and adjacent said housing, with said chamber extending to a point above the elevational position of the bung opening of such a drum when installed on said base unit; means for coupling such drum at its

bung opening to said chamber to provide both a vapor flow passage between such drum and chamber and a mechanical connection between such drum and said housing, said coupling constituting the only mechanical connection required between such drum and said degreaser unit to restrain removal of such drum following installation thereof on said base unit and vapor level control means in said chamber.

10. A degreaser unit comprising a base unit including a heater unit, said base unit being adapted to interfittingly receive the lower end of a conventional type drum having a bung opening in the side thereof, and thereby removably support such drum in a fixed position thereon; a housing defining a chamber; means connecting said housing to said base unit in offset relationship thereto to permit of the installation of such a drum on said base unit and adjacent said housing, with said chamber extending to a point above the elevational position of the bung opening of such a drum when installed on said base unit; means for coupling such drum at its bung opening to said chamber to provide both a vapor flow passage between such drum and chamber and a

mechanical connection between such drum and said housing, said coupling constituting the only mechanical connection required between such drum and said degreaser unit to restrain removal of such drum following installation thereof on said base unit; vapor level control means in said chamber; and valve controllable discharge means extending from said housing at approximately floor level therein.

References Cited in the file of this patent

UNITED STATES PATENTS

1,927,686	Kapner	Sept. 19, 1933
1,938,841	Koch	Dec. 12, 1933
2,016,376	Koch	Oct. 8, 1935
2,057,177	Wolff	Oct. 18, 1936
2,161,793	Beaucolin	June 13, 1939
2,289,023	Koch	July 7, 1942
2,305,166	Koch	Dec. 15, 1942
2,318,455	Black	May 4, 1943
2,456,335	Skelly	Dec. 14, 1948