April 18, 1933. H. L. SOLIE ET AL 1,904,391

CAN WASHING MACHINE

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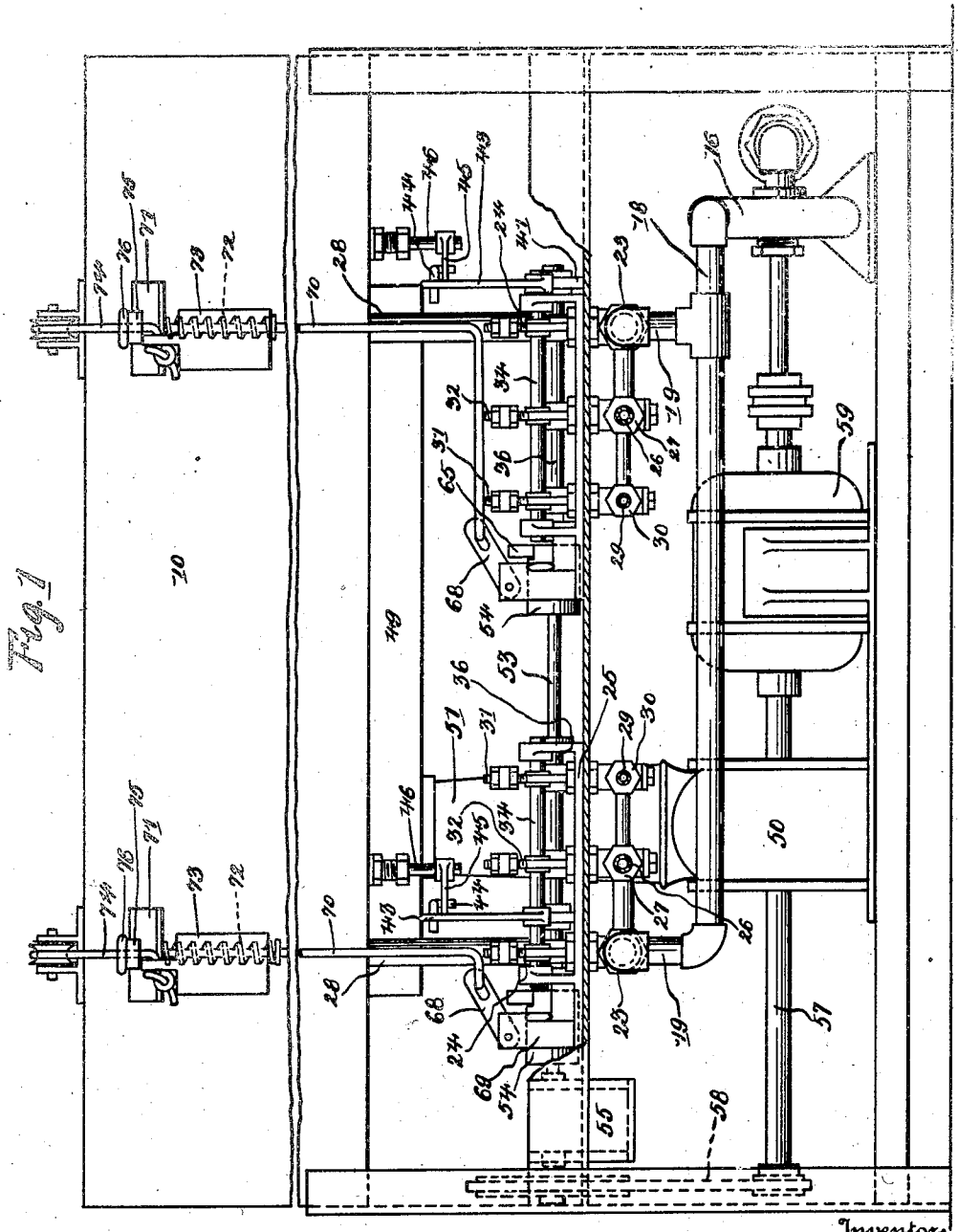


