

Dec. 1, 1936.

I. H. KENDALL

2,062,664

METHOD OF AND APPARATUS FOR WASHING MILK CANS OR OTHER RECEPTACLES

Filed Nov. 18, 1929

4 Sheets-Sheet 1

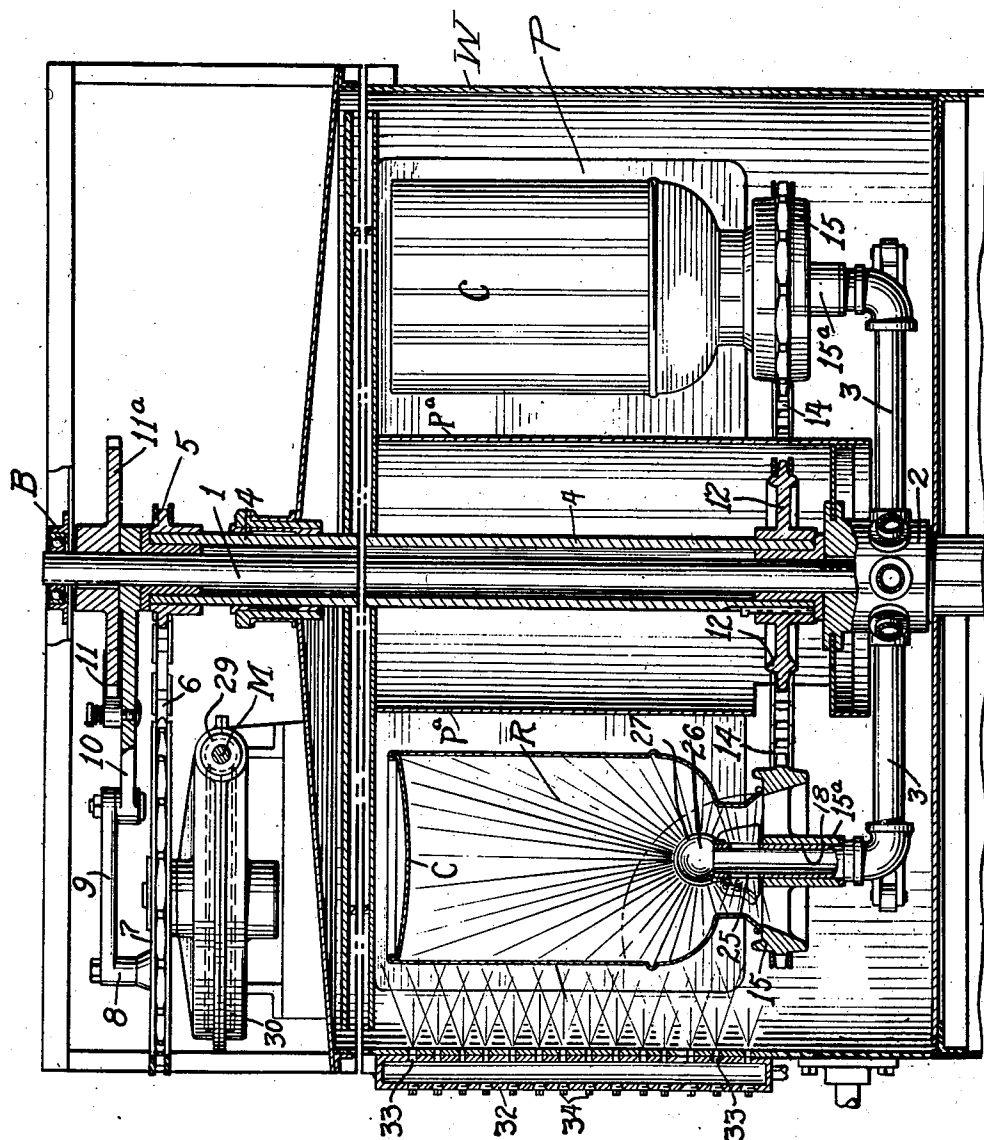


Fig. 1.

