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HYDRAULIC CAN WASHER AND DRIER

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6 Sheets-Sheet 1

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HYDRAULIC CAN WASHER AND DRIER.

To all whom it may concern:

Be it known that we, THEODORE L. VALERIUS and OLAF LARSEN, residing at Fort Atkinson, in the county of Jefferson and State of Wisconsin, have invented certain new and useful Improvements in Hydraulic Can Washers and Driers, of which the following is a specification.

Our invention relates to mechanical washing apparatus and more specifically to an improved hydraulic can washer and drier.

One object of our invention is to produce such an apparatus especially adapted to handle ice cream containers of all sizes as well as covers for the same, and ice cream brick pans.

Another object is to eliminate rubbing between the parts of the machine and the containers going through the machine.

Another object is to carry the containers through the machine in a horizontal position.

An advantage of the construction we employ is that it is very easy to arrange it so as to prevent contamination between the different cleansing and sterilizing baths. Another advantage is that the mechanical parts may be so arranged as to be very easily cleaned.

Further objects and advantages of our invention will become apparent as the description proceeds.

In the accompanying drawings, Fig. 1 is a plan view of a washing and drying apparatus in which our invention has been embodied. Fig. 2, Sheets 2 and 3, is a side elevation of the machine. Fig. 3, Sheet 4, is a longitudinal section through the tanks. Fig. 4 is a horizontal section through the front portion of the machine looking down on one of the conveyors. Fig. 5 is a vertical transverse section on line 5–5 of Fig. 2. Fig. 6 is a detail view illustrating a friction transmission. Fig. 7 is an enlarged side view of the conveyor carrying frame. Fig. 8 is a plan view of a portion of this frame showing means for adjusting the tension of the conveyor. Fig. 9 is a detail section showing the mounting of the conveyor drive shaft and the arrangement of the can carrying racks with respect to the conveyor. Fig. 10 is an enlarged detail illustrating means used in the removal of the forwarder support shaft.

In the embodiment of our invention selected for illustration, the cleaning part of the apparatus comprises two tanks 10 and 12 each equipped with conveyor means for carrying the cans through the apparatus. Each conveyor comprises a moving can forwarder and a stationary can support rack.

The front forwarder 14 comprises a drive shaft 16 carrying a sprocket 18 engaging the links of a chain 20 passing over an idler sprocket 22 at the other end. The idler sprocket 22 is pivotally mounted between arms 24 (see Fig. 8) on a bracket 26 which has telescoping engagement with a frame 30 the opposite end of which has U-shaped terminals 32 embracing sleeves 34 forming part of the bearings 36 for the shaft 16. These bearings are preferably protected by packed caps 37. The central rod 28 passes through a cross piece 38 in the frame 30 and its longitudinal position may be adjusted by means of nuts 40 to properly tension the chain 20. The chain carries a plurality of rather closely spaced slats 42 extending from side to side of the apparatus, certain of said slats at regular intervals carrying U-shaped clips 44, the arms of which project upwardly from the upper portion of the forwarder 14 for a purpose to be hereinafter described.

The ends of the slats are steadied and guided at the sides of the machine by guide shoes 46 suitably mounted on the frame 30, as for instance, by attachment to upwardly projecting lugs 48 carried by the frame. A plurality of longitudinal strips or slats 50 overlies the forwarder 14 and form a stationary track to support the cans as they pass through the machine. The cans are laid in a horizontal position so that they roll sideways along the slats 50 being pushed along by contact with the upwardly projecting arms of the U-shaped clips 44 on the forwarder. The ends of the slats 50 are bent downwardly as at 52 so that the cans after travelling the length of the first conveyor will roll down by gravity onto the front end.
of the second or rear conveyor. Slats similar to the slats 50 overlie the rear for-
warder 56 and project past the end of it, being inclined downwardly at 58 and then
extending practically horizontal as at 60 to carry the cans across a short intervening
drip space and deliver them to the drier 62.
Any suitable power driven means for ac-
tuating the forwarders 14 and 56 may be
employed. We have illustrated an electric
motor 64 connected by a chain 66 and sprocket 68 (see Fig. 6) to a friction flange
70 resiliently pressed against a cooperating
flange 72 by springs 74 confined in a suitable
holder 76 mounted on the sleeve 78 carrying
the flange 72 and held in position by a suit-
able nut 80. The sleeve 78 is rotatable on
the transmission shaft 95 and carries a pinion 88 splined on it which drives a gear
84 rigid with a second pinion 86 which
meshes with a clutch gear 88 also freely ro-
tatable on the transmission shaft 95. A suit-
able clutch element 90 splined to the trans-
mis sion shaft and preferably controlled from
the front end of the machine by means of
shifting rod 92 and clutch engaging fingers
4 may be shifted into engagement with the
gear 88 to drive the transmission shaft 95,
which extends to the rear end of the machine
and carries spiral pinions 96 engaging spiral
gears 98 on the drive shafts of both for-
warders.

