

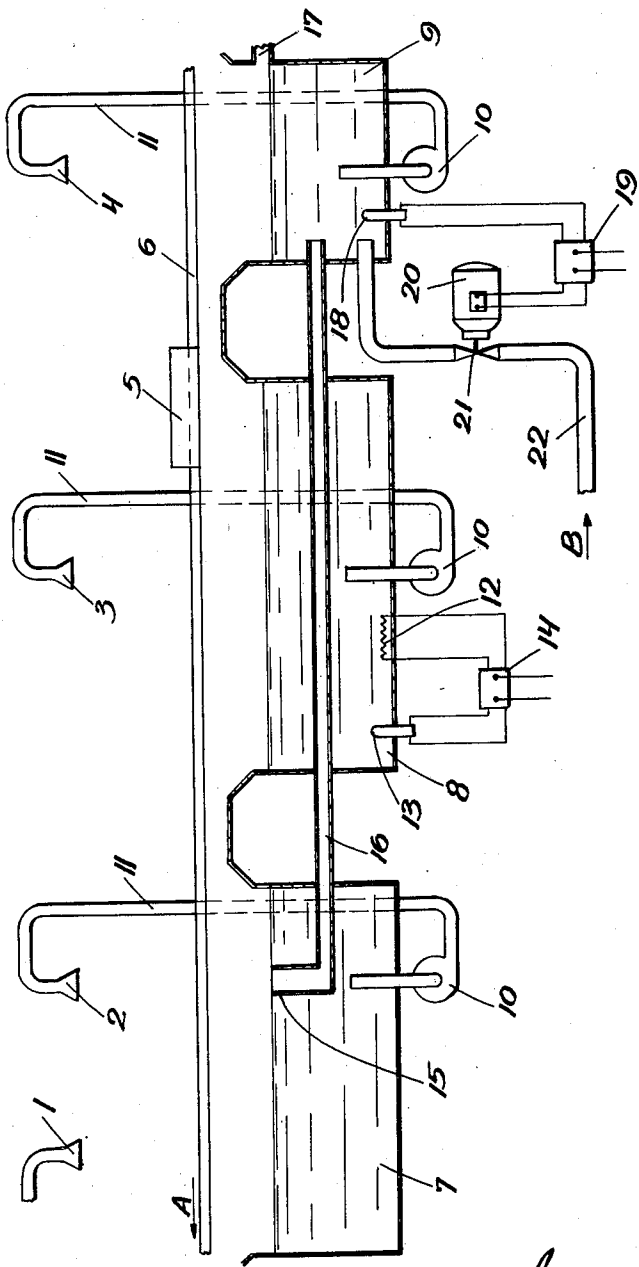
Nov. 25, 1952

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2,619,097

DISHWASHING MACHINE WITH WATER TEMPERATURE REGULATING MEANS

Filed Aug. 30, 1946



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UNITED STATES PATENT OFFICE

2,619,097

DISHWASHING MACHINE WITH WATER
TEMPERATURE REGULATING MEANS

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Application August 30, 1946, Serial No. 693,890
In Sweden September 4, 1945

4 Claims. (Cl. 134—57)

1

This invention relates to dish-washing machines of the type, in which the articles to be washed are placed, preferably in boxes and previous to the washing proper, which is performed with a dish-water, preferably with an admixture of a washing powder, the temperature of which is higher than the coagulation temperature of the substances which are to be found in the food-leavings etc. on the unwashed articles, are subjected to a preliminary washing by means of a circulating dish-water supplied from a preliminary washing tank, the temperature of which is lower than said coagulation temperature, the articles being subjected, after the washing proper, to a rinsing operation with hot rinsing water and possibly also to a sterilization with boiling sterilization water, said last-mentioned waters, the temperatures of which are higher than said coagulation temperature, being transferred after usage to the preliminary washing tank, possibly via the washing tank designed for the dish-water proper.

In previously known dish-washing machines of this type it is tried to hold the temperature of the preliminary dish-water below the coagulation temperature by introducing the cold articles to be washed in the machine with such a velocity that the preliminary dish-water in consequence of the cooling caused by the articles loses as great an amount of heat as that supplied by the used rinsing water and sterilization water, respectively. If, however, in this procedure a relatively long stagnation should occur in the continuous feeding of the boxes the temperature of the water in the preliminary washing tank will rise very rapidly as a result of the supply of the used rinsing water and sterilization water, respectively, so that the coagulation temperature is surpassed which, as is well known, involves that the articles cannot be made clean in the following washing but are coated with a milky film appearing particularly distinctly on glass-ware.