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4 Sheets-Sheet 2

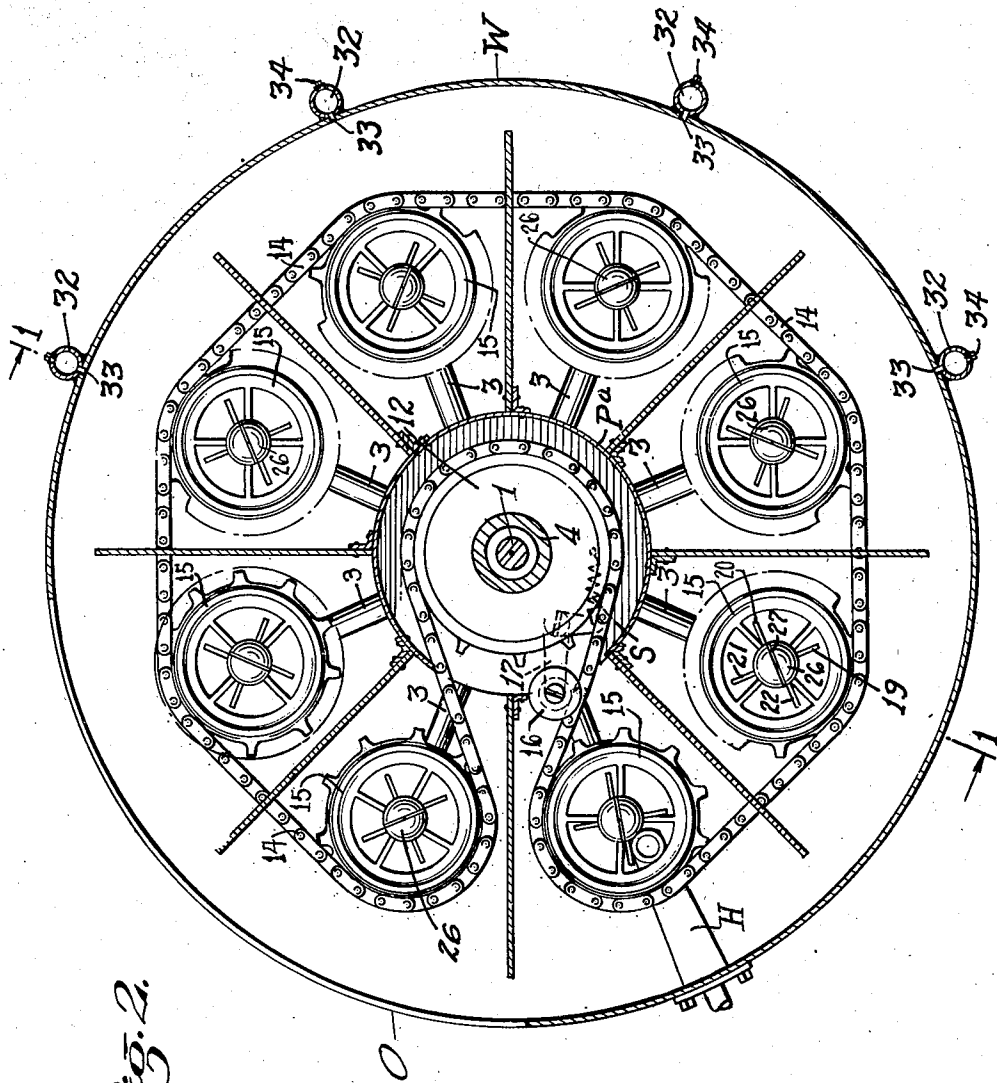


Fig. 2.

