July 30, 1963 R. L. BERGENDAHL 3,099,276

CONTAINER WASHING APPARATUS

Filed March 20, 1961 3 Sheets-Sheet 1

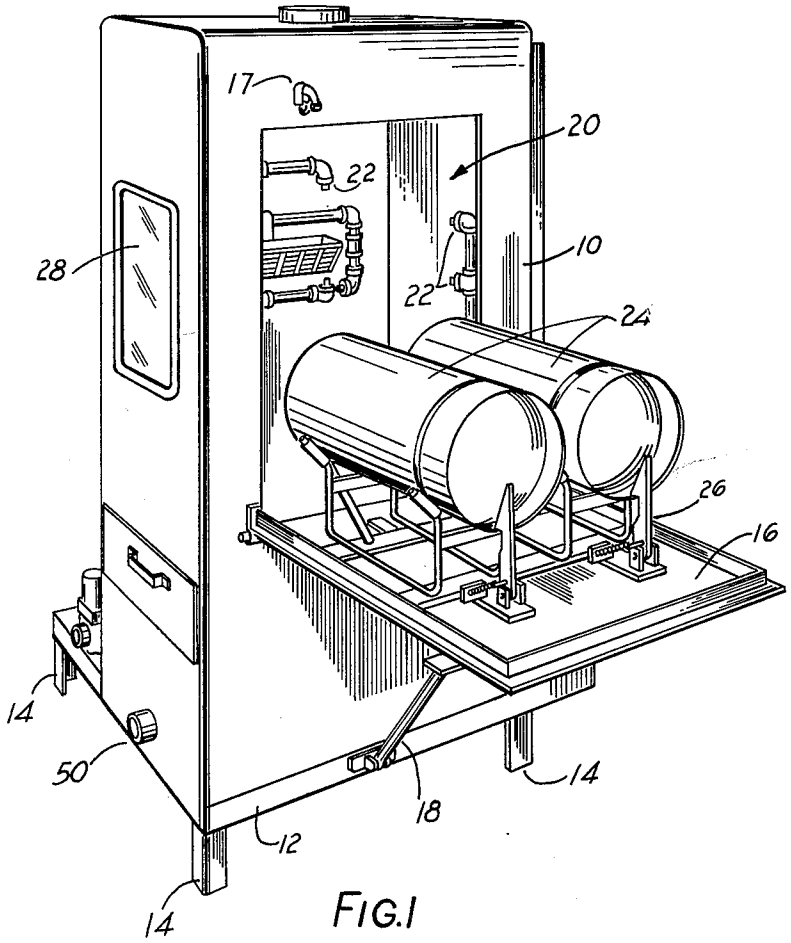


FIG. 1

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CONTAINER WASHING APPARATUS

Filed March 20, 1961 3 Sheets-Sheet 2

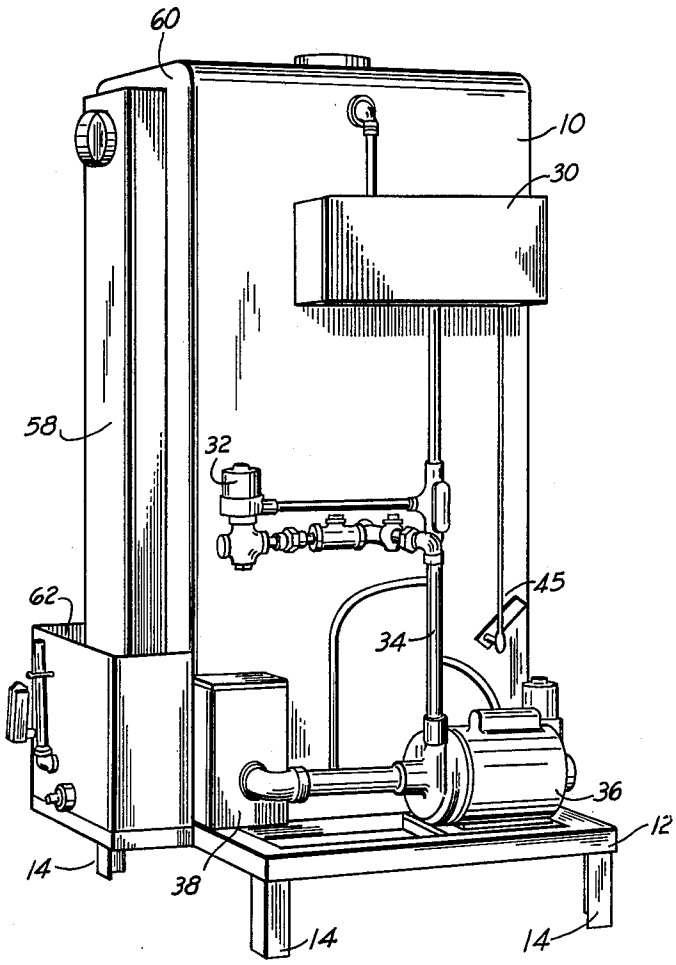


FIG. 2

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July 30, 1963 R. L. BERGENDAHL 3,099,276

CONTAINER WASHING APPARATUS

Filed March 20, 1961 3 Sheets-Sheet 3

