

Aug. 24, 1954

S. G. NOBLE ET AL
METHOD FOR CONTROLLING DETERGENT CONCENTRATION
IN DISHWASHING MACHINES OR THE LIKE
Filed April 22, 1948

2,687,139

FIG. 1

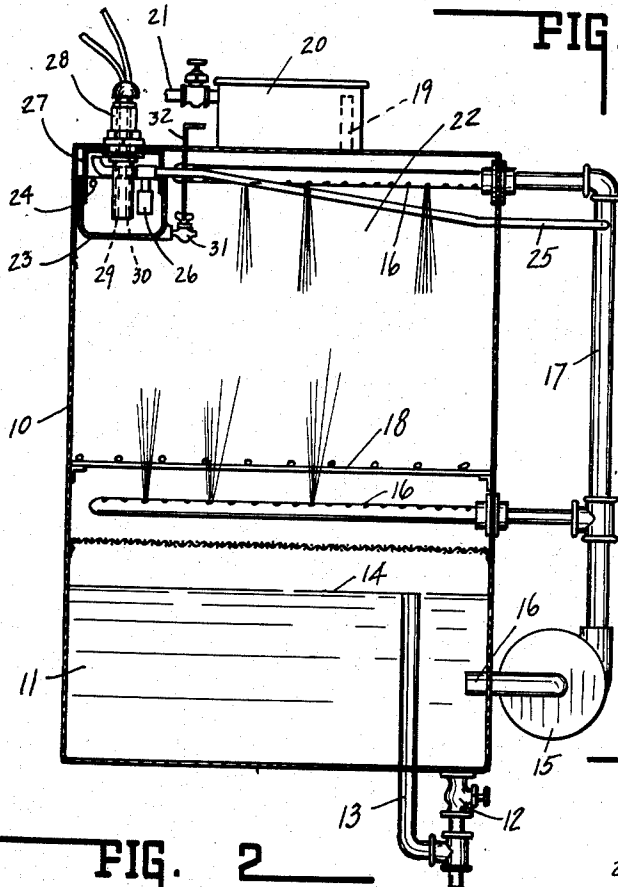


FIG. 3

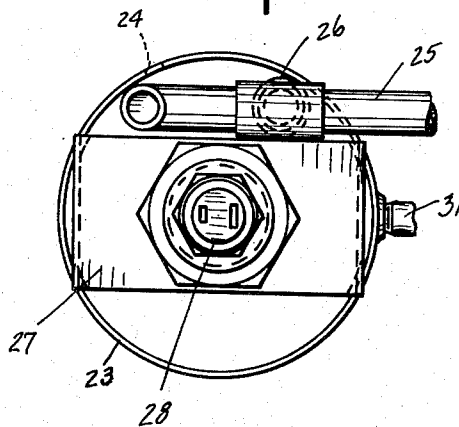
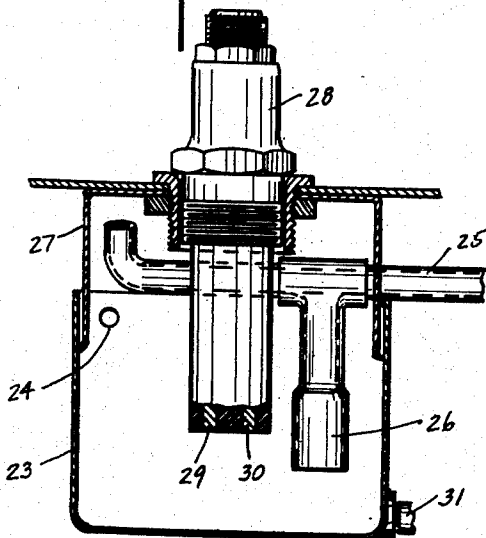


FIG. 2



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UNITED STATES PATENT OFFICE

2,687,139

METHOD FOR CONTROLLING DETERGENT
CONCENTRATION IN DISHWASHING MA-
CHINES OR THE LIKE

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row, Chicago, Ill., assignors, by mesne assign-
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Application April 22, 1948, Serial No. 22,538

2 Claims. (Cl. 137—5)

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This invention relates to an electrically con-
trolled, 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
thereto.

For a better understanding of the present in-
vention reference is had to the prior Noble and
Wolgemuth Patent No. 2,377,363, 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 econom-
ical and efficient operation of such apparatus, ex-
cess and deficient detergent solution supply re-
spectively should be avoided.

Heretofore electrodes exposed to the tank water
often tend to scale up chiefly due to drying there-
of 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 opera-
tion the attendants usually forget and also find
unpleasant to perform.

The chief object of the present invention ac-
cordingly 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 pur-
poses.

The full nature of the invention will be under-
stood 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

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having tank 11 in its base. This is provided with
valve controlled drain 12 and overflow 13 main-
taining 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 16, said sprays being con-
nected 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 recep-
tacle 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 26 reduces the amount of bub-
bling 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 thereby is the electrode unit
28 having the aforesaid electrodes 29 and 30
therein and exposed at its lower end which is dis-
posed 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 re-
quired. 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

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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 of 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.

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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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