Fig. 1

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Fig. 2

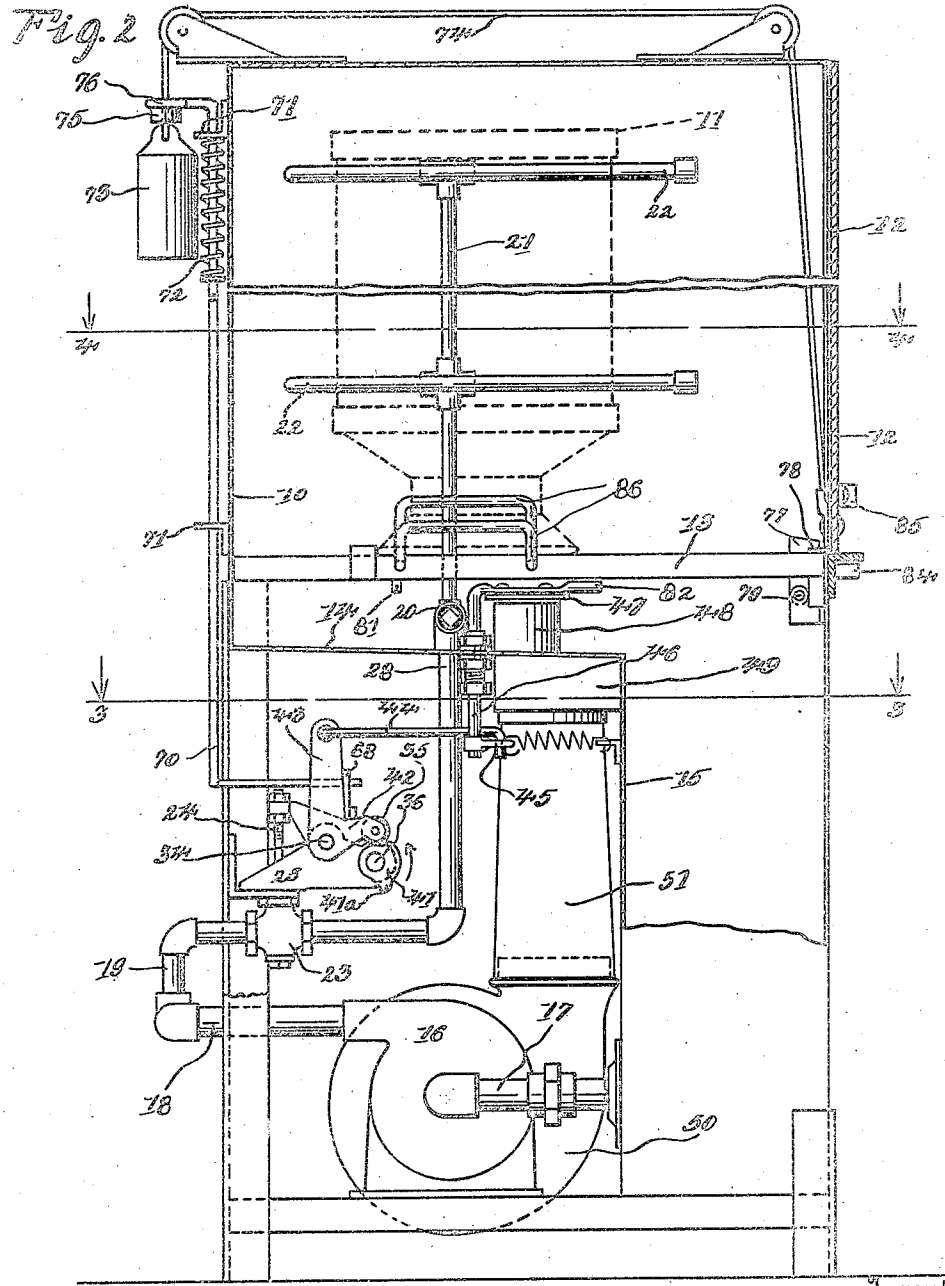
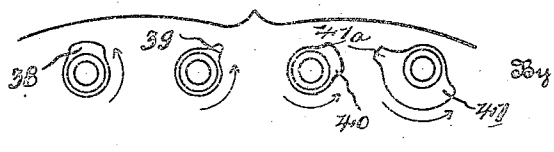