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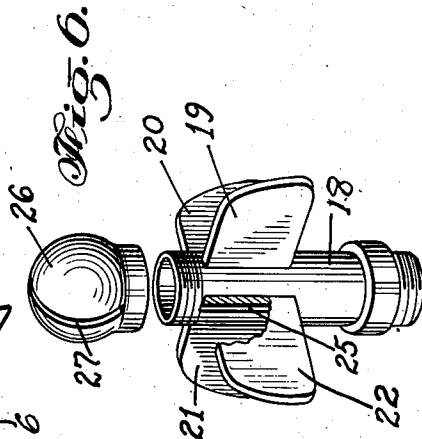
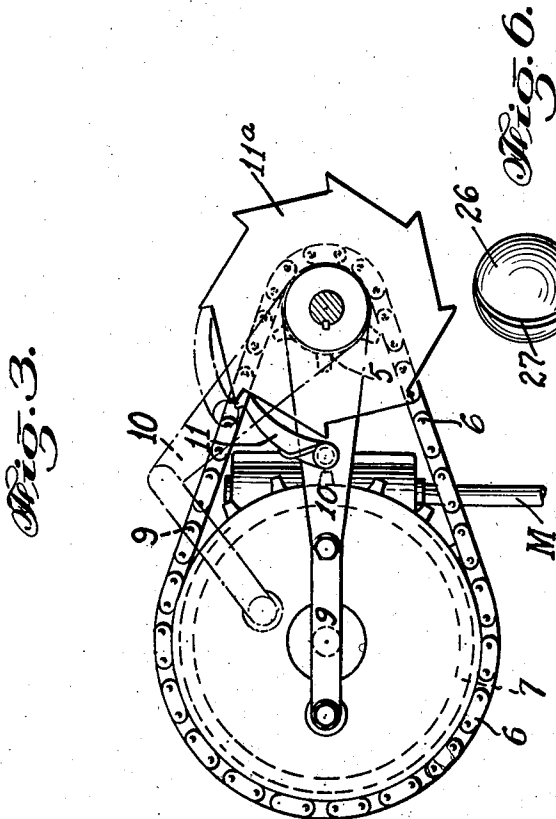
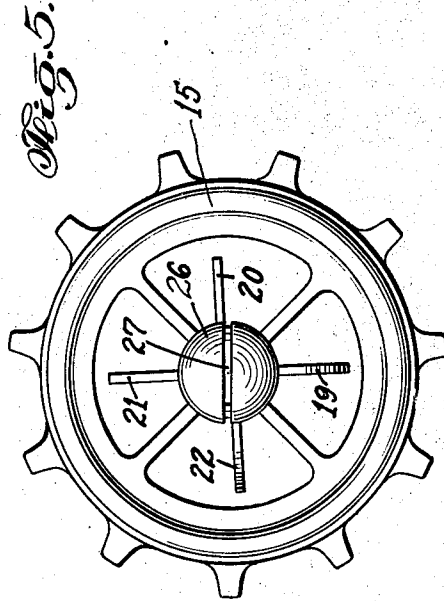
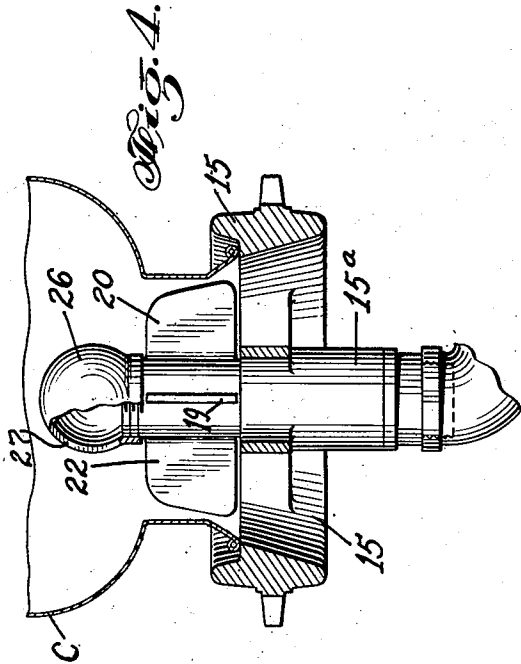
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METHOD OF AND APPARATUS FOR WASHING MILK CANS OR OTHER RECEPTACLES