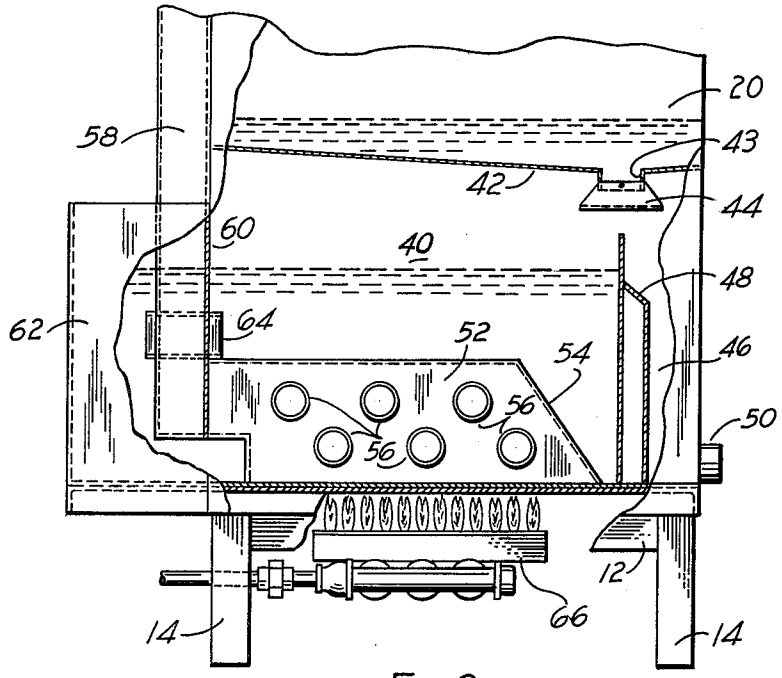


FIG. 3

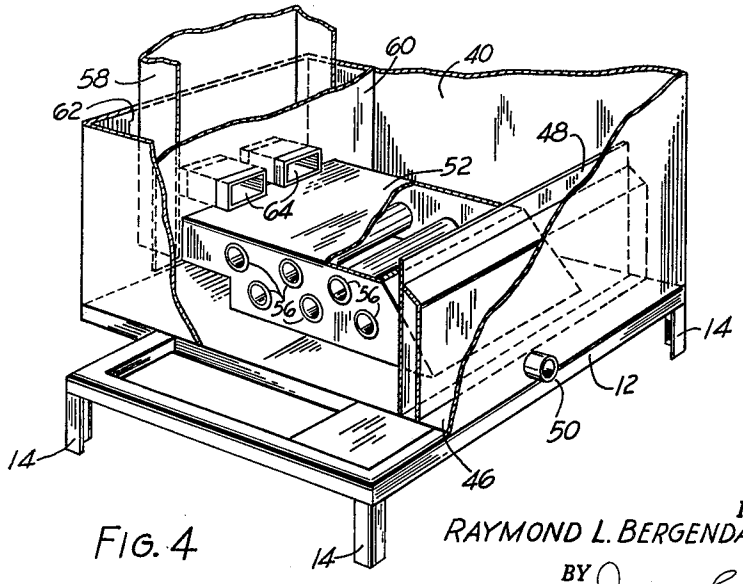


FIG. 4

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3,099,276

CONTAINER WASHING APPARATUS

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1 Claim. (Cl. 134—107)

This invention relates to a container washing apparatus and more particularly to improvements in the design of apparatus for washing containers automatically with solution heated in the apparatus itself.