Fig. 8



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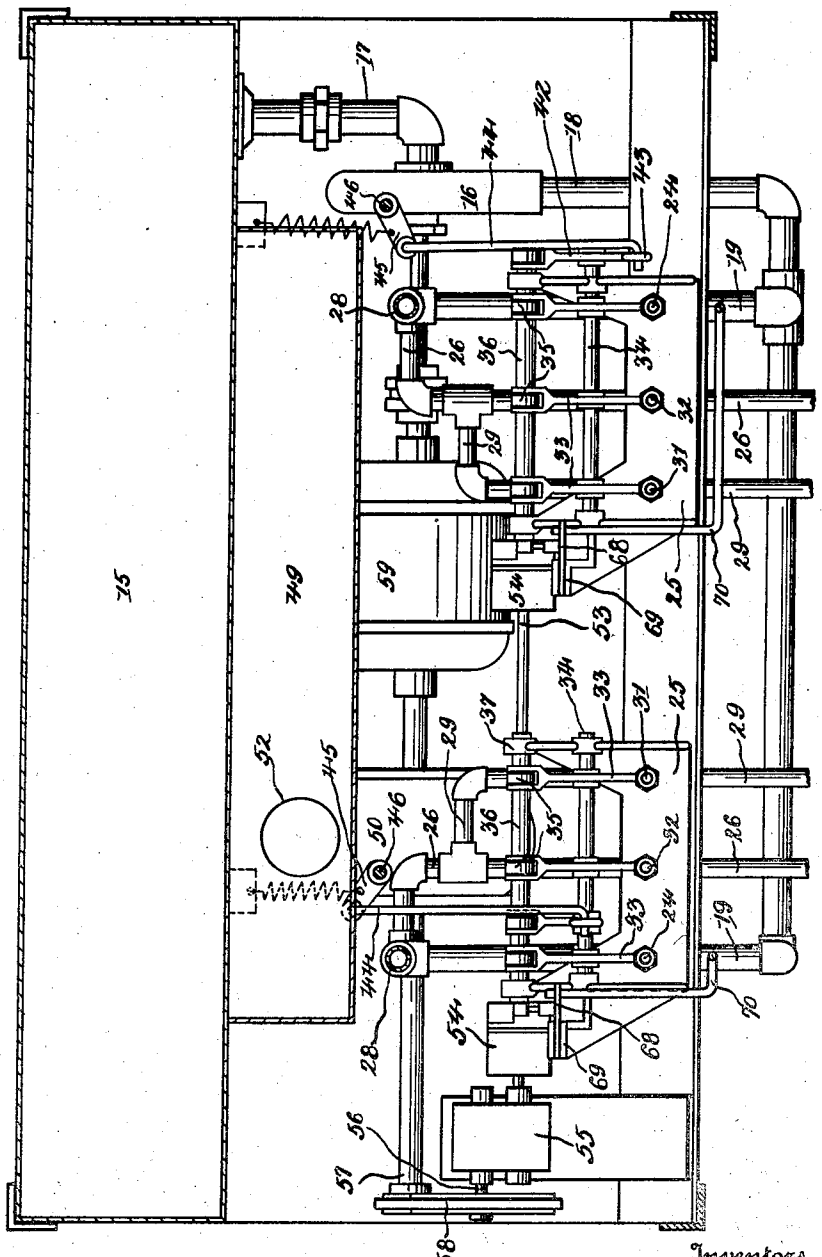
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CAN WASHING MACHINE

