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CAN WASHING MACHINE

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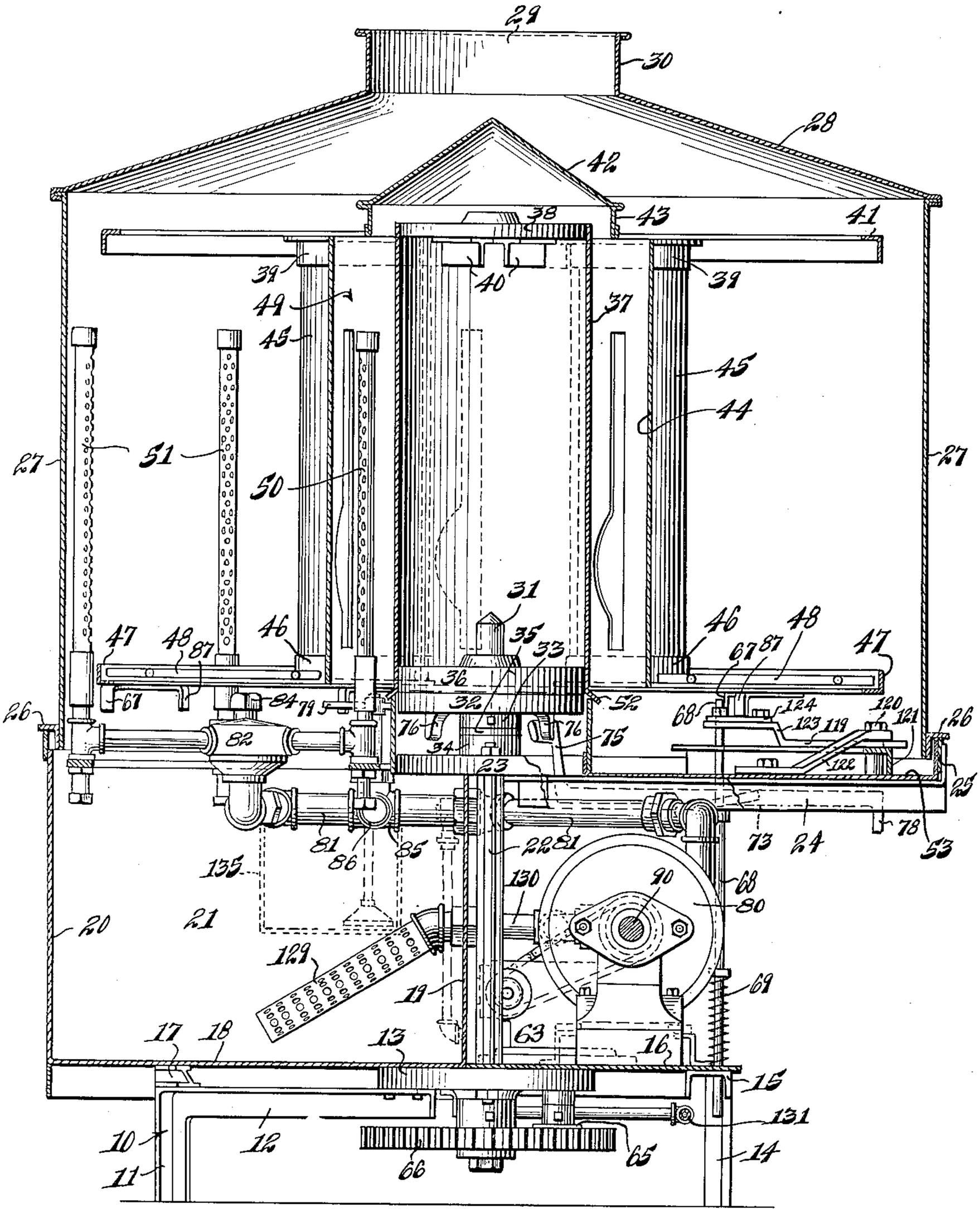

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CAN WASHING MACHINE

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This invention relates to can washing machines, and more particularly to those of the rotary type in which the several cans are moved intermittently in a circular path through the machine and successively subjected to a plurality of treatments for the cleansing, sterilizing and drying thereof.

The principal object of the invention is to produce a machine of the above noted character which is simple in structure, yet durable and highly efficient in operation. A further object of the invention is to produce a novel construction and arrangement of the driving and driven mechanism of the machine, with a yieldable clutch connection therebetween. Other objects and advantages to be attained will hereinafter more fully appear.

The invention consists in the general structural features, and in the parts and combinations and arrangements of parts hereinafter described and pointed out with particularity in the appended claims.