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4 Sheets-Sheet 3



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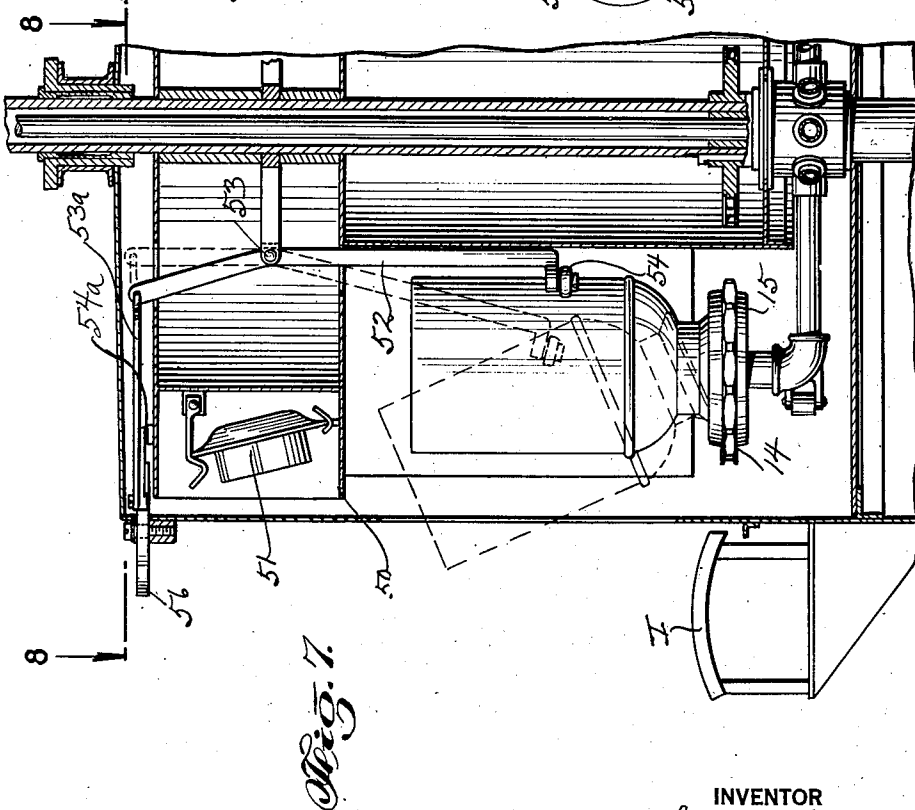
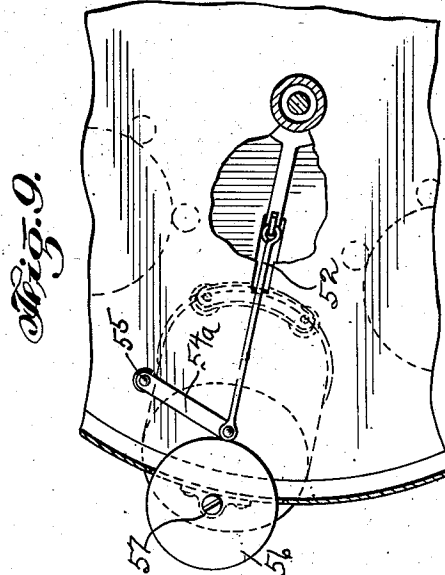
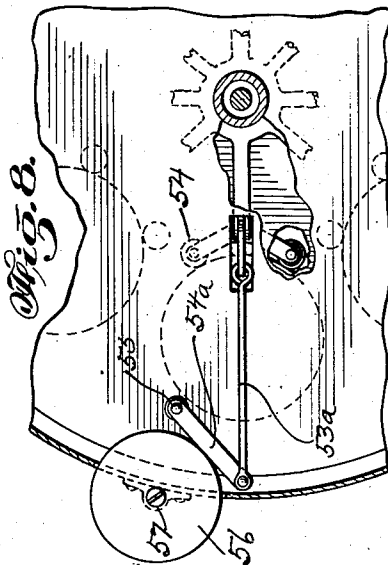
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METHOD OF AND APPARATUS FOR WASHING MILK CANS OR OTHER RECEPTACLES

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,062,664

METHOD OF AND APPARATUS FOR WASHING MILK CANS OR OTHER RECEPTACLES

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Application November 18, 1929, Serial No. 407,885

8 Claims. (Cl. 141—7)

My invention relates to a new and improved method of and apparatus for washing milk cans or other receptacles.