The cans are placed on the receiving table
99 by the operator and rolled into the ma-
ti ne to be received by the front conveyor.
We have provided means for exposing the
cans as they pass over each conveyor to the
action of a large number of powerful jets
of cleansing fluid in the front tank and to
similar jets of rinsing and sterilizing fluid
in the second tank. This means comprises
pressure heads 100 located opposite each
other on the sides of the tanks, each head
provided in this instance with a set of noz-
zles 102 adjacent the front side of the head
and preferably extending horizontally and
at an angle rearwardly, in opposition to the
direction of travel of the conveyor, another
set of nozzles 104 adjacent the rear edge of
the head and directed horizontally and
slightly forwardly, and a central set of jets
the lower jets 106 of which are directed hor-
zontally and directly across the body of the
machine, and the upper jets 108 of which
are directed across the body of the machine
and inclined somewhat downwardly. It will
be seen that as each can passes between the
opposed pressure heads, it will be heavily
sprayed by jets coming from a large num-
ber of different directions completely cleansing every part of the surface of the can. As
illustrated in Fig. 1 at 110 and Fig. 6 at
112 the back of the plate 114 forming the
front wall of the pressure head is preferably
cast to present surfaces at its rear side per-
pendicular to the direction in which the jet
holes are to be drilled. This greatly facili-
tates the drilling operation as the drill is
not likely to slip sideways. Each of the
heads 10 and 12 is preferably part full of
a suitable fluid which is withdrawn
through a strainer 116 by a suitable pump
118 and delivered through a riser pipe 120
and a horizontal pipe 122 to one of the
pressure heads 100. A U-shaped pipe con-
nection 124 establishes communication be-
tween opposite pressure heads so that an
adequate supply of fluid under pressure is
delivered to each head. All the pressure
heads are apertured, as at 125 so that the
pumps and associated piping can be located
at either side of the machine.

The conveyors extend at a slight upward
inclination as clearly shown in the draw-
ings so that the fluid on the cans as it
drains off will tend to fall back into the
tank from which it came and the front tank
terminates in an inclined rear wall 126 exten-
sing upwardly and rearwardly to a level
considerably above the level of the liquid
in the front tank. Pivoteldoors are pro-
vised which may be readily swung out of
the way by engagement with the cans as
they pass through the machine. One door
128 is located at the entrance to prevent the
fluid in the front tank splashing out of the
machine, a second door 130 is positioned at
the end of the front conveyor to prevent
the liquid in the front tank being thrown
by the jets into the rear tank and vice
versa, and a third door 132 is positioned at
the rear end of the rear conveyor to prevent
the contents of the rear tank being splashed
out at the rear end of the body. As they
reach the end of the rear conveyor the
articles passing through the machine are
subjected to the action of a steam jet located
at 134 to completely sterilize and heat them
after which they roll across a short space
onto the drier 62.
The drier comprises a simple open top
box 136 containing a coil of piping 138 to
which live steam is delivered under high
pressure. The articles come to rest on this
box and as soon as dry, may be removed.
The steam jet 134 is preferably fed from the
discharge end of the coil 138 and we also
provide piping 139 for conveying steam
from the same source to two additional man-
ually controlled valves 140 and 142 one posi-
tioned back of each tank. Steam may thus
readily be delivered to any suitable noise-
less steam heater (not shown) one of which
may be located in each tank for heating the
contents of the tank and maintaining it at
proper temperature during the operation of
the machine.

