Oct. 29, 1957 W. F. WEBER ET AL 2,811,163

ARTICLE WASHING APPARATUS

Original Filed Dec. 16, 1949 2 Sheets-Sheet 1

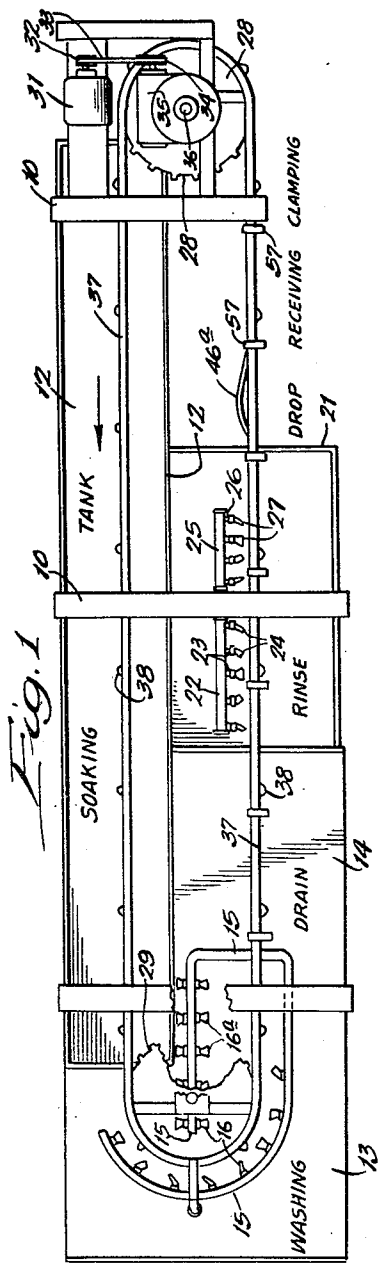


Fig. 1

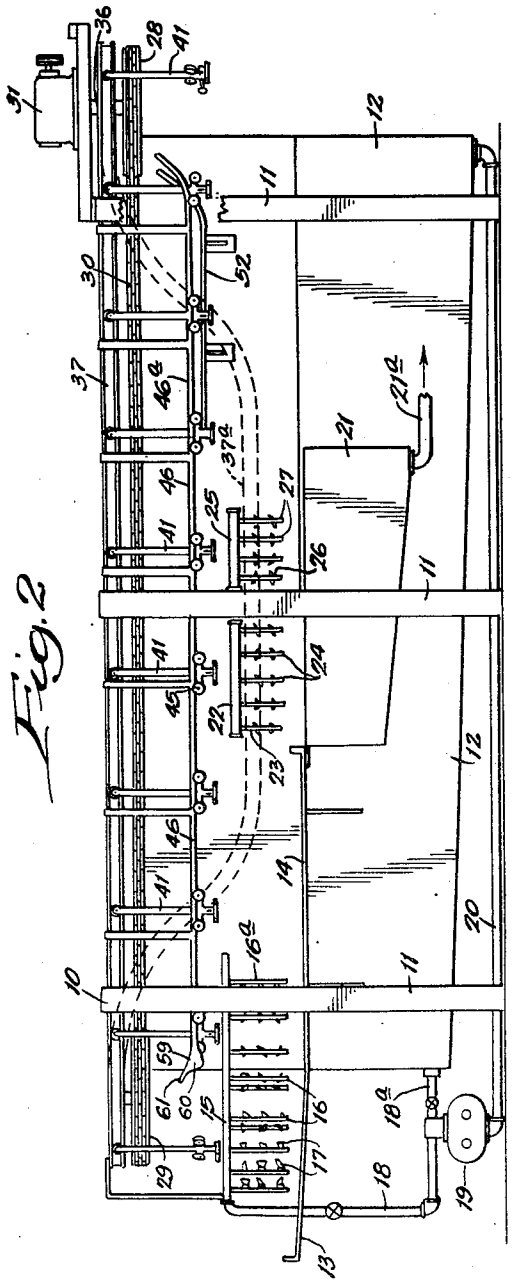


Fig. 2

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ARTICLE WASHING APPARATUS

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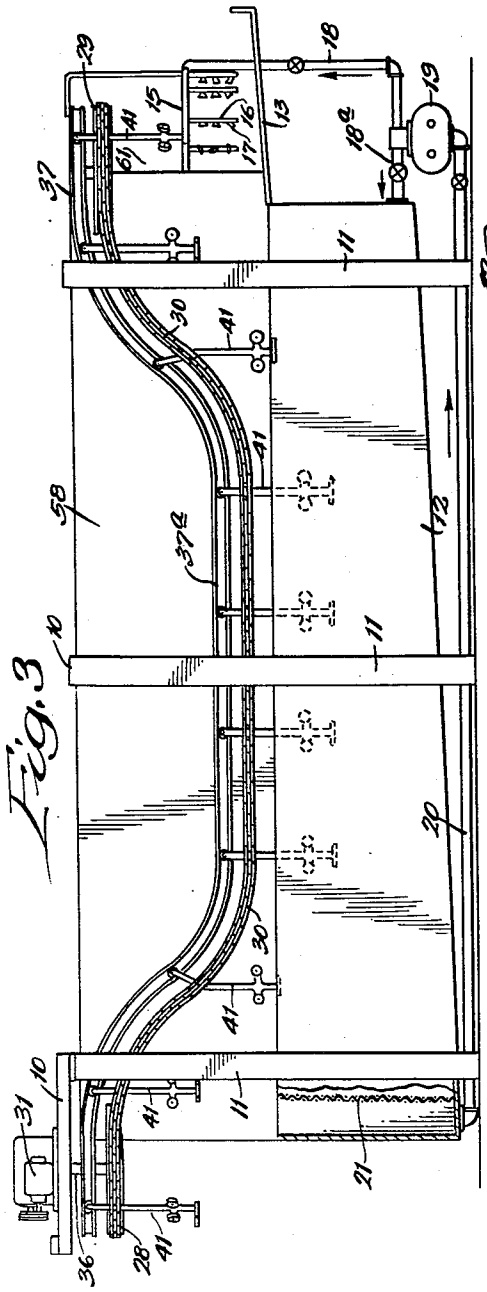


Fig. 3

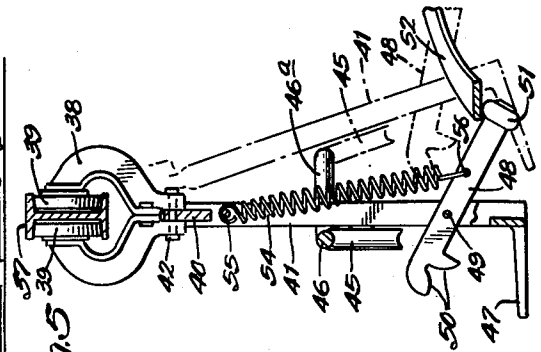


Fig. 5

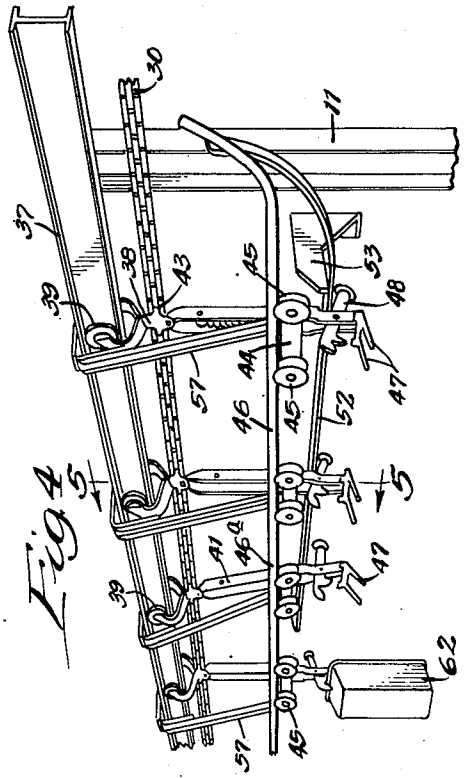


Fig. 4

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2,811,163

ARTICLE WASHING APPARATUS

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Original application December 16, 1949, Serial No. 133,369, now Patent No. 2,710,819, dated June 14, 1955. Divided and this application October 23, 1952, Serial No. 316,478

5 Claims. (Cl. 134—70)

This invention relates to an article-washing apparatus. The invention is particularly applicable to the washing of molds and pans and to apparatus which automatically carries through the washing step while also automatically discharging the washed articles.