One of the objects of my invention is to provide a method and apparatus whereby the interior of a milk can or other receptacle can be thoroughly washed by injecting water or other cleansing fluid into the interior of the receptacle, while causing the water or other fluid which is so injected to escape from the can without substantially hindering the washing action.

Another object of my invention is to provide a device for this purpose having a washing head of improved design.

Another object of my invention is to provide a method whereby a sheet of water is permitted to strike against the inner surface of the wall of a can, and to then spread out in a horizontal direction along said wall of the can.

Another object of my invention is to provide a method whereby a pair of vertical planar sheets of water are caused to move laterally so as to strike the interior wall of the can, said sheets then being permitted to spread horizontally.

Another object of my invention is to provide a method whereby the can is washed by a fan-shaped sheet of water, so that the wash-water can freely leave the can.

Another object of my invention is to provide a mechanism whereby the can or other receptacle is turned around its own axis while it is subjected to the action of a cleansing or drying fluid, so that the entire inner wall and the entire outer wall of the can are thoroughly washed, dried, or the like.

Another object of my invention is to provide an improved mechanism whereby the cans are rotated, and are also revolved. I prefer to have each can rotate about its own axis more than once, and preferably not less than twice, while it is in each operative position. By an operative position, I mean the position in which the can is being acted upon by water, steam, air, or in any other manner.

Another object of my invention is to provide a mechanism which may be utilized in connection with the machine shown in my application Ser. No. 249,172, filed in the U. S. Patent Office on Jan. 24, 1928, which has matured into Patent No. 1,972,711, granted September 4, 1934.

Other objects of my invention will be set forth in the following description and drawings which illustrate a preferred embodiment thereof, it being understood that the above general state-

ment of my invention is intended to generally explain the same and not to limit it in any manner.

Fig. 1 is a diagrammatic side elevation partially in section. This is a section on the line 1—1 of Fig. 2.

Fig. 2 is a diagrammatic horizontal sectional view.

Fig. 3 is a detail top view of the primary drive whereby the cans are rotated and revolved.

Fig. 4 is a detail view of a washing head.

Fig. 5 is a detail view of a can support.

Fig. 6 is a detail view showing the respective parts of a washing head.

Fig. 7 is a detail view showing another embodiment of the invention.

Fig. 8 is a sectional view on the line 8—8 of Fig. 7.

Fig. 9 is a view similar to Fig. 8 showing the operation of the ejector device.

The complete machine comprises a casing having a wall W, which is provided with exterior pipes 32. This casing is provided with an open portion O at which the attendant stands in order to insert and to remove cans from the device. Said pipes 32 are provided with horizontal holes by suitably drilling the same, and these drill holes also extend through the wall W of the casing. The outer holes are closed by means of plugs 34. Four of these outer pipes 32 are shown. The first of these pipes can be supplied with rinse water, the second of these pipes can be supplied with hot wash water, the third of these pipes can be supplied with hot clean rinsing water, and the fourth of these pipes can be supplied with steam. I have not shown the details of the connections for supplying the various fluids to these pipes 32 as these are shown in machines already on the market and well known to the trade. Likewise, it is to be understood that the machine is assumed to turn in the clockwise direction. The pipes or nozzles communicating with the interiors of the cans are also supplied with rinse water, with hot wash water, and with hot clean rinsing water, when the cans are respectively adjacent the first three of these pipes 32. The interior of the receptacle to be washed can also be supplied with steam when the can is adjacent the fourth or last pipe 32. The inside of each can is also treated with hot air through the pipe H, before it is moved to the position in which it is removed by the attendant.

A valve body 2 is mounted upon a shaft 1 which is supported on an anti-friction bearing B. The turnable valve body 2 is provided with radial pipes 3 communicating with openings in said

valve body 2. The valve plug on which the said valve body 2 is mounted may be of any known type. Hence, as the valve body 2 is turned, fluids of different kinds, such as cold water, hot water, and steam may be forced through the pipes 3. The details of the connections for supplying the fluids to the pipes 3 require no further explanation as machines based on this principle are already on the market and are well known, and are described in my previously filed application Serial No. 249,172.