Apparatus of the type to which my invention relates generally have a washing chamber and some means for heating a detergent solution prior to the time it is pumped into the washing chamber and sprayed onto the containers. The operation preferably is fully automatic and a not uncommon period of time for the complete cycle is two to three minutes. In between cycles it is only necessary for the operator to remove the washed containers and position another pair of containers in the washer. With a time cycle of this duration, a large number of containers can be washed in a short period of time. This places quite a load on the heating system that warms the wash solution to the desired temperature. Therefore any saving of heat will greatly increase the efficiency and thereby reduce the operating cost of the washing apparatus.

It is therefore a principal object of my invention to provide a container washing apparatus in which heat that would otherwise be wasted is utilized thereby increasing the efficiency of the apparatus.

It is another object of my invention to provide a container washing apparatus in which the normally lost stack heat is utilized to maintain the washing chamber at a higher than normal temperature while the washer is being unloaded and loaded between cycles of operation.

It is a further object of my invention to provide a heating system for a container washing apparatus in which there is provided a maximum amount of heating surface area in the solution heating chamber thereby obtaining practically full utilization of the supplied heat.

It is a still further object of my invention to provide a more efficient heating system for a container washing apparatus without greatly increasing the size or cost of the apparatus.

These and other objects of my invention will be readily apparent from a consideration of the following description taken in connection with the accompanying drawings in which:

FIGURE 1 is a perspective view looking at my novel apparatus from the left front;

FIGURE 2 is a perspective view of my novel apparatus looking at the apparatus from the right rear and showing some of the necessary equipment;

FIGURE 3 is a rear view of the lower portion of my apparatus with most of the exterior covering and equipment broken away to show details of the wash solution chamber; and

FIGURE 4 is a perspective view of the wash solution heating chamber viewing the apparatus from the right rear with much of the exterior equipment broken away to show details of the heating chamber.

The illustrated washing apparatus embodying my invention has an exterior cabinet **10** mounted on a supporting framework **12** that includes four legs **14**. On its front side (FIG. 1) the cabinet **10** has a door **16** pivotally mounted along its bottom edge so as to swing downwardly to a horizontal position. A catch or latch **17** holds the door **16** closed and a supporting arm **18** provides a stop and support when the door **16** is open. The upper portion of the cabinet **10** provides a container washing chamber that is indicated generally by the reference numeral **20**. The washing chamber **20** iniludes a piping system having a plurality of outlet nozzles **22** through which the wash solution and rinse water are sprayed under pressure onto the containers **24** to be washed.

The containers **24** to be washed are mounted on the backside of the door **16** on a suitable supporting rack **26**. The containers **24** are thus so positioned in the washing chamber **20** that when the door **16** is closed the streams of liquid from the nozzles **22** will be directed into the interior and onto the exterior of the containers **24**. A sight glass **28** may be provided on the left side of the cabinet **10** so that the proper operation of the spray nozzles **22** may be periodically checked.

On the rear side of the apparatus, as best seen in FIG. 2, there is mounted a control box **30** that contains electrical controls and wiring to operate the apparatus automatically. Flow of water from a suitable source into the apparatus is controlled by a solenoid valve **32** in pipeline **34** leading to the solution pump **36**. A sump **38** with a strainer (not shown) is also preferably provided since the wash solution is recirculated after use.

The portion of the washing apparatus to which my invention is primarily directed is the heating arrangement for the wash solution. A solution heating chamber **40** is located in the lower portion of the cabinet **10** beneath the washing chamber **20**. The washing chamber **20** and heating chamber **40** are divided by a suitable partition **42** that has a drain opening **43** therein. A diverter **44** is controlled by an operator **45** (FIG. 2) that directs the wash solution back into the heating chamber **40** during the wash cycle. During the rinse cycle, the diverter **44** operates to direct the rinse water into a small chamber **46** that is separated from the solution heating chamber **40** by a baffle **48**. Baffle **48** preferably is of a double wall construction enclosing a dead air space so that the warm solution in chamber **40** will not be cooled by the cool rinse water drained from the washing chamber **20** into chamber **46**. The rinse water is carried away from chamber **46** immediately through drain **50**.

Located on the floor of the heating chamber **40** is a heating compartment **52**. The heating compartment **52** is shaped as shown being substantially rectangular with one side **54** sloping to provide greater surface heating area. The heating compartment **52** is open on the bottom and has a plurality of tubes **56** extending from one side to the other. Thus, solution to be heated in the chamber **40** will flow through the tubes **56** providing a substantial increase in the effective heating surface of the system.