In the accompanying drawing, illustrating a practical adaptation of the invention,—

The sole figure is a vertical section through the machine.

Referring now to the drawing, the numeral 10 designates generally the supporting underframe of the machine, said frame comprising integral leg portions 11 and radial horizontal members 12, which are preferably formed of the ordinary commercial angle iron. The inner end portions of the horizontal members 12 are riveted to the under side of a circular disc 13, comprising a special casting. This frame further comprises leg portions 14, which are preferably integral extensions of a horizontal member 15 which is of the ordinary channel iron cross-section. Supported on the disc 13 and the frame member 15 is a rectangular plate 16, said plate being rigidly fastened to said members 13 and 15 so as to constitute a part of the underframe and afford a supporting shelf for the driving and operating mechanism to be later described.

Supported on said disc 13 and interposed blocks 17 on the radial frame members 12, is the bottom plate 18 of a tank having a straight vertical wall 19 coinciding with the inner marginal portion of said plate 16, said tank having a curved wall 20. This tank, designated generally by the numeral 21, is provided to contain the washing solution, which solution in the use of the machine is generally of a caustic nature and maintained in a heated condition, as will later more fully appear.

Extending upwardly from the disc 13 is a pair of supporting bars or struts 22, on the upper end portions of which is secured a disc 23, said disc 23 having the inner end portions of radial frame members 24 secured to the under side thereof, said radial frame members 24 being preferably of angle iron cross section and having their outer end portions turned upwardly at right angles and secured to an annular frame member or band 25. The annular frame member 25 affords a support for the outwardly flanged portion 26 of a cylindrical housing 27, said housing having a frusto-conical or dome-like cover 28 which is provided with a central opening 29 surrounded by an annular upstanding flange 30. This housing 27 is provided with an opening (not shown) in its side wall for permitting access to the rotating carriage to be presently described, said opening being obviously provided with a closure member or door, preferably slidably mounted.

Extending axially through the discs 13 and 23 is a drive shaft 31, said shaft having a friction clutch disc 32 secured on its upper end portion above the upper frame disc 23, said friction clutch disc 32 having a depending hub portion 33 resting on an upwardly extending hub portion 34 of the disc 23 with an interposed anti-friction bearing 35 of any desirable kind. Said clutch disc 32 being pinned or otherwise fastened to the shaft 31, it, obviously, rotates therewith. Fitted loosely so as to rotate freely about the upper end portion of said shaft 31, which projects above the disc 32, is a companion friction clutch disc 36, the meeting faces of the two discs 32 and 36 being generally flat but, obviously, having concentric oil grooves therein. By this arrangement, the disc 36 normally rotates with the supporting disc 32, but

when sufficient resistance is brought to bear upon said disc 36 it, of course, may remain stationary while said supporting and driving disc 32 continues to rotate. This is an important feature of the present invention, and it is the structural arrangements and connections between said disc 36 and the rotatable cam carrier which is more particularly herein concerned. That is to say, the present invention has more particularly to do with the construction and operation of the rotatable carrier and also with the peculiar adaptability thereof for the accommodation and operation of the several cleaning and treating devices for the cans.

Secured at its lower end portion to the peripheral face of the upper friction clutch disc 36 is a cylindrical supporting element or hollow spindle 37, in the upper end portion of which is secured a disc 38. Extending from the upper end portion of said cylindrical spindle member 37, are radial arms 39, whose inner end portions are projected inwardly through the wall of said member 37, as at 40, and are secured to the under side of said disc 38. At the outer ends of said radial members 39 is an annular member 41, said annular member 41, as shown, being L-shaped in cross-section, and the radial members 39 being T-shaped. Just above the cylindrical member 37 is a conical hood element 42 having an annular marginal flange 43 which is supported on the radial members 39 and extends concentrically about the upper end portion of said member 37. Depending from the radial members 39, and spaced from the central cylindrical member 37, in concentric relation thereto, is an open-ended cylinder 44. Depending also from said radial members 39 are partition plates 45, said partition plates carrying at their lower ends radial frame members 46, at the outer ends of which latter is secured an annular member 47, said annular member being L-shaped in cross-section and its horizontal flange being disposed inwardly whereby to afford a supporting ledge for open frames or grilles 48 on which the cans are placed to receive the various treatments as they make the circuit of the machine on the carrier. The radial members 46 at the lower ends of the cylindrical element 44 are also provided with horizontal flanges for supporting said open frames or grilles 48, as do outwardly extending flanges provided therefor on the lower ends of said cylindrical member 44.

