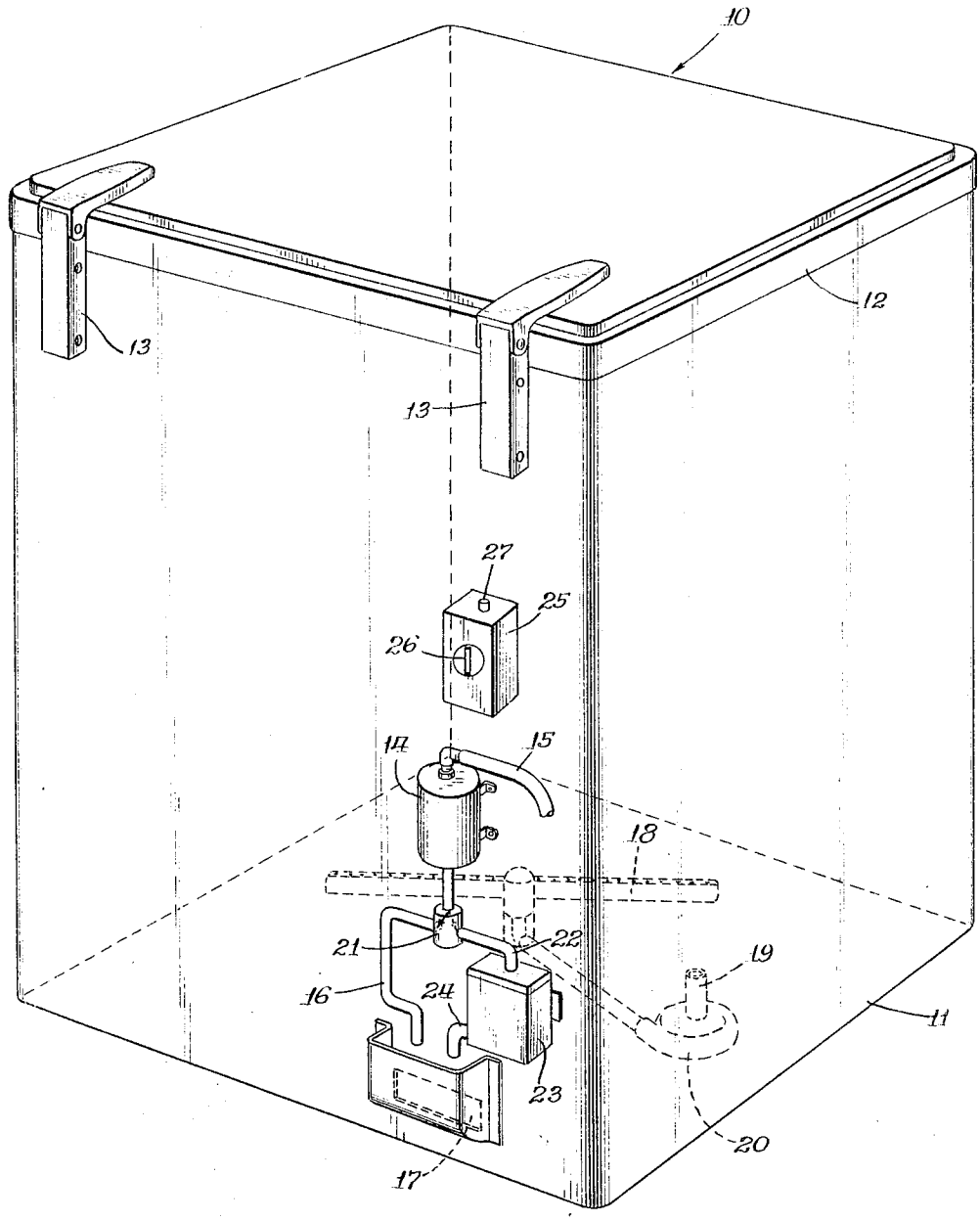
Sept. 13, 1966 D. C. WOOD 3,272,652

METHOD OF REMOVING FILM DEPOSITS

Original Filed Jan. 6, 1961



INVENTOR.

Donald C. Wood

BY

Hofgren, Brady, Wegner, Allen & Stellman

Attys.

United States Patent Office 3,272,652 Patented Sept. 13, 1966

3,272,652

METHOD OF REMOVING FILM DEPOSITS

Donald C. Wood, Fredonia, Wis., assignor to Whirlpool Corporation, a corporation of Delaware

Original application Jan. 6, 1961, Ser. No. 81,083. Divided and this application Nov. 12, 1964, Ser. No. 412,281

4 Claims. (Cl. 134—34)

This application is a division of my copending application Ser. No. 81,083, filed Jan. 6, 1961, now abandoned.

This invention relates to dishawashers and in particular to a method of removing film deposits from the washed objects.

A serious problem in the use of automatic dishwashers is the development of a cloudy film on glassware, dishes and the like as a result of washing such articles a number of times in hard water. This film appears to comprise a calcium or magnesium complex, the deposit of which may be accelerated by washing such articles as in detergents containing phosphates or silicates.

The present invention is concerned with the removal of this film from the glassware and comprehends the removal thereof by contacting the glassware with a fluid containing monovalent electropositive ions.

A principal feature of the invention is, therefore, the provision of a new and improved method of removing film deposits on elements such as glassware resulting from the washing thereof.

Another feature of the invention is the provision of such a method of removing film deposits including the steps of providing a solution containing monovalent electropositive metal ions and contacting said solution with said deposits on the elements.

A further feature of the invention is the provision of such a method of removing film deposits wherein the solution comprises a brine solution.

Still another feature of the invention is the provision of such a method of removing film deposits wherein the solution is formed substantially concurrently with the contacting thereof with said film deposits.

Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawing wherein:

The figure is an isometric left rear view of a dishwashing apparatus provided with means embodying the invention for removing film deposits from elements such as glassware.

In the exemplary embodiment of the invention, as disclosed in the drawing, a dishwasher generally designated **10** of generally conventional construction includes a cabinet portion **11** in which elements such as dishes and glassware may be washed. Access to the interior of the cabinet for insertion and removal of the dishes and glassware may be had by means of a conventional cover **12** secured to the cabinet by suitable hinge structures **13**. Washing water is delivered to the interior of the cabinet by suitable conventional means such as a control valve **14** connected to a conduit **15** which is, in turn, connected to a suitable supply of hot water (not shown). Valve **14** may comprise a conventional solenoid operated valve which, when opened, passes the hot water through a discharge conduit **16** to an inlet means **17** for delivering the water to the interior of the cabinet through a suitable spray device **18** therein. The wash water is recirculated within the cabinet by suitable conventional means including a drain **19** and a pump **20**. Suitable control means including a timer (not shown) may be associated with the valve **14** to effect an automatic operation of the dishwasher as desired.

The present invention comprehends the provision of means for introducing into the dishwasher or generating

therein a fluid adapted to remove film deposits on glassware and the like resulting from the washing thereof. If has been found that these deposits which produce a cloudy, unsightly film on the glassware are caused primarily by orthosilicates and/or orthophosphates in the washing solutions in hard water. These deposits may be removed by placing the glassware in a solution containing monovalent electropositive ions for a substantial period of time whereby the glassware is restored to sparkling clarity. As shown in the drawing, the contacting of such a fluid with the glassware may be effected in dishwasher **10** by providing a selector valve **21** in the conduit **16** selectively operable to direct the incoming water through a bypass conduit **22** leading to a container **23** in which a suitable quantity, such as two pounds, of salt per each 20 pounds of water is placed. A discharge conduit **24** leads from the container **23** to the inlet means **17** whereby water delivered through conduit **22** and passed through the container **23** to form a salt solution is delivered through the conduit **24** and inlet means **17** to the interior of the dishwasher to be sprayed and circulated therein similar to the washing water. The spraying and circulation of the salt solution may be controlled by a suitable timer control **25** so that this operation is continued for a predetermined period of time such as 1½ hours to assure that the film deposit on the glassware is fully removed. The time necessary to fully remove the deposit has been found to vary with the amount of deposit on the glassware and the strength of the salt solution and, thus, timer **25** may be provided with suitable adjusting means **26** for varying the length of the cycle. In the conventional dishwasher, a quantity of approximately two pounds of salt provides an approximate 10% salt solution; satisfactory film removal may be effected with substantially less salt such as a quantity providing as low as approximately 3% solution. Where a minimum treatment time is desired, the solution may be a saturated solution. The customary spray action of the dishwasher accelerates the ion exchange to remove the deposit in a relatively short time.

The removal of the film deposits from the glassware may be effected relatively infrequently, depending on the rate of deposit of the film. Thus, control **25** may be provided with a manually operable push button **27** for effecting the film removing operation only when desired. Thus, selector valve **21** may be normally maintained in the position wherein flow of the water from valve **14** is through conduit **16**. Upon operation of the control **25** to initiate the film removing cycle, the control may actuate the valve **21** to direct the water to conduit **22** rather than conduit **16**. The control may be arranged so that upon completion of the control cycle the valve **21** is restored to the normal position for directing the water from the valve **14** to conduit **16** allowing normal dishwashing operation until the operator once again desired to effect a film removing operation.

The salt which may be used for removing the film deposits may comprise any salt providing monovalent electropositive ions such as metal or hydrogen ions. Illustratively, sodium chloride may be utilized. To flush the dishwasher and rinse the glassware subsequent to the film removing operation, the control **25** may be arranged to provide an additional rinse cycle.

If desired, the salt may be dispensed directly into the dishwasher from a dispenser such as the well known types for dispensing detergent but of increased size to accommodate the amount of salt required.

This invention may be practiced either periodically as described or more frequently as, for example, in each cycle of dishwashing. By adding a "brine and rinse" operation to an otherwise conventional dishwashing cycle following its wash and rinse operations, the objectionable

deposits may be effectively prevented from building up on the articles.

Having described my invention as related to the emmodiment shown in the accompanying drawing, it is my intention that the invention be not limited by any of the details of description, unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:

1. The method of removing film on tableware deposited thereon as a result of washing the tableware with phosphate or silicate containing detergents in hard water, comprising the steps of:

forcibly spraying the tableware with a solution of hard water and at least approximately 3% by weight sodium chloride to dissolve the deposited film; and

rinsing the tableware with water to remove said solution and dissolved film.

2. The method of claim **1** wherein the water utilized in each of the film removing and rinsing steps is provided from a common source.

3. The method of claim **1** wherein said film removing solution is a saturated solution.

4. The method of claim **1** wherein the spraying and rinsing steps are conducted within a chamber and wherein the sodium chloride is introduced into the chamber for dissolving in hard water therein to form said film removing solution.

References Cited by the Examiner

UNITED STATES PATENTS

1,870,318	8/1932	Stoddard	134—29
2,008,839	7/1935	Samson	134—22
2,395,260	2/1946	Farmer et al.	134—22 X
2,424,049	7/1947	Parker et al.	134—28 X
2,766,151	10/1956	Stearns	134—27
2,825,666	3/1958	Stoddard	134—28
2,884,349	4/1959	Axelrad	134—22

FOREIGN PATENTS

118,498	5/1944	Australia.
647,673	12/1950	Great Britain.

MORRIS O. WOLK, *Primary Examiner.*

J. ZATARGA, *Assistant Examiner.*