Nov. 21, 1933. G. WEBB 1,936,279

WASHING MACHINE

Filed May 20, 1931

Fig. 1

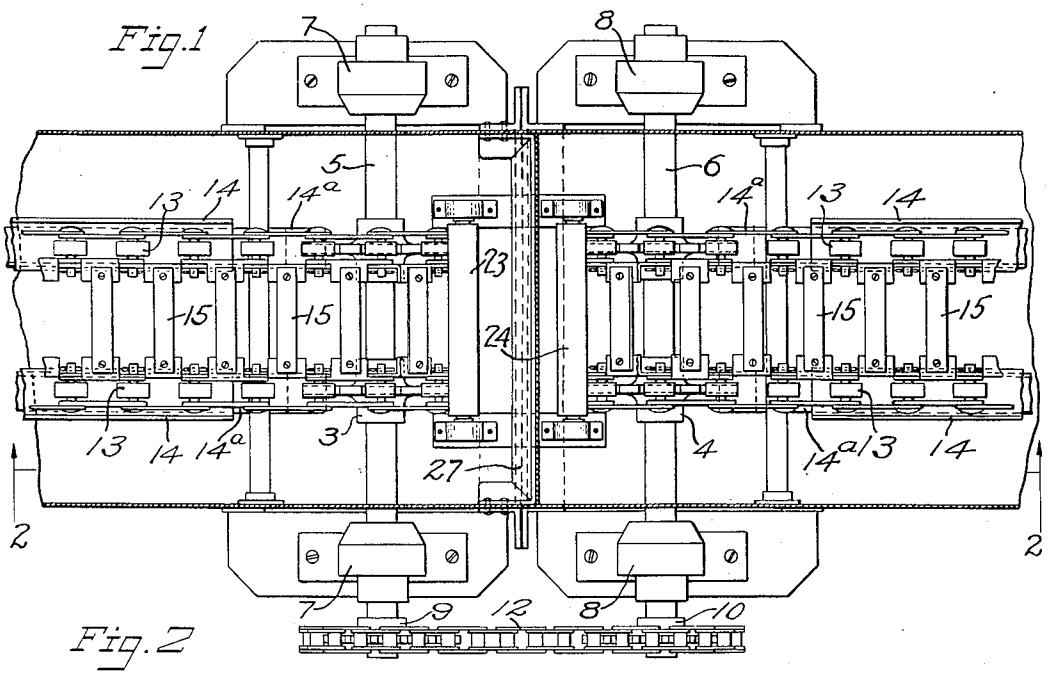
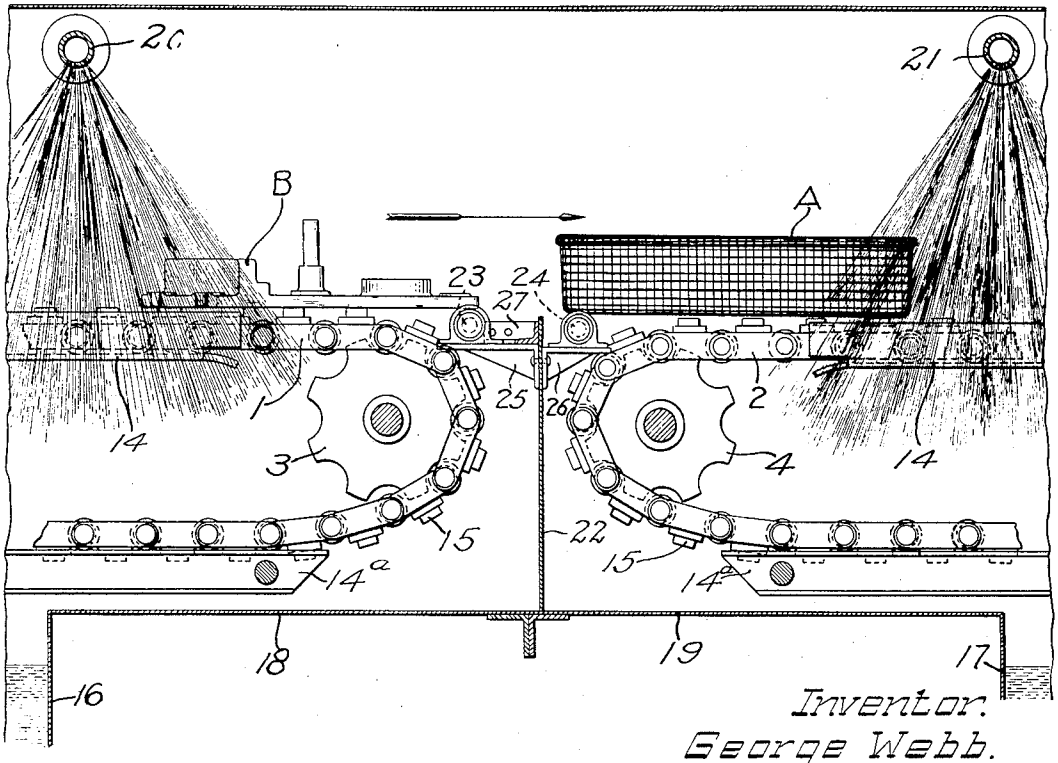