Each radial pipe 3 is provided with a vertical pipe 18. Each said pipe 18 is provided with diametrically opposite slots 25 through which water or steam can be forced to act upon the mouth portion of the can. Each washing head 26 is provided with a slot 27 which extends completely around the same. Each pipe 18 is connected to its respective pipe 3 by a suitable coupling, and each washing head 26 has a threaded connection with its corresponding pipe 18. Each pipe 18 is also provided with four fins or wings 19, 20, 21 and 22. These wings are spaced apart equally and two of said wings are substantially adjacent the longitudinal slots 25. When the washing head 26 is screwed into position, the slot 27 is preferably aligned with the slots 25. I have shown the slots 25 and the slot 27 as being vertical, but it would not be departing from my invention to incline one or more of said slots. Each can support comprises a sprocket or gear 15 having a raised edge and an inner sleeve 15^a, by means of which each said support 15 can be suitably mounted on a corresponding pipe 18. When the valve body 2 is turned, the respective can supports follow a circular path so that the cans C are correspondingly revolved about the axis of the shaft 1. The shaft 1 is located within an outer sleeve 4 which is mounted on a suitable bearing. Said sleeve 4 has a sprocket 5 connected thereto and said sprocket 5 is connected by means of a chain 6 to a sprocket 7 mounted on the main drive of the machine. Said main drive comprises a worm shaft M, a worm 29 and a worm wheel 30. This type of drive is merely illustrated by way of example, it being understood that this detail, as well as other details of the machine disclosed herein, can be varied or omitted without departing from the invention. The sprocket 7 is provided with a boss 8 on which a link 9 is pivotally mounted. Said link 9 is pivotally connected to a second link 10 which is turnably mounted on the shaft 1. The link 10 is provided with a pawl 11 having the usual spring so that the index plate 11^a is intermittently turned. In this embodiment, the shaft 1 to which the index plate 11^a is connected, is turned one-eighth of a revolution for each complete revolution of the drive sprocket 7. In the type specifically illustrated herein, I have shown an intermittent drive for intermittently revolving the can C about the axis of shaft 1, but I do not wish to be limited to such intermittent drive.

The outer sleeve 4 is provided with a sprocket 12 which is provided with a chain 14 that passes around the respective sprockets 15, which form the supports for the cans C. As previously stated, the sleeves 15^a permit said sprockets 15 to freely turn around the pipes 18, so that each sprocket 15, together with the can placed thereon, can be freely rotated about its own axis. An idler 16 is provided for tightening the sprocket chain 14. This idler 16 is mounted on a lever 17 which is moved by the spring S to maintain

the chain 14 in tight condition. The sprocket chain 14 moves in the same direction as the valve body 2. It is clear that the sprocket 12 and the sprockets 15 are continuously turned so that the sprockets 15 turn while they are being revolved about the central axis of the shaft 1, and said sprockets 15 continue to turn while the shaft 1 is stationary.

It is also clear that when the sprockets 15 are being revolved around the central axis of the shaft 1, that their speed of revolution is less than when the shaft 1 is held stationary. The action of the device is to cause each can to turn twice, about its own axis, while the shaft 1 is held stationary.

As shown in Fig. 3, the ratchet wheel 11^a is turned one-eighth of a revolution while sprocket 7 is turned a half revolution. During the remaining half revolution of sprocket 7, ratchet wheel 11^a remains stationary. Since sprocket 7 drives sprocket 5, the sprockets 7, 5, 12, and 15, can be designed so as to cause each can to turn twice around its own axis while shaft 1 and ratchet wheel 11^a are stationary.

A can is placed upon a support 15, or is removed therefrom by a tilting movement.