This application is a division of our copending application, Serial No. 133,369, filed December 16, 1949, now Patent No. 2,710,819, dated June 14, 1955, for Article Washing Method.

An object is to provide apparatus by which the articles to be washed are moved slowly through a soaking pool and thereafter spray-washed, the movement through the soaking pool being slow but continuous. Yet another object is to provide apparatus for the soaking and spray-washing of articles and for the automatic discharge thereof after draining, while maintaining the article-securing means open for the receiving of additional articles to be washed. Other specific objects and advantages will appear as the specification proceeds.

Our invention is illustrated in one embodiment by the accompanying drawing, in which—

Figure 1 is a broken top plan view of the apparatus embodying our invention and with which our process may be employed; Fig. 2, a side view in elevation; Fig. 3, a broken side view in elevation, the view being taken from the side opposite that shown in Fig. 2; Fig. 4, a broken detailed perspective view on an enlarged scale of the clamp-tilting and opening mechanism; and Fig. 5, a detailed sectional view on a larger scale than that shown in Fig. 4, the section being taken as indicated at line 5—5 of Fig. 4.

In the illustration given, 10 designates a frame equipped with standards 11. In the lower portion of the frame 10 is supported a tank 12. A wide apron 13 extends above one end of the tank and is downwardly inclined to direct liquid into the tank 12 as shown best in Fig. 2. Similarly, a drain apron 14 extends a short distance along one side of the tank 12, as shown best in Figs. 1 and 2, and serves to drain liquid into the tank 12.

Over the apron 13 at the end of the machine is an arcuate spray manifold 15 equipped with depending spray pipes 16. The spray pipes 15 are provided with apertures and deflectors 17 adjacent the apertures. The deflectors 17, as illustrated, are turned in different directions so as to direct the washing liquid against the molds or pans or other articles from all sides and at different angles so as to traverse the entire area of the article. Similar spray pipes 16a extend to the inner side of the chain conveyor 28. Liquid may be supplied to the manifold 15 through the valve-controlled pipe 18, which communicates with the outlet of the pump 19. Fresh water may be supplied by the pump or, if desired, hot water, with detergent, may be drawn from tank 12 and passed upwardly through the pipe 18 to the spray manifold 15. The pipe 20 connects the lower end of tank 12 to the inlet side of pump 19, as shown best in Figs. 2 and 3, and we prefer to equip the tank 12 near the lower end

thereof adjacent the intake of pipe 20, with a screen 21, as shown more clearly in Fig. 3, to prevent the passage of any solid particles from tank 12 into pipe 20 leading to the pump 19.

Over the rinse drain tank 21 is supported a rinse manifold 22 equipped with depending spray pipes 23, and deflectors 24, which are similar to the deflectors 17 already described. The rinse water may be drawn off separately through pipe 21a.

A second fluid manifold 25 is provided adjacent manifold 22 and provided with depending pipes 26 having deflectors 27. Both of the pipes 22 and 25 may be supplied with rinse water, or, if desired, steam or hot water may be supplied to the manifold 25 for the drying of the articles while pipe 22 is used to receive fresh rinsing water which is preferably heated.

We prefer to employ a continuous conveyor system of the character which will now be described. At one end of the apparatus upon frame 10 is mounted a drive sprocket 28 and at the other end of the apparatus is mounted an idler sprocket 29. A continuous conveyor chain 30 is carried by the sprockets. A motor 31 is equipped with a drive pulley 32, and a belt 33 connects pulley 32 to the driven pulley 34. The pulley 34 is mounted upon a shaft which drives, through reduction gears mounted in the casing 35, the depending shaft 36 on which is mounted the drive sprocket 28.