The invention, the principal object of which consists in avoiding the above disadvantages, is substantially characterized in that a thermo-regulator is inserted in the preliminary dish-water, adapted to open a cold water conduit emerging into the preliminary washing tank when the temperature of the preliminary dish-water tends to rise above a certain predetermined temperature below the coagulation temperature, and preferably also to close said conduit when the temperature of the preliminary dish-water tends to sink below a certain predetermined temperature lower than the first-men-

2

tioned temperature, as a result of a supply of cold water.

Other objects and advantages of the invention will appear from the following specification, in which the invention is described more in detail, reference being had to the annexed drawing in which a machine according to the present invention is shown in a preferred form by way of example only.

Referring to the drawing, at 1, 2, 3 and 4 are shown four different sprayers below which the articles to be washed placed in boxes 5 are fed along a path 6 in the direction of the arrow A. At 7, 8 and 9 are shown three water tanks which are connected to the sprayers 2, 3 and 4, respectively, by means of conduits 11 provided with circulating pumps 10. The first of these tanks 7, 8 and 9, which preferably may have a capacity of 90, 140 and 90 liters, respectively, contains rinsing water of 85° C., the second dish-water of 60° C.—70° C and the third preliminary dish-water of 40° C. The temperature of the rinsing water is maintained in such a way that the sterilization water supplied by the sprayer 1 after spraying the washed articles is led into the rinsing water tank 7, the sterilization water having a temperature of about 95° C. The temperature in the dish-water tank 8 proper is maintained by the aid of a heating element 12 or another suitable heating device which is connected through an electric relay 14 to a thermo-regulator 13 arranged in said tank. The rinsing water tank 7 is provided with an overflow pipe 15 connected to a pipe 16 emerging into the preliminary washing tank 9.

The temperature of the latter tank which tends to rise as a result of the rinsing water discharged through the overflow pipe 15 and the pipe 16 is held constant in previously known machines by the cooling to which the preliminary dish-water is subjected when meeting the cold articles to be washed. In order to obtain this the articles evidently must be fed in a uniform stream and at a rate having a definite relation to the amount of sterilization water supplied by the sprayer 1. If, however, there should be a stagnation of the continuous feeding of the dish-boxes the preliminary dish-water will not be cooled for which reason the temperature of this water, as suggested in the introduction, can readily reach and rise above the coagulation temperature of the albuminous substances contained in the food-leavings on the articles to be washed, as the sterilization water is usually supplied to an amount of 400 liters an hour. This causes the albuminous substances to coagulate

3

which in its turn has as a result that the articles cannot be cleaned however efficient washing they may be subjected to thereafter. As a result of the coagulation a milky film is formed on the articles to be washed which can be removed only by drying the articles carefully with a towel. Said film is particularly apparent on glass.

According to the invention, in the preliminary washing tank 9 is arranged a thermo-regulator 18 which is adapted to open a supply conduit of cold water as soon as the temperature in the preliminary washing tank 9 tends to rise near the coagulation temperature. In the form shown as an example the thermo-regulator 18 is connected to an electric relay 19 which in turn is connected to an electro-motor 20 adapted to operate a stop valve 21 arranged in a cold water conduit 22 which emerges into the preliminary washing tank 9 and through which cold water is supplied in the direction of the arrow B. The cold water conduit 22 which preferably may be connected to the water mains should be dimensioned in such a way that the temperature in the preliminary washing tank 9 immediately sinks when a stagnation occurs in the continuous feeding of the dish-boxes. The cold water valve may preferably be adapted to open and close relatively slowly, e. g. during a period of 15 seconds.

The thermo-regulator should be adapted to actuate the valve 21 in such a way that the preliminary dish-water always has a temperature, e. g., about 40° C., safely far below the coagulation temperature.

The machine according to the invention provides in a very simple manner that the coagulation temperature cannot be surpassed under any circumstances, as at a stagnation of the continuous feeding of the articles cold water is immediately supplied to the preliminary washing tank. This regulation of the temperature of the preliminary dish-water is very cheap and effective. By means of the supply of relatively cheap cold water the further advantage is obtained that the preliminary dish-water is cleaner as the food-leavings removed from the articles accompany the excess water flowing off through the overflow pipe 17. Another advantage is that the amount of supplied sterilization water need not be adapted to the rate of feed of the articles to be washed, contrary to what is necessary in the case of known dish-washing machines.

The invention is not limited to the embodiment described and shown as an example as it can be varied in many ways within the scope of the appended claims.