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Fig. 3



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Fig. 4

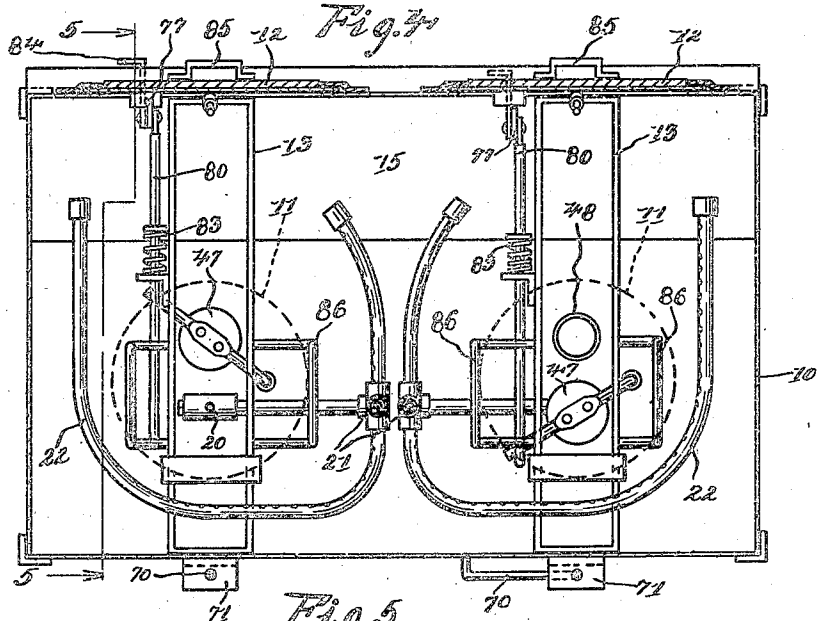


Fig. 5

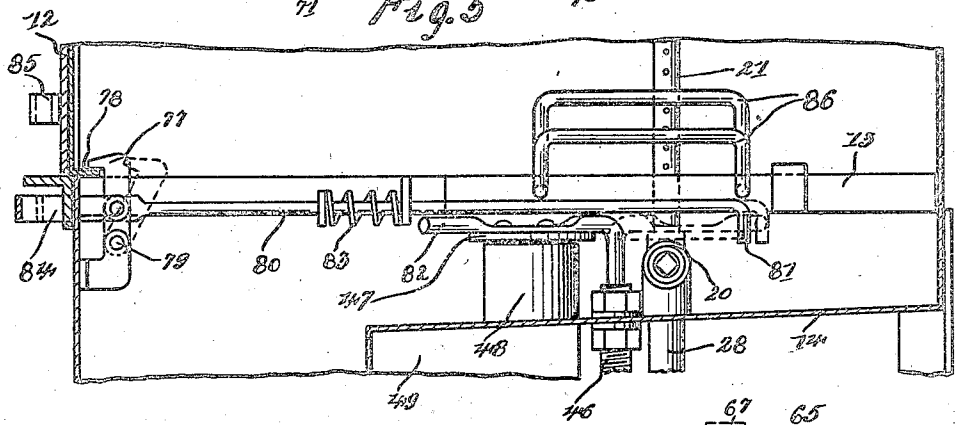


Fig. 6

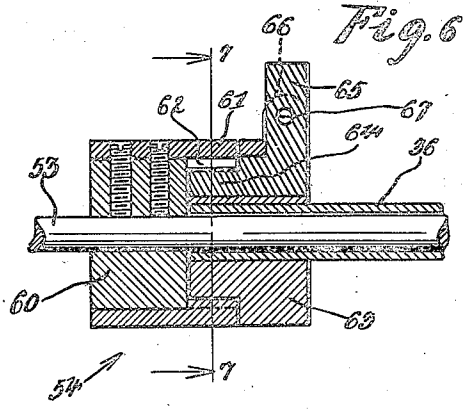
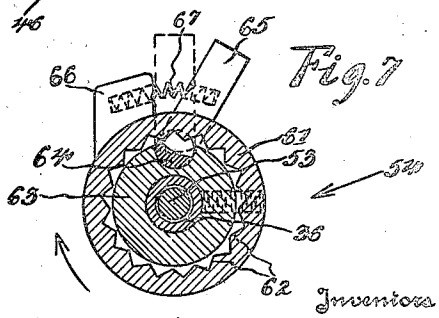


Fig. 7



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UNITED STATES PATENT OFFICE

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CAN WASHING MACHINE

Application filed July 26, 1930. Serial No. 470,781.

It is our object to provide an efficient, automatic can washer of novel and relatively simple and inexpensive construction primarily for the use of dairies or in the smaller creameries. As far as we are aware, the can washing machines in common use are relatively complicated, expensive devices which occupy much floor space and employ conveyor mechanism for passing the cans from one cleansing operation to another. Dairies and the smaller creameries can seldom afford the expense of such large machines and we have designed the present device to meet the needs of the smaller users.