Fig. 2




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## WASHING MACHINE

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4 Claims. (Cl. 141—1)

In machines used for washing or cleaning metal parts and other articles during or subsequent to the manufacture thereof, it is common practice to subject the metal parts or other articles to the action of two or more different washing or cleansing liquids. One liquid may be a solution of a cleaning compound and another may be pure rinsing water, or one liquid may be an acid pickling solution and another may be rinsing water, or various other combinations of liquids may be used. Ordinarily the articles have been placed upon an endless conveyor which moved them continuously through the machine. During the movement of the articles by the conveyor, the several washing liquids were discharged against or onto the work and tanks were provided underneath the conveyor so that the respective liquids could, in the main, return to their proper tanks.

Notwithstanding all precautions, there has heretofore always been a considerable degree of mixing of the liquids. This mixing has occurred partly on account of splashing of the liquids over the top of any partition that could be provided between the tanks, as the top of the partition had to be below the lower run of the conveyor. A major cause of mixing has been the conveyor itself, as considerable quantities of the liquids would adhere both to the upper and lower runs of the conveyor and then during travel of the conveyor would drip into the tank intended for another liquid. The conveyor has been particularly troublesome as a means of liquid transfer in the case of a liquid which tended to become foamy or frothy. The foam or froth would adhere in large quantities to the conveyor and thus be bodily transferred.

The principal object of the present invention is to materially reduce the amount of mixing of the liquids occurring in washing machines of the general type described. In accordance with the invention I almost entirely eliminate any mixing due to the two causes which have been referred to.

In the accompanying drawing I have shown so much of a washing machine as is necessary for a complete understanding of the present invention, and it will be understood that the drawing is for illustrative purposes only and is not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawing:

Fig. 1 is a fragmentary plan view of a washing machine embodying the invention, this view being a sectional view taken along a horizontal plane immediately above the conveyors.

Fig. 2 is a fragmentary side view taken along the line 2—2 of Fig. 1.

The drawing shows an intermediate portion of a washing machine at which the structure embodying the present invention is located. The machine comprises two or more washing divisions and the structure of the present invention is located at the juncture between the two divisions. In the washing machine as illustrated, the work can be understood as traveling from left to right, and there are provided two work carrying and supporting endless conveyors, marked respectively 1 and 2. These conveyors have their upper runs in approximate alignment. Pairs of sprocket wheels 3, 3 and 4, 4 are provided for supporting and guiding the adjacent ends of the two conveyors, these sprocket wheels being carried on transverse shafts 5 and 6 mounted in bearings 7, 7 and 8, 8. In order that the two conveyors may move in unison and in order that one of them may drive the other, there is provided a power transmitting connection between them. As shown there are sprocket wheels 9 and 10 on the shafts 5 and 6, these sprocket wheels being connected by an endless chain 12.

The details of the conveyor belts themselves may be widely varied, but as shown each conveyor belt comprises two separate series of links at the respective sides, these links being provided with rollers 13, 13 which travel on upper rails 14, 14 and on lower rails $14^a$, $14^a$. The two series of side links are connected by means of transverse slats or bars 15, 15.

Positioned beneath the respective conveyors 1 and 2 are liquid containing tanks 16 and 17, of which only small fragments are shown in the drawing. As illustrated the main body portions of these tanks are separated from each other, but the tanks are provided respectively with aprons 18 and 19 which span the space between the main portions of the tanks and which are adapted to receive liquids and drain them into the corresponding tanks.

Above the respective conveyors 1 and 2 are located separate means for discharging washing liquids onto the work carried by the conveyors. As shown each discharge means comprises a transverse pipe 20 or 21 with discharge orifices in the bottom thereof. It will be understood that two or more of such pipes are provided for each conveyor, and that the pipes may be provided with suitable pumps or other means for delivering the liquids under pressure. It will be also understood that the respective pipes are so located that the liquids discharged from those of each group will fall into the corresponding tank or into the apron extension thereof.