By the foregoing arrangement an axially supported rotatable carrier is provided for the cans, there being an annular space 49 between the cylindrical spindle member 37 and outer cylindrical member 44 which is open at its bottom and provides clearance for the accommodation of vertical discharge nozzles 50 for the cleansing and treating solution or water, said cylindrical member 44 having vertically elongated openings therein for permitting the liquid discharged from said nozzles to enter the respective compartments of the can carrier. There is also ample space between the peripheral portion of the carrier 47 and inner face of the cylindrical shell 27 for the accommodation of the outer nozzle members 51.

The cylindrical spindle member 37 is provided at its lower end with an outturned downwardly inclined deflecting flange 52, which serves to direct the water or cleansing fluid away from said spindle member 37 and into pans or receptacles provided therefor beneath the rotary can carrier.

One of these pans, designated by the numeral 53, is located in the region of the nozzles of first application or, in other words, the cold water nozzles, by the jets from which respective cans are initially rinsed or washed. The water received in said pan is drained therefrom through a suitable outlet opening and communicating drain pipe (not shown), which latter leads outside the lower portion of the machine in an obvious manner and discharges into a sewer or other outlet. Next in order, the can is washed with a strong caustic solution and the excess of solution delivered to and about the can, and the drainings therefrom, are returned to the solution tank to be used over again in the preferred construction and arrangement of the machine. The next treatment is a hot water rinse, the water after being directed upon the can being delivered into a pan (not shown), from which it is drained through an outlet opening and waste pipe. After the hot water rinse the can is sterilized by being subjected to the action of a jet of steam, and the water of condensation therefrom is received in a pan or tray, which is preferably without a wall at one end thereof, and located so as to drain into the caustic solution tank.

As hereinbefore stated, the principal features of the present invention reside in the novel construction and operation of the carriage whereby the cans are conveyed and supported in proper position to receive the various treatments, and the treatments and various mechanisms and instrumentalities for effecting the same, will be herein described only in a general way and with mere sufficiency to give an adequate understanding of the invention as the same are set forth and claimed in applicant's copending application, Serial No. 416,964, filed December 27, 1929. Other features herein shown and described but not herein separately claimed are claimed in said copending application.

In the machine illustrated in the drawing, a unitary main driving mechanism including a single motor is preferably provided. There may be provided a sprocket and chain or other suitable connection between the armature shaft of the motor and a transmis-

sion gearing which is encased in a housing 63 located on the lower frame plate 16. This gearing is not shown in detail, but may be generally described as including a worm gear mechanism (not shown), which operates a countershaft carrying a pinion 65, said pinion in turn meshing with a larger gear 66 on the lower end of the drive shaft 31, by which arrangement said shaft 31 is driven and, of course, the clutch disc 32 is rotated therewith.

As hereinbefore stated, the disc 36 at the lower end of the cylindrical supporting spindle 37 rests upon the disc 32 which is fixed to the drive shaft 31, said disc 36 being loose on said shaft 31, but there being sufficient frictional contact between the two discs whereby the can carrier is rotated with said shaft 31, yet when sufficient resistance is brought to bear upon the can carrier by a stop device, the driving clutch disc continues to rotate. In the operation of the machine the can carrier is intermittently rotated, and a practical stop mechanism for controlling this will now be described. Correlated to each compartment or division of the can carrier is a stop element 67 which, as shown, comprises an angle plate secured to the under side of the lower annular carrier frame member 47, said members 67 coming successively into engagement with a vertically movable stop element 68 located normally in the circular path thereof, said stop element comprising a vertically movable rod which is yieldably held in raised position by spring 69. The rod 68 is provided with a suitably located lateral arm, which is engageable by a cooperating rock arm which is a lateral extension of a rod 73 having both longitudinal and rotative movement in bearings preferably located on one of the radial frame members 24. The inner end portion 75 of the rod 73 is offset to afford a crank arm which may be shifted into and out of the path of a cam projection 76, or a series thereof, on the under side of the driving disc 32. As shown, there are two of these cam projections, in diametrically opposed relation to each other, by which arrangement the rod 72 is rocked twice during each rotation of the disc 32 and, consequently, the stop element 68 is depressed the same number of times during each rotation of the disc 32. Normally, said rod 73 is held with its crank portion 75 in the path of the cams 76, this being preferably accomplished by providing the rod 73 with suitable catch means with which a pivotal latch member is engaged but releasable at the will of the operator. This particular portion of the mechanism is illustrated somewhat conventionally in the drawing. By this arrangement, when the rod 73 is released it may be moved longitudinally in its bearings so as to withdraw the crank portion 75 from the path of said cam projections 76 on the under side of the rotating disc 32 on the drive shaft 31, at which time the stop member 67 remains in engagement with the bar 68 and the can carrier, of course, is stationary. The rod 72 is provided at its outer end with a crank portion 78, which may be grasped by the operator to rock the arm and thereby release the stop member 68 from engagement with the stop member 67, thereby permitting the can carrier to rotate and, obviously, as said stop member 68 is held out of the path of the stop members 67, the can carrier continues to rotate.