A vent stack **53** is located on the right sidewall **60** of the cabinet **10**. As best seen in FIGURE 4, the right sidewall **60** does not extend all the way down to the floor of the heating chamber **40** thereby allowing the heating solution to flow beneath the vent stack **58** into a second heating chamber **62**. To provide for a maximum amount of heating surface and free flow of the solution from the chamber **62** into the main heating chamber **40** we have provided two passageways **64** that extend through the vent stack **58**. Thus, it is seen that the heat normally lost through the vent stack **58** is partially used to heat the solution in the chambers **40** and **62**. Moreover, the vent stack **58** is extended all the way up the sidewall **60** thereby utilizing the heat from the stack to warm the washing chamber **20** between cycles when the apparatus is being unloaded and reloaded. Therefore, the washing chamber **20** is actually picking up heat while reloading takes place thereby lessening the recovery load when the washer starts a new cycle. The effect is that the next cycle of operation starts with a warm chamber **20** rather than one that is slightly above tap water temperature.

The heat is preferably supplied to the chamber **40** by means of a gas fired burner **66** (FIG. 3) mounted on the

framework 12 directly below the chamber 40. Since the chamber 40 is open at the bottom the heat will circulate freely around the tubes 56 and be exhausted through the vent stack 58.

To operate the washer, two containers 24 are placed in the rack 26 and the door 16 is closed. The washing cycle then automatically commences with a fresh water prerinse which is drained from chamber 20 through drain 43 in partition 42. The rinse water is directed into chamber 46 and out drain 50 by diverter 44. The wash cycle then commences, the wash solution being pumped into chamber 20 from the heating chamber 40 by pump 36. The solution is returned by diverter 44 to chamber 40 for reheating. The last cycle of operation is a rinse cycle with tap water, and the washing chamber 20 would therefore normally be at tap water temperature upon start of another cycle. However, because of our novel arrangement with the vent stack 58 covering the sidewall 60, some of the heat exhausted by stack 58 is utilized to prewarm the apparatus for the next cycle. Thus, the atmosphere into which the wash solution is sprayed will be slightly above tap water temperature thereby requiring wash solution of a lower temperature than otherwise would be needed to clean the containers effectively.

The novel design of the solution heating chamber 40 with its maximum utilization of available heat produces a heating system for the washing apparatus that has a relatively high efficiency thereby reducing the operating cost of the apparatus. However, it will be appreciated that the particular construction shown in the drawings and described herein is merely illustrative of my invention and that the principles thereof can be applied for other uses by revisions and variations in the illustrated structure. It is intended that such revisions and variations of the inventions as are reasonably expected on the part of those skilled in the art will be included within the scope of the following claim.

I claim:

A container washing apparatus comprising an enclosed cabinet having sidewalls defining a washing chamber and a liquid heating chamber beneath said washing chamber, means for positioning the containers to be washed in said washing chamber, a heating compartment in said heating chamber, said compartment being open at the bottom and extending upwardly into a portion of said heating chamber with the sides of said heating compartment spaced from the sides of said heating chamber, a plurality of spaced-apart liquid passageways extending from one side to another through said heating compartment to provide increased heat exchange surface, an exhaust stack connected to a third side of said heating compartment and extending upwardly through said heating chamber and contiguous to the outside of a sidewall of said washing chamber, means for supplying heat to said heating compartment to heat the liquid in said heating chamber, means to circulate the heated liquid from said heating chamber to said washing chamber and to return said liquid to said heating chamber, and at least one liquid passageway extending through the portion of said exhaust stack in said heating chamber to provide additional surface for heating the liquid in said heating chamber.

References Cited in the file of this patent

UNITED STATES PATENTS

1,554,495	Garrett et al.	Sept. 22, 1925
1,690,449	Jourdan	Nov. 6, 1928
2,066,232	Schmidt	Dec. 29, 1936
2,170,730	Rodieck	Aug. 22, 1939
2,414,875	Horne	Jan. 28, 1947
2,527,430	Kniviton	Oct. 24, 1950
2,825,349	Keliher	Mar. 4, 1958
2,841,136	Pettit	July 1, 1958

FOREIGN PATENTS

902,115	Germany	Jan. 18, 1954