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METHOD OF CLEANING CHOCOLATE MOLDS

Filed July 18, 1947

2 Sheets-Sheet 1

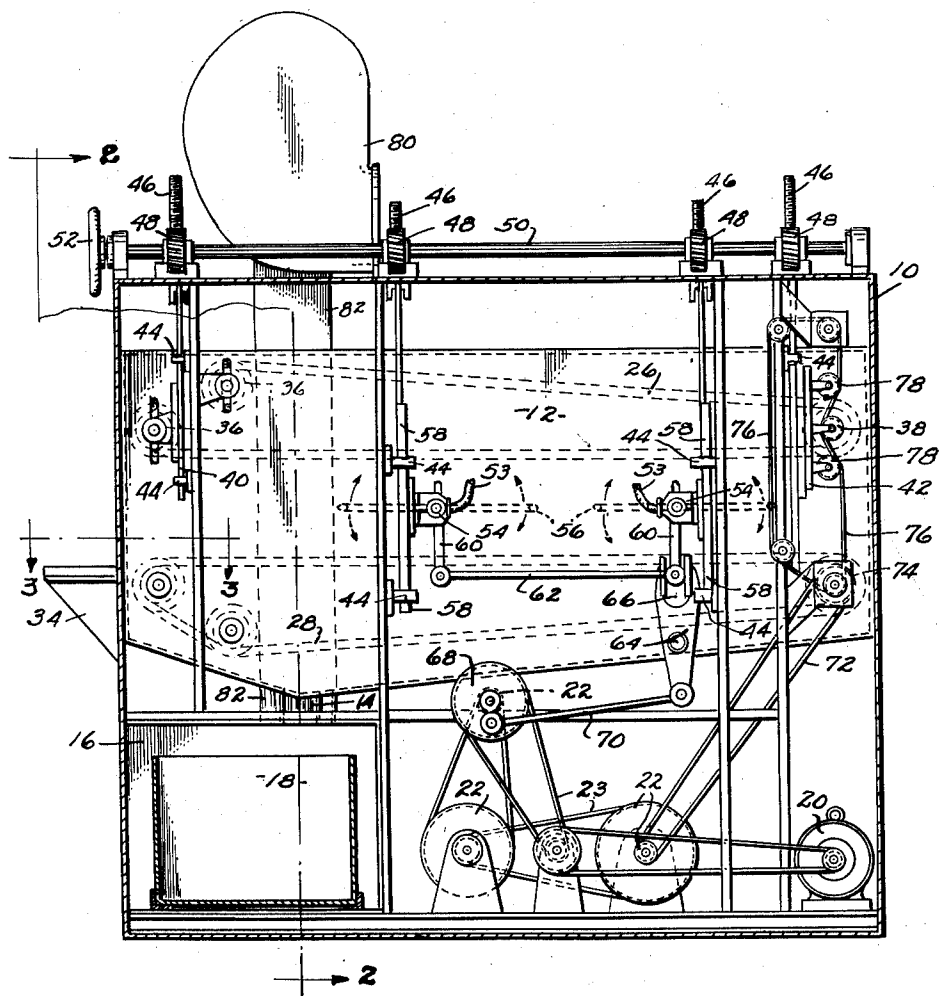


Fig- 1

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FIG- 2

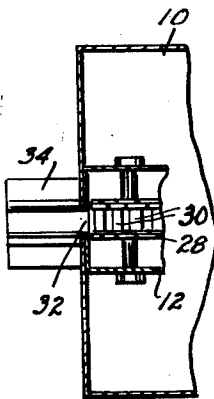
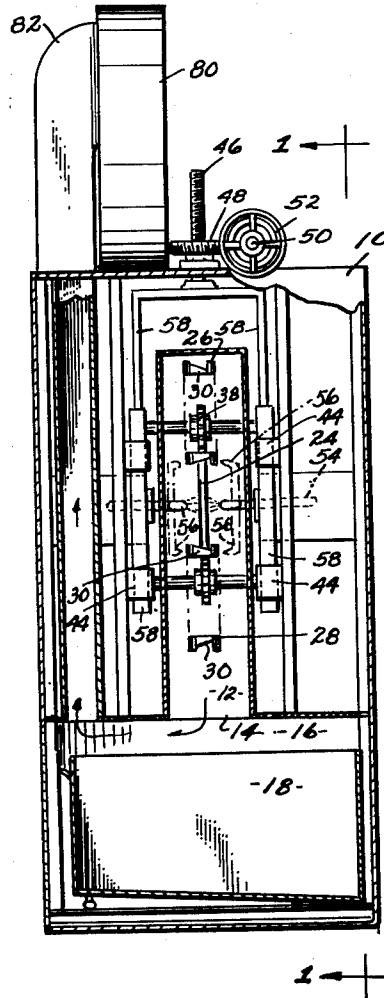


