METHOD FOR CONTROLLING DETERGENT CONCENTRATION IN DISHWASHING MACHINES OR THE LIKE

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2 Claims. (Cl. 137—5)

1. This invention relates to an electrically controlled, detergent supply device of the critical control type and same is particularly applicable to dish washing and can and equipment washing apparatus for restaurants and milk handling companies although not specifically restricted thereto.

For a better understanding of the present invention reference is had to the prior Noble and Wolgemuth Patent No. 2,577,365, dated June 5, 1945. Therein is disclosed a washing and/or sterilizing tank which is intermittently supplied with a detergent or like saturated solution, the supply being of intermittent type, electrically controlled by means including a pair of electrodes exposed to the washing and/or sterilizing water the concentration of which is proportional to its electrical resistance.

It has been discovered that for more economical and efficient operation of such apparatus, excess and deficient detergent solution supply respectively should be avoided.

Hence electrodes exposed to the tank water often tend to scale up chiefly due to drying thereof when the tank water (usually heated) is drained at the end of a washing period. This of course varies the resistance across the electrodes unless same are cleaned daily, which is an operation the attendants usually forget and also find unpleasant to perform.

The chief object of the present invention accordingly is to provide an electrode system that is inherently accurate at all times in that daily electrode cleaning is not necessary.

The chief feature of the present invention is to provide a tank, which may be drainable, with a constantly submerged electrode system and which is further characterized by the electrodes being disposed for ready removal for inspection purposes.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

In the drawings:
Fig. 1 is a semi-diagrammatic central sectional view of an electrode controlled detergent supplied washing apparatus including the invention.
Fig. 2 is an enlarged central sectional view of the electrode cup and electrodes.
Fig. 3 is a top plan view thereof.

Since the major portion of the control system of and detergent supply to the tank are shown and described in said patent, duplication herein is omitted for brevity.

In Fig. 1 herein 10 indicates a suitable housing having tank 11 in its base. This is provided with valve controlled drain 12 and overflow 13 maintaining cleansing solution level 14. A pump 15 has its intake 16 disposed above the tank bottom so that it will not circulate sludge etc. and thus clog the spray outlets 17, said sprays being connected to the pump discharge 17. The sprays may be disposed for opposed spraying of articles carried or supported by screen 18 above tank 11.

Detergent supply is effected at 19 from receptacle 20 having a valve controlled inlet 21, and the details of this portion of the device may be as illustrated in said patent. The normal water supply (hot and/or cold) to the tank are omitted for clearness.

Disposed in an overhead position in the spray chamber 22 is a cup 23 having an overflow outlet 24. A bypass 25 from the pump discharge 17 is of suitable character and supplies spray liquid to the cup as indicated at 26. Thus the cup is always filled substantially to the overflow level determined by outlet 24. Note that the bell mouth shape at 25 reduces the amount of bubbling to a minimum thereby insuring accuracy of determination by the electrodes 29 and 30.

Carried by the cup is overhead bracket 27 and detachably supported therein is the electrode unit 28 having the aforesaid electrodes 29 and 30 therein and exposed at its lower end which is disposed below the aforesaid overflow level of the cup.

Thus the cup contents closely corresponds at all times to the tank contents in concentration during washing periods. The terminals of the electrodes, notwithstanding draining of the tank, will, therefore, always be submerged despite tank draining. The cup may have a valve controlled drain 31 exteriorly controlled by rod 32.

Operation is as follows: Assume the tank has been drained. The operator then fills it to the level determined by the overflow. The electrodes are removed, examined and replaced. Having been submerged and never having been exposed to sludge, infrequent cleaning only will be required. The drain outlet 31 is opened and cup content wasted to the tank. When the cup is emptied, the outlet is closed and the pump started.

As the sprays are supplied the cup is filled and since the cup contents is now clean hot water, the control, see patent aforesaid, supplies concentrate at 19 until the desired concentration is effected in the tank solution. The articles to be sprayed are then placed in the spray chamber for cleaning. When the degree of concentration...
sufficiently raises the resistance across terminals 29—30 in the cup causes the control system not shown to supply the requisite amount of concentrate to bring the tank solution back to its maximum concentration.

This repetitious concentration supply is repeated as often as required same being determined by the control and throughout the day's run for example. At the end of the day the tank contents are drained. The electrode immersing cup, however, is not drained. Thus the electrodes are submerged while the tank is empty.

Also it is to be understood, that if the cup be not drained, the solution therein is rapidly displaced by clean water which immediately calls for concentrate supply, and such is continued until the tank solution is sufficiently saturated to satisfy the control system. Then the tank is ready for actual use.

By reference to a day's work or run is meant a continuity of operation not necessarily of an actual day's time because in a dishwashing machine for a restaurant the tank would be used generally at and after the breakfast, lunch and dinner hours.

Thus it would be emptied thrice daily, being empty for two short periods of two or three hours and for a much longer period, say of nine hours. Obviously if the device is used to an extent that, if for any one run or dishes, the sludge accumulation is excessive, the tank will then be emptied and refilled with clean water. The cycle then is as described above.

While the invention has been illustrated and described in great detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character. The several modifications described herein as well as others which will readily suggest themselves to persons skilled in this art, all are considered to be within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. A method of controlling detergent concentration in a dish washing machine or the like, which method comprises continuously subjecting two exposed electrodes to said solution, intermittently supplying to the solution amounts of concentrate sufficient to bring the solution to the desired concentration, said concentrate being supplied in response to variations in the resistance of said solution as determined by the current flow between said electrodes, and maintaining the electrodes, in an immersed condition while said solution is completely drained from the washing machine.

2. A method of controlling detergent concentration in a dish washing machine or the like, which method comprises continuously cycling the solution and intermittently supplying to the solution while cycling, the amount of concentrate required to bring the solution to the desired concentration, the control over the concentrate supply being exercised by continuously bypassing a portion of the solution being circulated to a concentrate control including a receptacle having electrodes immersed therein for measuring the resistance of the solution, and maintaining said electrodes immersed in the solution in said cup while the machine is completely drained.

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