The invention will be best understood by reference to the accompanying drawings in which Figure 1 is a rear elevation of the device; Fig. 2 is an end view of the same with a portion of the washing chamber wall broken away to show the interior; Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 2; Fig. 4 is a horizontal section taken on the line 4—4 of Fig. 2; Fig. 5 is a fragmentary, vertical section taken on the line 5—5 of Fig. 4; Fig. 6 is a central, longitudinal section through one of the clutches; Fig. 7 is a transverse section through the clutch taken on the line 7—7 of Fig. 6 and Fig. 8 illustrates the separate cams in approximately the relative angular positions on the cam shaft.

Our can washer has a washing chamber 10 adapted to receive two cans 11 to be washed and having vertically sliding doors 12 through which the cans may be introduced into the washing chamber. Stationary rails 13 are provided to support the cans in inverted position. The bottom 14 of the chamber slopes toward a reservoir 15 for washing fluid to permit repeated use of said fluid. A power-driven pump 16 has a suction pipe 17 communicating with the reservoir 15 and a delivery pipe 18 with branches 19 for supplying the washing fluid to delivery spouts 20 beneath the rails 13 and to vertical pipes 21 for supplying sprayer pipes 22. These sprayer pipes 22 have outlet openings for directing small streams against the exterior of the cans, the openings being arranged to give the desired distribution over substantially the entire periphery of the cans.

A valve 23 is duplicated for each can and has an upstanding stem 24 (Figs. 1 and 3) adapted to be actuated for controlling the supply of washing fluid through one of the branches 19. Suitable supports 25 are secured to the valve casings. Rinsing water under pressure is supplied through pipes 26 controlled by valves 27. These pipes 26 connect with riser pipes 28 and the riser pipes connect with the delivery nozzles 20 and sprayers 22. Steam for sterilizing the cans is supplied through pipes 29 under control of valves 30. The pipes 29 communicate with the stand pipes 28 through portions of the pipe 26, as clearly shown in Fig. 3. The valves 30 and 27, like the valve 23, are secured to the support 25 and are of the type having an internal spring to normally raise the valve stems and retain the valve in closed position. To open the valves the stems are depressed. The stems 31 and 32 of the valves 30 and 27 respectively project above said support. Rocker arms 33 are connected to the valve stems and are pivoted on rods 34 having bearings on the support 25. The rocker arms have rollers 35 on their inner ends to be engaged by cams on the shafts 36. Bearings 37 integral with the support 25 are provided for each shaft 36.

As shown in Fig. 8, cams 38, 39 and 40 are provided to actuate the valves 23, 27 and 30 respectively, a set of these cams being fixed on each shaft 36. A fourth cam 41 (Figs. 2 and 8) is secured to each shaft 36 to actuate a rocker arm 42 having an upwardly extending arm 43. A link 44 connects the arm 43 with a crank 45 on the lower end of a pivot shaft 46 extending up through the bottom 14 of the washing chamber. On its upper end the shaft 46 carries a closure 47 for the delivery end of an air pipe 48. There are two of these air pipes arranged to deliver a supply of drying air to the interior of the cans on the supports 13. At their lower ends the pipes 48 communicate with a transverse conduit 49 and a blower 50 has an air delivery pipe 51 having an outlet opening 52 into the conduit 49.

The shafts 36 are tubular and, extending axially through them is a power-driven shaft

53. Clutches 54, best shown in Figs. 6 and 7, are provided to severally connect the shafts 36 with the shaft 53 and the latter shaft is connected, through suitable speed reducing gears in a housing 55, to a parallel shaft 56. Another shaft 57 extends parallel to the shaft 56 and is connected thereto by suitable pulleys and a belt 58. To drive the shaft 57 an electric motor 59 is provided and this motor also directly drives the pump 16 for wash water and the blower 50 to supply drying air.