FIG- 3

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METHOD OF CLEANING CHOCOLATE MOLDS

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1 Claim. (Cl. 134—21)

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In cleaning chocolate moulds with soda lye or like solutions and afterwards rinsing with hot water it has appeared to be difficult to remove all traces of impurities. Generally this cleaning method leaves on the moulds single dull stains originating from sugar substance not removed and such stains will later on effect the appearance of traces on the chocolate moulded in the said moulds. Hitherto it has, therefore, been necessary after the cleaning process to scour the moulds in order to remove the said stains.

Similar conditions are found when washing other articles having a smooth surface, e. g. dinner-service, dishes with a glazed surface and polished silver. The washing methods hitherto known necessitate after the washing and rinsing operation drying off or rubbing off of the articles if the same shall appear bright, even minor deposits on the surface being visible owing to the special nature of the surface. This may not be due to residual dirt, only, but also to matter deposited from the washing or rinsing water as the same has been heated.

Dish washing machines are known in which the articles treated are finally subjected to a steam sterilisation. In an embodiment of such known machines the articles are moved along a predetermined path, the said articles first being washed with a washing solution, then rinsed with water and finally sterilised by admitting steam. This steam treatment does not effect cleaning and is not carried out under such conditions as will secure that the articles leave the machine in a stainless condition.

A further object of the invention is to provide a method of cleaning chocolate moulds in order to remove fatty and sticky matter therefrom.

A further object of the invention is to provide a method by which the dirt adhering to the articles will be loosened and be removed and simultaneously be carried away.

Further objects of the invention will appear from the accompanying drawing illustrating by way of example an embodiment of an apparatus for carrying out the method according to the invention. Said embodiment which is specially designed for cleaning chocolate moulds is shown diagrammatically. It will be understood that the invention is not restricted to the special apparatus shown, nor to the special conditions of operation here described.

Figure 1 shows a longitudinal section of the said apparatus taken substantially along the lines I—I of Figure 2.

Figure 2 shows a vertical cross-section on line II—II in Figure 1 and

Figure 3 shows a horizontal cross-section on line III—III in Figure 1.

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The apparatus shown is enclosed in a casing 10, in the middle of which is confined a steam chamber 12 extending on the whole length of the casing and communicating with a chamber 16 arranged at the bottom by means of a connecting piece 14, the latter chamber enclosing a sludge container 18. The rest of the casing 10 contains an electromotor 20 which is drivingly connected with driving gears 22 by transmission members 23.

In the steam chamber 12 a conveyor device for the chocolate moulds 24 to be cleaned, Figure 3, is arranged. The said device consists of two superposed conveyor chains 26 and 28 having parallel chain parts moved in the same direction, between which the moulds 24 are advanced in a vertical position from one end of the casing 10 to the other. As shown in Figure 3, the conveyor chains 26, 28 are provided with supporting members 30 having wedge-shaped notches engaging the edges of the moulds. At those places where the moulds are carried into the chamber 12 and where they are discharged therefrom, slits 32, Figure 3, are provided in the end walls of the casing 10, and the moulds are put into the casing along guides on a bracket 34, while after having passed the chamber 12 they are discharged along a chute not shown. The guide rollers 36, 38 or the upper chain are supported on slides 40, 42, by means of bearing pedestals, the said slides being slidable in a vertical direction in guides 44 and being adjustable by means of a common shaft 50 mounted on the top of the casing 10, screws 46 and worm wheels 48, by the use of a hand wheel 52, in such a manner that the distance between the horizontal chain parts may be adapted to the height of the moulds.

The steam by which the moulds are to be cleaned and which may have a pressure of e. g. 4 atmospheres, is supplied to two pipes 54 on both sides of the chamber 12 through conduits 53. Each pipe 54 has at its inner end a cross-pipe 56 the ends of which are bent inwardly towards the path of movement of the moulds, the latter pipes being closed by nozzles lying at a short distance from the said path and through which the steam is ejected against the surface of the moulds. Between the conduits 53 and the pipes 54 packing boxes are inserted which allow turning of the pipes, the same being mounted in brackets on slides 58 which are adjustable in vertical direction by rotation of the shaft 50, just as the slides 40, 42, but in such a way that the first mentioned slides are moved only by half the distance by which the latter ones are moved. Hereby it can be obtained that in the adjustment, the pipes 54 are always midway between the horizontal chain parts.