The frame 10 supports at the top of the apparatus an endless track 37 formed by an I beam. A U-shaped carrier 38 is equipped with rollers 39 which engage the lower flange of the I beam on opposite sides thereof, as shown more clearly in Fig. 5.

The carrier 38 has spaced-apart lower portions which receive the upper portion 40 of an article support 41 and a bolt 42 pivotally connects the article holder 41 to the carriage 38. The carriage 38 is also provided with spaced arms 43 which extend into recesses of the chain 30 to secure the carriage 38 to the chain.

The article holder 41 is provided with a cross strap 44, carrying rollers 45 at each end thereof, and such rollers at one stage are adapted to engage a guide rod 46, as shown more clearly in Fig. 4.

The lower portion of the article support 41 is provided with forwardly-extending spaced lugs 47 upon which an article or a flange thereof is received. Above the spaced lugs 47 is a clamping member 48. In the illustration given, the clamping member 48 extends through a slot in the holder 41 and is pivotally secured therein by pin 49. The forward end of the clamping member 48 is provided with projections 50, or other means for the engaging of the article to be held, and the rear end of the clamping member 48 is provided with a roller 51. The roller 51 is adapted to engage a guide strip 52 which is spaced below guide rod 46. The engagement of the roller 51 by the guide strip 52 serves to control the opening of the clamping member 48. The guide strip 52 may be supported by a bracket member 53, or by any other suitable means. A tension spring 54 has its upper end secured to a pin 55 carried by the support 41, and its lower end extended through an opening in the clamping member 48, as shown more clearly in Fig. 5. Thus the spring 54 normally tends to draw the clamping projections 50 against the article which is to be held upon the spaced lugs 47.

The guide rod 46 may be supported by depending bracket arms 57 mounted upon the I beam or endless track 37, as shown best in Fig. 4. The guide rod 46 is preferably turned inwardly as indicated best in Figs. 2 and 4, so as to tilt the support 41 inwardly to permit the article to fall off of the lugs 47. This point of inward-turning of the track 46 is indicated in Figs. 1, 4 and 5 by 46a.

In order to immerse the articles in the tank for a soaking operation, the track 37 on one side of the apparatus is turned downwardly to follow a U-shaped course as indicated by the numeral 37a and as shown best in Fig. 3. We prefer to separate the two track segments, i. e, the horizontal portion on one side, as shown in Fig. 2, and the U-shaped portion 37a, as indicated by Fig. 3, by a partition wall, as shown more clearly in Figs. 2 and 3. The U-shaped configuration of the track portion 37a, as shown in Fig. 3, causes the article supports 41 to bring the articles to be washed downwardly into the tank and to move them slowly forward in a soaking operation, after which the articles are lifted and after draining are subjected to spray-washing from the spray pipes 16.

In order to guide the rollers 45 of the article support 41 into engagement with the guide rod 46, we provide a guide member 59, as shown more clearly in Fig. 2. The guide 59 is provided with a side wall 60 and with a downwardly-inclined top wall 61. As the rollers 45 meet the downwardly-inclined wall 61 and the side wall 60 which is on the outer side of the rollers 45, the rollers are directed against the lower surface of the guide rod 46 and proceed in engagement therewith for the subsequent draining, rinsing, steaming, discharging and loading operations, as will be later described.

Molds or pans 62, or other articles which are to be washed, are suspended upon the spaced lugs 47 and the clamp 48 maintains the article thereon during the soaking, washing, draining, and final treating steps which will be described.

While our new process may be carried on through the use of the apparatus disclosed herein, it will be understood that other apparatus may be used, if desired, for the carrying out of the steps employed.