It will be evident that by providing two separate conveyors 1 and 2 instead of a single conveyor as has heretofore been customary, I have eliminated one important cause for the transfer of liquid from the tank 16 to the tank 17 or for the transfer of liquid from the tank 17 to the tank 16. In order to further avoid any such transfer

of liquid there is provided a transverse partition 22 which extends entirely across the machine and which has its top edge substantially at the level of the top of the upper runs of the two conveyors. This partition serves to further separate the respective liquids, it being obvious that this partition will prevent the transfer of liquids by splashing. In order that the work may pass smoothly from the conveyor 1 to the conveyor 2, I provide means additional to the conveyors and positioned adjacent the top of the partition 22 for supporting and guiding the work during movement thereof over the partition from the conveyor 1 to the conveyor 2. This supporting and guiding means may vary as to details, but preferably it comprises two rollers 23 and 24 parallel with the partition and located at opposite sides thereof. These rollers are shown as being rotatably supported on brackets 25 and 26 carried by the partition 22. The tops of the rollers are approximately in alignment with the tops of the respective conveyors and work can therefore pass smoothly along from one conveyor to the other. If necessary the partition 22 may be suitably reinforced adjacent the brackets 25 and 26, as for instance by an angle bar 27.

The right hand roller 24 may be somewhat lower than the left hand roller 23, as is indicated in the drawing. This difference in level facilitates the movement of the work over the rollers, it being evident that the work will, if necessary, move by gravity without any assistance from either of the conveyors.

Small pieces of work which might fall into the spaces between the slats 15, 15 or into the spaces between the conveyors and the rollers or between the rollers are placed in baskets such as the basket A shown in Fig. 2 of the drawing. Larger pieces of work such as indicated at B may be placed directly upon the conveyor.

It will be apparent from the foregoing description that the washing liquids cannot be transferred from one division of the machine to another by means of the conveyors themselves or as the result of splashing. With this construction the transfer of liquids can be effected only by adherence of the liquid to the work itself. To reduce to a minimum even this small amount of liquid transfer, the partition 22 is differentially spaced with respect to the two conveyors and is located as far as possible from the conveyor 1, so as to provide the maximum opportunity for dripping from the work to take place before the work passes the partition 22.

What I claim is:

1. In a washing machine of the type described, the combination of two adjacent tanks adapted to contain two different washing liquids, two closely adjacent separate endless belt conveyors positioned above the respective tanks with their upper runs in approximate alignment and moving in the same direction, two separate means for discharging washing liquids onto work carried by the respective conveyors which liquids drain from the work and from the conveyors into the respective tanks, a transverse partition serving to separate the respective liquids and extending upward between the adjacent ends of the two conveyors approximately to the level of the tops thereof, and a roller additional to the conveyors and positioned adjacent and parallel to the top of the partition and at one side thereof for supporting and guiding work during movement thereof over the partition from one conveyor to the other.

2. In a washing machine of the type described, the combination of two adjacent tanks adapted to contain two different washing liquids, two closely adjacent separate endless belt conveyors positioned above the respective tanks with their upper runs in approximate alignment and moving in the same direction, two separate means for discharging washing liquids onto work carried by the respective conveyors which liquids drain from the work and from the conveyors into the respective tanks, a transverse partition serving to separate the respective liquids and extending upward between the adjacent ends of the two conveyors approximately to the level of the tops thereof, and two rollers additional to the conveyors and positioned adjacent and parallel to the top of the partition and at opposite sides thereof for supporting and guiding work during movement thereof over the partition from one conveyor to the other.

3. In a washing machine of the type described, the combination of two adjacent tanks adapted to contain two different washing liquids, two closely adjacent separate endless belt conveyors positioned above the respective tanks with their upper runs in approximate alignment and moving in the same direction, two separate means for discharging washing liquids onto work carried by the respective conveyors which liquids drain from the work and from the conveyors into the respective tanks, a transverse partition serving to separate the respective liquids and extending upward between the adjacent ends of the two conveyors approximately to the level of the tops thereof, which partition is differentially spaced with respect to the two conveyors being farther from the conveyor which first carries the work, and two rollers additional to the conveyors and positioned adjacent and parallel to the top of the partition and at opposite sides thereof for supporting and guiding work during movement thereof over the partition from one conveyor to the other.

4. In a washing machine of the type described, the the combination of two adjacent tanks adapted to contain two different washing liquids, two closely adjacent separate endless belt conveyors positioned above the respective tanks with their upper runs moving in the same direction and with the upper run of the conveyor which first carries the work positioned at a slightly higher level than the upper run of the other conveyor, two separate means for discharging washing liquids onto work carried by the respective conveyors which liquids drain from the work and from the conveyors into the respective tanks, a transverse partition between the adjacent ends of the two conveyors for separating the respective liquids, and two rollers additional to the conveyors and positioned adjacent and parallel to the top of the partition and at opposite sides thereof for supporting and guiding work during movement thereof over the partition from one conveyor to the other, the said rollers being at different levels to facilitate movement of the work by gravity.

GEORGE WEBB.