In the particular machine illustrated in the drawing, provision is made for the several separate treatments of the can and, accordingly, the can carrier is divided into a corresponding number of compartments and the carrier is therefore provided with the same number of stop elements 67, by which arrangement the can carrier is stopped in its movement that number of times during each complete revolution thereof. During each rest period a can in all except one of said compartments is being treated and a can is removed from that one and another placed therein at each period of rest of the carrier. The duration of each period of rest of the can carrier depends upon the speed at which the driving clutch disc 32 rotates and the number of cam projections 76 on the under side thereof which successively engage the crank portion 75 of the rod 73 which actuates the stop element 68.

As the stop element 67, correlated to one of the compartments of the can carrier, engages the stop element 68 on the under frame, thereby arresting the movement of the carrier, the corresponding stop element 67 under the next preceding compartment has engaged an operating lever arm 79 which opens the valve which controls the supply of caustic solution to the nozzles which are located in correlation to the next preceding compartment, which is the second ahead of the compartment, whose stop element 67 is now engaged with the stop element 68 on the underframe. In this connection, it may be here stated that the caustic solution is drawn from the supply tank 21 by a continuously operating rotary pump 80 and forced through a pipe 81 connecting the pump with the manifold or head 82, to which are connected the vertical nozzles 50, 51, which wash the outside of the can, and the nozzles (not shown) which wash the can covers and are usually located below the cover supporting portions of the can supporting grilles 48. This manifold or head 82 is provided with central jet orifices 84 which effect the washing of the interior of the can. It is in this pipe connection that the valve 85, controlled by the operating lever 79, is located. This valve 85 is of the two-way or by-pass type; that is to say, in one position thereof an unobstructed flow is permitted through the pipe connection 81,

and in another position thereof such communication is cut off between the valve and the delivery head or manifold 82 and the bypass is opened so as to discharge the solution from the lateral outlet 86 which is disposed above the tank 21, and whereby the solution is returned to said tank. During the time the can carrier is at rest said valve 85 is in the position to which it was operated to permit passage of the solution from the pump to the delivery head or manifold 82, but correlated to each of the stop elements 67 is a second element 87 which travels in a circular path inward from the path of the members 67, said stop element 87, during the rotation of the can carrier, engaging a lever arm (not shown) which is diametrically opposed to the arm 79, immediately after said member 67 has moved out of engagement with said arm 79, whereupon the valve 85 is operated to shut off the supply of solution from the delivery head or manifold 82, and the outlet 86 from the valve is immediately opened. By this arrangement the pump 80 is permitted to operate continuously and steadily, and at the same time a minimum of power is required in the motor. This pump, as shown, is operated directly from the armature shaft of the motor, a suitable coupling being provided between the pump shaft 90 and the motor shaft. The pump shaft 90 is also connected to the rotor of a rotary blower (not shown), said blower being in communication with a suitable heating chamber in which the air is heated before it enters the blower.

The blower operates continuously and, of course, there is a continuous blast from obviously provided outlet openings which are respectively located in a delivery chamber (not shown) in position to act upon the respective cans and covers in the compartments of the can carrier as said compartments are successively and intermittently brought into cooperative relation to said delivery chamber. This is the final treatment, and is for drying the cans.

Prior to the washing of the cans and covers with the caustic solution they are, as first hereinbefore described, given a cold water rinse, and after the caustic solution the cans are rinsed with hot water, after which they are subjected to the action of steam for the purpose of sterilizing them just prior to the drying operation. These various treatments, in themselves, do not concern the present invention, and the same are illustrated merely to give a sufficiently clear description of the machine to set forth the objects and advantages of the present invention. Therefore, it is only deemed necessary to illustrate and describe in a general way the structural arrangement and operation of these devices. It may be here stated that the cold water may come from any source of supply, as from the ordinary city main, and the steam from any suitable generator. So, too, the steam from the same source may be utilized to heat the air for drying the cans and to heat the caustic solution in the tank 21.