The method according to the invention is most effectively carried out by moving the jets to and fro over the surface of the moulds, the moulds simultaneously being moved past the jets, or vice versa. Hereby, it is obtained that in the cleaning process the moulds can be cleaned by means of relatively few jets, so to say by the kinetic energy contained in the ejecting jets.

In operating the apparatus the cross-pipes 56 are oscillated in such a manner that the nozzles placed at their ends are moved from the lower edge of the moulds to the upper edge and back again. This movement is obtained thereby that arms 60 are secured to the pipes 54, said arms being connected by a connecting rod 62 and being driven together by means of an oscillating lever 64, engaging with a slit 66 a roller on one arm 60, the said lever itself being driven by a crank on a disc 68 secured to one of the driving gears 22 with the use of a pitman 70. When adjusting the slides 58, the said roller is moved in such a manner in the slit 66 that the magnitude of the oscillating movement of the cross-pipes 56 becomes dependent on the mutual distance of the chain parts and thus on the height of the moulds.

One of the driving gears 22 drives one of the guide rollers 74 of the conveyor chain 28 by means of a belt or chain 72. The shaft of this guide roller drives the guide roller 38 of the conveyor chain 26 by means of a belt or chain gear 76 with vertical parts, one of which is led in a curve over the guide roller 38 by means of guide rollers 78 on the slide 42, so that the said guide roller 38 is driven independently of the height position of the conveyor chain 26.

The suction side of an exhaustor 80 placed on top of the casing 10 is connected to the chamber 16 by means of a conduit 82. The said exhaustor is driven independently, e. g. by an electromotor not shown.

In operating the apparatus the moulds 24 are introduced, e. g. manually, at the left end of the casing 10 through the slit 32, whereafter they are engaged by the conveyor chains 26, 28 and are led slowly through the casing to the other end of the same. While the moulds are led through the chamber 12, they are hit from both sides by the steam jets from the nozzles which—while being moved up and down—cause the jets to describe a zigzag path on the surface of the moulds. Simultaneously, the steam and the impurities suspended therein are removed by suction by the exhaustor 80. Said impurities are deposited in the container 18. Preferably, the exhaustor is so large or it is driven with such a velocity that no steam is discharged through the slits 32, whereas some atmospheric air is sucked in through the same. Thereby it is possible to control the temperature and the steam conditions in the chamber 12, which is of substantial importance as it must be avoided that the steam in the chamber is condensed on the moulds which are on the verge of leaving the chamber in a finished cleaned state. If such a condensation takes place, the moulds will become stained due to the impurities present in the steam used for the cleaning operation. Owing to the presence of the slits 32 the pressure in the chamber 12 will be substantially equal to the atmospheric pressure.

In order to attain the object mentioned it is essential that the steam having hit the moulds and having dissolved and partly removed the impurities adhering thereto is removed as soon as possible from the surroundings of the moulds,

namely in such a direction that it cannot come into contact with the moulds which already have been cleaned more satisfactorily and which are subjected to the action of the subsequent nozzles or which have to be subjected to such action, a progressive cleaning being obtained by the nozzles resp. series of nozzles passed by the moulds. To this end the exhaustor 80 is connected to the chamber 12 at the bottom at the end of the chamber where the moulds are led into the casing. Thereby a somewhat regular circulation of the steam from the various series of nozzles towards the connecting piece 14 is obtained so that the steam which has already hit the moulds cannot re-contact with the same. The conveyor device is placed at the top of the chamber 12 and the steam is removed by suction at the base, as the downward circulation thereby obtained is natural, the discharged steam being heavier than the steam supplied, the former, besides, containing impurities. Furthermore, it has proved to be essential that the last nozzle of each series is found in the neighborhood of the point of removal of the moulds from the casing, as, thereby, said moulds are not to a substantial degree subjected to a cooling action and thereby to a steam condensation before leaving the casing.

By using the method described and the appertaining apparatus a satisfactory cleaning of the articles treated is obtained, as it has been found that the thermic and mechanic action of the dry steam jets on the articles and on the impurities brings about the removal of the latter without leaving stains of any kind.

Having thus fully described my invention I claim as new and desire to secure by Letters Patent:

A method of cleaning chocolate moulds comprising projecting jets of dry steam against the surface of the said moulds in a confined space and simultaneously removing the steam used together with the impurities embodied therein from the space surrounding the moulds by suction.

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