The fins 19, 20, 21, and 22 are effective to properly locate the cans on their supports so that the washing head is aligned with the central axis of the can. The fins 19, 20, 21, and 22 may be of any desired size for this purpose. For example, while I have shown them as being spaced from the inner wall of the adjacent portion of the can, it is to be understood that the drawings are not necessarily according to scale, and said fins could be made wider so as to accurately center the can upon its support. It will be noted that the central column P_a is mounted on the valve body 2, and that partitions P are mounted upon the central column P_a.

When water under substantial pressure, such as a pressure not less than 22 pounds per square inch, is supplied to a pipe 3, the water issues from the slot 27 in planar fan-shaped form. While of course the sheet of water has an initial thickness corresponding to the width of the slot 27, it may be described as planar because it moves outwardly in the form of a flat sheet which strikes the inner side wall surface of the can at two diametrically opposite points. Said sheet of water, defined by the rays R shown in Fig. 1, also strikes the bottom of the inverted can. The sheet of water spreads laterally when it strikes the side wall surface of the can. It therefore spreads in opposite directions along horizontal lines or planes until the horizontally moving sheets of water thus produced meet each other along lines substantially midway between the portions of the can which are initially struck by said flat sheet of water. When the horizontally deflected sheets of water thus meet, their kinetic energy is largely or totally destroyed, and the water drops out of the can at these points. Heretofore, in washing the interior of an inverted can with the use of a very large volume of water, the water tended to accumulate in the upper part of the can so that this hindered the washing action. Likewise, when the large body of water had to flow out of the can, it interfered with the proper washing action of the incoming jet, body or sheet of water. However, according to the present invention, there is no interference between the incoming water and the outgoing water. Flat or planar sheets of water are also caused to issue out of the slots 25 so as to properly

wash the mouth portion of the can. The sheets of water which issue from the slots 25 spread out horizontally in the manner before described.

This washing action is made more thorough by the turning of the can while it is being subjected thereto. By turning the can twice while the shaft 1 remains stationary, the thorough washing of each and every portion thereof is positively insured, and the outer portion of the can is also thoroughly acted upon by means of the outer washing pipes 32.

In the embodiment shown, each can moves through eight positions. The central shaft and the valve body 2 are connected to a central column Pa having partitions P, so that column Pa turns in unison with the valve body.

It will be noted that in this embodiment of my invention, I do not provide baffles or other means for downwardly deflecting the water in case a can is not upon a support. However, this is not absolutely necessary because the average operator can be depended upon to see that each support receives a can.

In addition to centering the can, the fins 19, 20, 21, and 22 are useful when hot air is supplied to the interior of the can through a pipe H. The hot air is caused to substantially enter the angular space between a pair of said fins and it passes out of the can through the angular space opposite thereto so that there is no interference between the inflowing air and the outflowing air at the mouth of the can. In this respect the invention is also broadly new.

Whenever I refer to cans in the claims, it is to be understood that I wish to include receptacles of all kinds. Likewise, the wash water can have any suitable detergent dissolved therein, or it can have sand therein.

As shown in Fig. 7, automatic means may be provided for ejecting the cans from their holders upon an inverting device I of any suitable type. In this embodiment the supports for the cans turn in unison with an upper support 50 upon which can covers 51 are mounted. The general details of the mechanism for holding, washing and releasing the can covers are shown in my previously filed application, Serial No. 372,594. Each of the cans is held against being tipped from its upright position, when water is forced against its exterior, by means of a yoke 52 which is pivotally connected at 53 to the revolving portion of the device. Each of these yokes 52 is provided with a pair of rollers 54 which abut the can at the inner side thereof. Hence, when water is forced against the outside of the can with considerable pressure, as shown in Fig. 1, the rollers 54 prevent the can from being tipped from its upright position, while permitting the can to freely turn. The upper end of each yoke 52 is provided with a link 53a which is pivotally connected to an arm 54a, said arm 54a being pivoted at 55 to the revolving portion of the machine. The exterior stationary casing is provided with a wheel 56 pivoted thereto at 57. As shown in Figs. 7-9, when a can reaches the position in which it is to be ejected from the device, the link 54a contacts with the wheel 56 and the further turning of the device forces the upper end of the yoke 52 rearwardly, so that the can is tipped into the dotted line position indicated in Fig. 7, so that it falls upon the inverting device I.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes

and omissions could be made without departing from its spirit.