What I claim and desire to secure by Letters Patent is:

1. A dish-washing machine, comprising a preliminary dish-water tank adapted to contain heated water of a low temperature, a main dish-water tank adapted to contain water of a higher temperature than said preliminary dish-water tank, and a rinsing water tank adapted to contain water of a higher temperature than either of the other said tanks, means for conveying dishes across said tanks in succession, means above each said tank and said conveying means for selectively spraying the water of successively higher temperature from each said tank separately onto the dishes as they are conveyed across said preliminary dish-water tank, said main dish-water tank and said rinsing water tank, overflow means provided in said rinsing water tank, first conduit means connecting said overflow means directly with said preliminary

4

dish-water tank for transmitting heated water from said rinsing water tank to said preliminary tank, means including a second conduit and a valve in said second conduit for supplying cold water to said preliminary dish-water tank, and thermoregulating means arranged in said preliminary dish-water tank and governing said valve in response to the temperature of the body of water in said tank for adjusting the delivery of cold water so as to maintain said temperature below a predetermined level.

2. A dish-washing machine, comprising a preliminary dish-water tank adapted to contain heated water of a low temperature, a main dish-water tank adapted to contain water of a higher temperature than said preliminary dish-water tank, and a rinsing water tank adapted to contain water of a higher temperature than either of the other said tanks, means for conveying dishes across said tanks in succession, means above each said tank and said conveying means for selectively spraying the water of successively higher temperature from each said tank separately onto the dishes as they are conveyed across said preliminary dish-water tank, said main dish-water tank and said rinsing water tank, overflow means provided in said rinsing water tank, first conduit means connecting said overflow means directly with said preliminary dish-water tank for transmitting heated water from said rinsing water tank to said preliminary tank, means including a second conduit and a valve in said second conduit for supplying cold water to said preliminary dish-water tank, and thermoregulating means arranged in said preliminary dish-water tank and governing said valve in response to the temperature of the body of water in said tank for adjusting the delivery of cold water so as to maintain said temperature approximately constant at a value below the coagulation point of albuminous constituents of food-leavings on the dishes to be washed.

3. A dish-washing machine, comprising a preliminary dish-water tank adapted to contain heated water of a low temperature, a main dish-water tank adapted to contain water of a higher temperature than said preliminary dish-water tank, and a rinsing water tank adapted to contain water of a higher temperature than either of the other said tanks, means for conveying dishes across said tanks in succession, means above each said tank and said conveying means for selectively spraying the water of successively higher temperature from each said tank separately onto the dishes as they are conveyed across said preliminary dish-water tank, said main dish-water tank and said rinsing water tank, overflow means provided in said rinsing water tank, first conduit means connecting said overflow means directly with said preliminary dish-water tank for transmitting heated water from said rinsing water tank to said preliminary tank, means including a second conduit and a valve in said second conduit for supplying cold water to said preliminary dish-water tank, an electric motor for operating said valve, and thermoregulating means arranged in said preliminary dish-water tank and controlling the power supply of said motor in response to the temperature of the body of water in said tank for governing said valve through the intermediary of said motor for adjusting the delivery of cold water so as to maintain said temperature below a predetermined level.

4. A dish-washing machine, comprising a pre-

5

liminary dish-water tank adapted to contain water heated to a temperature below the coagulation point of albuminous material, a main dish-water tank adapted to contain water heated to a higher temperature than that in said preliminary tank, means in said main tank for maintaining the temperature of the water constant, a rinsing water tank adapted to contain water heated to a higher temperature than that in each of the other said tanks, dish conveying means above said tanks, separate spray means associated with each said tank for spraying the dishes with the water of various temperatures from each said tank separately, sterilizing spray means above said rinsing tank, conduit means from said rinsing tank directly to said preliminary tank for introducing heated water therein, controllable means for introducing cold water into said preliminary tank, and thermoregulating means in said preliminary tank controlling said controllable means responsive to temperature in said preliminary tank for controlling the flow of cold water thereto where-

6

by a proper constant temperature may be maintained in said preliminary tank by means of heated water from said rinsing tank and said cold water means.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,029,541	Haustetter	June 11, 1912
1,212,747	Dawson	Jan. 16, 1917
1,311,496	Castellini	July 29, 1919
1,406,465	Lynch	Feb. 14, 1922
1,719,410	Webb	July 2, 1929
1,720,622	Breton	July 9, 1929
1,761,812	Breton	June 3, 1930
2,213,359	Bessett	Sept. 3, 1940
2,348,232	Trautman et al.	May 9, 1944
2,384,898	Dietert	Sept. 18, 1945
2,444,925	Fischer	July 13, 1948