Each of the clutches 54 has a cylindrical element 60 which is fixed on the shaft 53 and an annular flange 61 projects longitudinally from said element and is formed with internal teeth 62. Another clutch element 63 is fixed on each of the tubular shafts 36 and has an annular hub projecting between the shaft 36 and flange 61. This element 63 carries a pivoted dog 64 and an arm 65 for actuating said dog from its dotted line to its full line position shown in Fig. 7. A lug 66 projects from the periphery of the element 63 to afford an abutment for the arm 65 and said lug and arm are formed with recesses to receive a coiled spring 67. The spring 67 is arranged to normally separate the arm 65 from the lug 66 and thereby extend the dog 64 into engagement with the teeth 62 on the element 60.

We provide mechanism for starting a cycle of operation upon closing of one of the doors 12 and for preventing the operation of the washing mechanism when said doors are open. This mechanism is connected to both of the clutches 54, adjacent to each of which is mounted a small arm 68 adapted to be moved into the path of the arm 65 on the clutch. The clutch arm 65 rotates in the direction indicated by an arrow in Fig. 7. Supporting brackets 69 for the arms 68 project upward from the supports 25 and rods 70 have their lower ends engaging the arms 68 in suitable elongated slots (Fig. 1). As shown in Fig. 2 the rods 70 extend up the back of the cabinet and are guided for vertical movement in brackets 71. A coiled spring 72 is confined on each rod 70 adjacent to one of the brackets 71 and is arranged to urge said rod downward and thereby normally retain the arm 68 in the path of the clutch arm 65. The doors 12 are normally raised to open position by counterweights 73 which are severally connected by suitable cables 74 to the doors, said cables passing over guide wheels on the top of the cabinet. Each cable and counter-weight is so arranged that when a door is closed a lug 75 at the top of the weight engages an end 86 on the rod 70 to raise the arm 68 out of the path of the arm 65.

Each door 12 has a latch for retaining it in closed position comprising a pivoted dog 77 (Figs. 4 and 5) adapted to engage a small clip 78 projecting inward from the door. Each dog 77 has a support 79 and is connected to a horizontal rod 80 having a downwardly bent end 81 adapted to be engaged by a projection 82 on the closure 47. A spring 83 normally retains the dog 77 in position to engage the clip 78. Projecting from the front of the cabinet beneath each door is a manually operable latch member 84 connected to the dog 77 and adapted to be thrust inward to release the door. Suitable handles 85 are provided for manual operation of the doors. Within each washing chamber 10 guide members 86 are secured to the rails 13 to insure proper placing of the cans 11 over the spout 20 and pipe 48. These guide members 86 also afford supports for the covers of the cans to be washed. The covers are placed in inclined position against the upright sprayer pipes 21 which are perforated to deliver streams of the washing fluid against the covers.

Operation

In use the motor 59 continuously drives the shaft 53, pump 16 and blower 50 and the several valves 23, 27 and 30 and closure 47, at the beginning of a cycle of operation, are in closed position. The doors 12 are normally retained in open position by the counter-weights 73. The cans to be cleansed are placed in inverted position on the rails 13 between the guides 86 and then the doors 12 are closed so that the latch dogs 77 engage the clips 78 and retain the doors in closed position. Movement of the doors 12 to closed position raises the lugs 75 into engagement with the rods 70 and raises said rods, together with the arms 68, out of the path of the clutch arms 65. The springs 67 are thus released, the arms 65 are moved away from the lugs 66 and the dogs 64 are turned to engage teeth 62. This operatively connects the clutch elements 60 and 63 so that the shafts 36 turn slowly together with the cams 38, 39, 40 and 41. A complete cycle of operation takes place during each complete revolution of the shaft 36. During this cycle the can or cans in the washing chambers are successively washed with suitable washing fluid, rinsed with hot water, sterilized by steam and dried. The cam 38 first comes into operation and raises an end of the rocker arm for actuating the valve 23. The stem of this valve is thus depressed and the valve is opened to admit a supply of washing fluid to the stand pipe 28. A spray of the fluid is delivered from the nozzle 20 and from the sprayer pipes 22 to thereby cleanse the interior and exterior of the cans. During this step of the operation the washing fluid is withdrawn from the reservoir 15 by the pump 16 and after the fluid has been applied to the cans it flows back into said reservoir. A suitable solvent for the substances removed from the cans is placed