In the drawing means for operating the controlling valves for the steam sterilizing devices is shown as comprising an actuating lever 119 which is pivoted, as at 120, between an arcuate support 121 and an angular bracket member 122 on the upper portion of the underframe of the machine. The end portion 123 of said lever 119 is offset upwardly and is provided with an adjustable cam shoe 124 which is engaged successively by the respective stop elements 67 on the under side of the rotatable can carrier, said cam shoe 124 being located so as to be engaged by one of said elements 67 during the time the element 67 is engaged against the vertical reciprocatory stop bar 68. By this arrangement the valves controlling the steam sterilizing devices begin to open just before the can carrier comes to rest in its intermittent rotation, and they remain open for a short time after the can carrier starts to rotate, but, in any event, the opening and closing of the valves is effected only during the time the cans are in range of the respective discharge nozzles of the sterilizing means.

The caustic solution in the tank 21 is preferably heated by supplying steam into the lower portion of the tank through a nozzle which is suitably connected to a source of steam supply. The solution is drawn from the lower portion of the tank 21 through a strainer 129 which, as shown in the drawing, is in the form of a perforated cylinder which is connected to the outlet pipe 130 leading to the pump 80.

The originally supplied and replenishing water for the solution tank 21 is supplied through a pipe 131 leading from a suitable source of cold water supply, preferably that which supplies the initial rinsing water. The machine illustrated in the drawing is provided with a supplemental mixing receptacle 135, shown by dotted lines, into which the caustic material may be placed and water turned into said receptacle to produce a strong liquid mixture therein and from said supplemental mixing receptacle caustic liquid of the desired strength is delivered into the tank 21, there to be diluted to any desired consistency by supplying water to said tank 21 from the water supply pipe 131.

By the provision of the hollow cylindrical spindle member 37 on the driven clutch disc 36 as herein set forth, and the construction and arrangement at the upper end of said spindle member 37 for supporting the annular can carrying portion of the carrier, not only is a well balanced structure produced which permits the use of a relatively

short driving shaft 31 and minimizes the power required for the operation of the machine, but a practical and efficient guard is produced for keeping the washing solution and water from the driving mechanism, motor and other working parts on the underframe of the machine.

Obviously, the machine admits of considerable modification without departing from the spirit and scope of the invention as defined by the claims. The invention, therefore, is not limited to the specific construction and arrangement shown in the drawing.

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

1. In a can washing machine, a supporting frame and power mechanism thereon, a supporting element rotatable about a vertical axis on said frame and having an operable connection with said power mechanism, and a rotary can carrier comprising a friction clutch element resting on said supporting element and rotatable about the same vertical axis therewith, said friction clutch element being normally rotatable by its engagement with said supporting element but permitting independent rotation of the latter, a hollow cylindrical spindle member mounted concentrically on said friction clutch element, and an annular carrier frame suspended from the upper portion of said hollow cylindrical spindle member in spaced concentric relation thereto.

2. In a can washing machine, a supporting frame and power mechanism thereon, a driving clutch disc rotatable about a vertical axis and being operably connected to said power mechanism, a driven clutch disc supported on said driving clutch disc and coinciding axially therewith, said driven disc being normally rotatable with said driving disc but permitting independent rotation thereof, a hollow cylindrical spindle member supported on said driven clutch disc and extending upwardly and axially therefrom, a radial supporting frame at the upper portion of said cylindrical spindle member, and an annular carrier frame depending from said radial supporting frame in spaced concentric relation to said cylindrical spindle member.

3. In a can washing machine, a base frame, a driving clutch disc, and a rotary can carrier thereon, said carrier comprising a friction clutch disc supported on said first mentioned clutch disc and having a hollow cylindrical spindle member secured to the peripheral portion thereof, said spindle member having an annular downturned flange at the lower marginal portion thereof overhanging said driving clutch disc peripherally, a disc secured circumferentially in the upper portion of said spindle member, an annular frame having radial members secured to the underside of said last named disc, a hollow cylindrical outer member spaced concentrically from said cylindrical spindle member, radial partition members supported on said radiator frame members and said outer cylindrical member, and an annular can supporting frame supported by the lower portions of said outer cylindrical member and said partition members.

4. In a can washing machine, a supporting frame, a driving disc supported therein and rotatable about a vertical axis, power mechanism for driving said disc, a driven disc supported on said driving disc and coinciding axially therewith, a spindle member carried by said driven disc and extending upwardly and axially therefrom, lateral supports carried by said spindle member, an annular carrier frame, and means for suspending said carrier frame from said lateral supports.

In testimony whereof I have signed my name to this specification.

CHARLES F. McEWAN.