The operation

In the operation of the process and the specific apparatus illustrated, the operator preferably stands near the station which is designated in Fig. 1 as receiving, and at that point places a mold 62, or other article upon the spaced lugs 47. As the chain 30 moves toward the drive sprocket 28, as shown in Fig. 1, the roller 51 of the clamp 48 leaves the guide strip 52 and the spring 54 causes the clamping jaws 50 to engage the article. The article is then carried around the drive sprocket 28 and downwardly by the track segment 37 into the soaking tank 12. In the soaking tank, the article is moved slowly in a forward direction, this movement causing new portions of the liquid to contact the article as it is moved forward. Finally, the article is raised out of the tank, as illustrated in Fig. 3, and the liquid drips therefrom onto apron 13. In the soaking step, we prefer to have the soaking water heated to a relatively high temperature and preferably in the neighborhood of 180° F. and to employ in the tank a detergent.

The article after being lifted from the soaking tank is brought into contact with the arcuate series of spray pipes 16 and inner spray pipes 16a, and the deflectors 17 thereof direct the wash water against the article from all directions. The deflectors direct water against the outside and the inside of the article and also against the bottom and top thereof so that every portion of the article is traversed by the washing stream.

The wash water may be supplied from any source, but in the specific operation shown it is drawn by pump 19 from the end of the tank equipped with screen 21 and the strained water is forced by the pump upwardly and into the manifold 15. If desired, a portion of the water may be recycled into the tank 12 through the valve-controlled pipe 18a for the purpose of agitating the solution in tank 12. In order to get the maximum benefit from the soaking operation it is desirable that there be substantial turbulence in the solution in tank 12, and such recycling through pipe 18a brings this about.

The water from the washing operation falls upon the wide apron 13 and is directed back into the tank 12. The article, after leaving the washing manifold 15, is carried along the apron 14 for some distance for draining, and the wash water dripping therefrom flows back into the tank 12. As the article is carried further, it is subjected to the action of rinse water from the manifold 22. It may further be subjected to rinse water from the manifold 25, or, if desired, to the action of steam or hot air, for drying the pan. Just beyond the station 25, the guide rod 46 is turned inwardly to provide the inwardly-turned segment 46a. This draws the support 41 inwardly so as to tilt downwardly the lower end thereof with the spaced lugs 47. At the same time, the clamp 48 is opened by the engagement of its roller 41 with the downwardly-inclined strip 52. The article upon being released slides off of the inclined lugs 47 onto a receiving platform below. At the same time, the clamping member 48 is maintained in open position so that the operator may place another pan or mold, etc., upon the lugs 47.

It will be seen from the foregoing description that the article supports 41 are thus carried in an endless path, first through a prolonged soaking operation in which, however, the article is moved constantly to bring it in contact with fresh portions of the soaking liquid. After the soaking, the article is allowed to drain slightly and then is subjected to pressure-spraying to remove the particles clinging to the article. There is then a draining of the wash liquid back into the tank and the rinsing completes the cleaning operation. Rinsing with hot water may produce a sufficient drying of the article, or, if desired, the drying may be effected by steam or hot air. Since the discharge of the washed pan or article is accomplished at the point adjacent the clamping station, a single operator may receive the discharged articles and attach new articles to the article supports.

We have found that the soaking operation, in which the articles are not merely dipped but are moved forward slowly so as constantly to meet new portions of the fluid, is extremely effective when followed immediately by the pressure-spray washing step. Further, by arranging the washing nozzles in a semi-circular path and through the use of the deflectors employed, the article is traversed by pressure-spray from all sides and the particles, whose grip upon the article has been weakened by prolonged soaking, are readily dislodged and removed.

The supports 41 hang freely upon the track 37 and chain 30 during most of the travel about the apparatus, but immediately after leaving the washng station the supports are brought into contact with the rod 46 so as to firmly hold the support during the following draining and rinsing steps. After leaving the rinsing station, the supports engage the guide strap 52, which, together with the arcuate portion 46a of the guide rod 46, cause the articles carried by the supports to be dropped at the unloading station.