in the fluid. After a suitable period of time the cam 38 allows the valve 23 to close, and thereby cut off the supply of washing fluid, and this is immediately followed by the opening of the valves 27 and 30 under the action of the cams 39 and 40. Hot rinse water is now delivered from each spout 20 and from the sprayer pipes 22 for a short period to remove the washing fluid. Upon further rotation of the shafts 36 the cams 39 permit closing of the valves 27 and the cams 40 remain in operative positions to supply live steam to the delivery opening within the washing chambers. This steam sterilizes the washed and rinsed cans 11 and then the cam 40 allows the valve 30 to close.

During a further part of the cycle, the cams 41 actuate the arms 42 and 43 for removing the closures 47 from the pipes 48 so that drafts of drying air are delivered to the interior of the cans. Each cam 41 has a projection 41*a* and these projections finally move into engagement with the rollers on the arms 42 to turn the vertical shafts 46 through a further angle. Thus movement of the projections 82 on the closures 47 actuates the downwardly bent ends 81 on the rods 80 to withdraw the teeth 77 from engagement with the doors. The doors now move to open position under the action of the counterweights 73 and the rod 70 is moved down by the spring 72 to advance the arms 68 into the path of the arms 65 on the clutches. Rotation of the clutch elements 63 continues while the projections 41*a* move out of operative relation to the arms 42 and until the clutch arms 65 are stopped. When the arms 65 strike the arms 68 the dogs 64 are turned to their dotted line position shown in Fig. 7, to thereby permit the shaft 53 to continue to rotate while the shafts 36 are held stationary. The cycle of operation is now completed and the cleansed cans 11 may be removed from the open doors.

Having described our invention what we claim as new and desire to protect by Letters Patent is:

1. A can washer comprising, a chamber adapted to enclose a can to be washed, a stationary support for a can within said chamber, pipes having outlet openings therein for supplying washing fluid, steam and air to a can on said support, valves for controlling said pipes, a low speed, power-driven shaft, a cam shaft, a clutch for operatively connecting said shafts, cams on said cam shaft for actuating said valves, manually actuated means for rendering said clutch operative and cam actuated means for rendering said clutch inoperative upon completion of a cycle of operation.

2. A can washer comprising a plurality of separate chambers each adapted to enclose a can to be washed, a support for a can within each of said chambers, a pipe for delivering a supply of washing fluid to a can in each of said chambers, a common tank for supplying washing fluid to said pipes, an air conduit for dry air communicating with each of said chambers and having upwardly directed outlets for supplying air to the interior of cans on said supports, valves for controlling the supplies of said fluid and air to said pipes and conduits, a motor, a pump actuated by said motor to forcibly deliver fluid from said tank to both of said chambers, a fan actuated by said motor to supply air to both of said conduits and means actuated by said motor to successively actuate said valves.

3. A can washing machine comprising a plurality of chambers each adapted to enclose a can to be washed, means for directing washing fluid, steam and air against the cans in said chambers, valves for severally controlling the supplies of said fluid, steam and air to each of said chambers, means, including a shaft, for actuating said valves for each chamber, a common power-driven shaft and clutches for severally connecting said power-driven shaft to said first mentioned shafts.

4. A can washer comprising, a chamber having a door opening, a stationary support for a can in inverted position within said chamber, pipes having outlet openings therein for supplying washing fluid and steam to the interior of a can on said support, valves for said pipes, a motor for actuating said valves, a closure for said door opening, a clutch to operatively connect said motor to said valves and means connecting said clutch to said closure for rendering the valves operative.

5. A can washer comprising, a chamber having a door opening, a stationary support for a can in inverted position within said chamber, pipes having outlet openings therein for supplying washing fluid, steam and air to the interior of a can on said support, one of said pipes being relatively large and having an upwardly directed opening to supply air to the interior of a can on said support, valves for severally controlling said pipes, power actuated means for successively actuating said valves in a predetermined cycle, a closure for said door opening and means for opening said closure upon completion of a cycle of operation.

In testimony whereof, we have hereunto signed our names to this specification.

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NELS J. HEDLUND.