It will be noted that the can supports 15 have openings in the interior thereof so as to permit the water to pass below said supports to a suitable tank, compartment, drain, or the like. These details are not specifically illustrated as they are well known in machines now on the market.

While I have shown a complete mechanism, it is obvious that this contains numerous sub-combinations or sub-mechanisms which could be used independently of the complete mechanism disclosed herein.

While I have shown a sprocket and chain drive in the description and I refer to the same in the claims, it is to be understood that the sprocket drive broadly includes any similar drive such as a belt drive or the like, by means of which the can supports are revolved while they are being moved through a closed path. In the specific embodiment disclosed herein, this closed path is a circular path.

I claim:

1. A can washing device, comprising an annular support adapted to hold a can in inverted vertical position, means adapted to rotate the can around its own vertical axis, a non rotating and substantially vertical pipe adapted to extend into and deliver water into the interior of the can on said support, said pipe having substantially vertical slots in its wall, said pipe having a non-rotating washing head mounted thereon, said washing head having a substantially vertical slot which extends around the top thereof, the slots in the wall of the pipe being below and substantially in alignment with the slot in said washing head.

2. A method of washing an inverted can which consists in turning the can around its own vertical axis while forcing into said inverted can an upwardly directed and continuous and flat body of water which moves upwardly so that it strikes the inner surface of the bottom of said can and which also moves in opposite directions with respect to the axis of the can so that said body of water also strikes predetermined portions of the inner surface of the vertical wall of said can, said predetermined portions being substantially diametrically opposite, to each other, said body of water being so injected with sufficient force and in sufficient volume so that the water spreads laterally in opposite directions from said predetermined portions over the entire inner surface of the vertical wall of the can, the movement of said body of water being limited to the above-mentioned movements.

3. In a can washing device, a water delivery pipe having a pair of slots in its side wall, the outer wall of said pipe having projecting portions extending radially therefrom intermediate said slots.

4. In a can washing machine, a water delivery pipe having a pair of slots in the side wall thereof, the outer wall of said pipe being provided with four symmetrically disposed fins which are located between said slots, two of said fins being adjacent said slots.

5. In a can washing machine, the combination of a support adapted to hold a can in inverted position, a first pipe adapted to deliver water into the interior of said can, a second pipe adapted to deliver hot air into the interior of said can, said first pipe having a plurality of projections extending radially from the outer wall thereof, said

second pipe having its mouth intermediate a pair of said projections, said projections being adapted to separate the incoming hot air from the outgoing hot air, said first pipe and projections extending into the can when it is held on the support.

6. A can washing machine comprising a rotatable valve body having pipes projecting therefrom, upstanding pipes which are connected to said projecting pipes, can supports comprising sprockets which are turnably mounted on said upstanding pipes, a shaft on which said valve body is mounted, a turnably mounted sleeve enclosing said shaft, a drive sprocket connected to said sleeve, a chain connecting said drive sprocket to said sprockets of the can supports, and means adapted to continuously turn said sleeve and to intermittently turn said shaft.

7. A can washing device comprising a turnable carrier having can holders thereon, means adapted to turn said carrier, means adapted to turn said can holders, means adapted to project

water against the outer walls of said cans while they are held in position on said holders, yokes pivoted to said carrier and having anti-friction means adapted to contact with said cans while they are mounted on said holders, and means adapted to actuate said yokes when they are adjacent a predetermined portion of the machine to tip the cans off the holder.

8. A can washing machine comprising a rotatable valve body having pipes projecting therefrom, upstanding pipes which are connected to said projecting pipes, can supports comprising supporting sprockets which are turnably mounted on said upstanding pipes, a shaft on which said valve body is mounted, a turnably mounted sleeve enclosing said shaft, a drive sprocket connected to said sleeve, a chain connecting said drive sprocket to said sprockets of the can supports, and means adapted to turn said shaft and to turn said sleeve relative to said shaft.

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