As a specific example of the process, the following may be set out:

A series of dirty molds and pans were suspended upon the projections 47 of supports 41 and clamped thereon and then passed through the soaking tank. The soaking tank contained a solution consisting of one part Excelo soap powder (5 pounds), plus ten parts of trisodium phosphate (50 pounds), in two hundred eighty parts of water (1400 pounds, or 168 gallons). The temperature of the soaking water was 170°–180° F. The pans were moved slowly through the soaking liquid and then raised upwardly and spray-washed with a solution pumped from the soaking tank. The spray-washing liquid was maintained under pressure of about 90 pounds. The wash water dripped down into the apron or pan and flowed back into the soaking tank. After spray-washing, the molds traveled over a portion of the drain pan for about three feet and the washing solution drained therefrom back into the soaking tank. After draining, the molds were spray-rinsed with hot water and after rinsing were thoroughly steamed. After release from the clamps, it was found that the molds

and pans were clean and dry, and ready for use again in cooking operations.

While in the foregoing specification, we have set forth specific steps and structures in considerable detail for the purpose of illustrating our invention, it will be understood that such details may be varied widely by those skilled in the art without departing from the spirit of our invention.

We claim:

1. In apparatus for washing articles, an elongated tank, a drain apron at one end of said tank, washing spray nozzles over said apron, said apron being inclined to drain fluid back into said tank, a second apron along one side of said tank and inclined to drain liquid into the tank, rinsing spray nozzles, an endless track, article supports carried by said track, an endless chain connected to said supports, means for advancing said chain, said track being downwardly inclined in one portion to bring articles carried by said supports into said tank for soaking, said tracks being upwardly inclined to bring said supports above said apron and into position for receiving spray from said washing spray nozzles, said washing spray nozzles being arranged in a semi-circular path about the end portion of the endless chain, means for discharging spray from said washing nozzles and from said rinsing nozzles, and clamps carried by said supports for releasably carrying said articles.

2. In apparatus for washing articles, an elongated tank, a drain apron extending above one end of said tank, washing spray nozzles over said apron, said apron being inclined to drain fluid back into said tank, a second apron along one side of said tank and inclined to drain liquid into the tank, rinsing spray nozzles, an endless track, article supports carried by said track, an endless chain connected to said supports, means for advancing said chain, said track being downwardly inclined in one portion to bring articles carried by said supports into said tank for soaking, said tracks being upwardly inclined to bring said supports above said apron and into position for receiving spray from said washing spray nozzles, means for discharging spray from said washing nozzles and from said rinsing nozzles, clamps carried by said supports for releasably carrying said articles, said support being provided also with a roller, and a guide rod adapted to be engaged by said roller, said guide rod being turned inwardly to form a bend whereby said support is tilted as said roller engages said bend and said articles are released upon the opening of said clamps as said supports are advanced beyond said rinse spray nozzles.

3. In apparatus for washing articles, an elongated tank, a drain apron extending from one end of said tank, washing spray nozzles over said apron, said apron being inclined to drain fluid back into said tank, a second apron along one side of said tank and inclined to drain liquid into the tank, rinsing spray nozzles, an endless track, article supports carried by said track, an endless chain connected to said supports, means for advancing said chain, said track being downwardly inclined in one portion to bring articles carried by said supports into said tank for soaking, said tracks being upwardly inclined to bring said supports above said apron and into position for receiving spray from said washing spray nozzles, means for discharging spray from said washing nozzles and from said rinsing nozzles, said article supports being provided with an article-engaging abutment and a clamping member opposed thereto, spring means normally urging said clamping member towards said abutment so as to grip said articles, said article support being provided also with a roller, a guide rod adapted to be engaged by said roller, said guide rod being turned inwardly at one point to form a bend, and a strip engageable with said clamping member to open the same for release of said articles as said article supports are advanced beyond said rinse spray nozzles.

4. The apparatus of claim 1 in which means are associated with said supports for engaging said clamps for releasing the articles as they are advanced beyond said rinsing spray nozzles.

5. The apparatus of claim 1 in which a screen extends across said tank at a spaced distance from the end thereof and pump means are associated with said apparatus for withdrawing liquid from the space between said screen and the end of said tank and for discharging said liquid under pressure through said washing spray nozzles.

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