To facilitate cleaning or repairing the ma-
ti ne the top of the body is formed of a
series of removable panels 144 upon removal
130.
of which each of the forwarders may be swung up out of the machine as indicated in dotted lines in Fig. 2 by rotation of the frame 30 and forwarder around the axis of the drive shaft 16. Before this is done the slats 50 and 54 are removed from above the forwarders and the support for the front end of each forwarder is disconnected from the supporting structure of the tank. The connection we have provided for this purpose comprises a removable supporting bar 146 (see Fig. 8) extending through suitable end bearings 148 carried by the walls 150 of the body. When the device is in use, lock nuts 152 are screwed on the end of the supporting bar to clamp it firmly in position as shown in Fig. 8. To remove the bar the lock nuts are first unscrewed and the threaded shank of an eyelet 154 is screwed into a threaded socket on the end of the bar so that it may be readily pulled out, releasing the frame 30 so that it may be swung up out of the way. Drain cocks 156 are provided for emptying the used fluid from the tanks and we prefer to employ a spray pipe 158 in each tank located near the rear end of the tank, through which by means of suitable piping 160 and valves 162 water may be sprayed into the empty tank to flow down the inclined bottom of the same and facilitate the cleaning of the machine.

The cylindrical containers ordinarily employed for handling bulk ice cream, and any other container or utensil having an approximately cylindrical body of sufficient length to enable it to roll will be carried through the device on the sloping tracks 50 and 54 in gentle contact with the clips 44 acting as followers. Rubbing between the containers and the conveyors which rapidly wear the tin off the containers, is thus reduced to a minimum. It will also be apparent that any other irregular shaped utensil such as a can cover or tray will slide through the machine with no more friction than it would be subjected to if drawn over any other sort of stationary track.

While we have illustrated and described in detail the preferred embodiment of our invention, it should be clearly understood that the disclosure is merely for purposes of illustration and that many modifications and variations will naturally occur to those skilled in the art. We aim in the subjoined claims to cover all such legitimate variations and modifications.

We claim as our invention:

1. In a device of the class described, a tank, a stationary track removably positioned therein, and a forwarder in said tank adapted to engage articles on said track and roll them along the same, said forwarder being detachably supported at one end and pivotally supported at the other end whereby the forwarder may be swung out of normal operative position to give access to the interior of said tank.

2. In a device of the class described, a tank, a stationary track removably positioned therein, and a forwarder in said tank adapted to engage articles on said track and roll them along the same, said forwarder being detachably supported at one end and pivotally supported at the other end whereby the forwarder may be swung out of normal operative position to give access to the interior of said tank.

3. In a device of the class described, a tank adapted to contain washing fluid, an inclined track removably positioned in said tank and having longitudinal spaces therein, a forwarder in said tank positioned beneath said track and having projecting portions extending through said spaces adapted to engage articles on said track and roll them along the same, said forwarder being detachably supported at one end and pivotally supported at the other end to enable it to be swung upward and partially out of said tank, and laterally positioned jet devices adapted to spray washing fluid upon the articles moving along said track.

4. In a device of the class described, a tank, a track extending through said tank, means for forwarding articles along said track, and a pressure head positioned in a side wall of said tank and having a chamber for a supply of washing fluid under pressure, said pressure head having a plurality of sets of nozzle openings through its inner wall communicating with said chamber and adapted to discharge jets of washing fluid across the path of movement of said articles, a centrally positioned set of said nozzle openings being directed to discharge downwardly inclined jets of fluid, another set of said openings spaced rearwardly of said first set being directed to discharge forwardly inclined horizontal jets of fluid, and a third set of said openings spaced forwardly of said first set being directed to discharge rearwardly inclined horizontal jets of fluid, said several jets converging upon the path of movement of said articles.

5. In a device of the class described, a tank having openings at opposite ends thereof, a driven shaft extending transversely through said tank and having bearing supports mounted on the side walls thereof, an elongated frame longitudinally positioned in said tank between said openings therein and pivotally supported at one end on said shaft, a bar extending transversely of said tank and having supports mounted on the side walls thereof adapted for the removal of said bar therefrom, the other end of said frame being detachably
supported by said bar, a forwarder belt operatively mounted on said frame having a driving connection with said driven shaft, a removable track positioned over said forwarder belt adapted to support containers to be washed, means on said forwarder belt for engaging and continuously moving said containers along said track, and means in said tank for spraying washing fluid upon said containers.

In testimony whereof we have hereunto set our hands.

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