Oct. 12, 1926. 1,602,667

O. H. HANSEN

CAN WASHER

Filed June 19, 1920 3 Sheets-Sheet 1

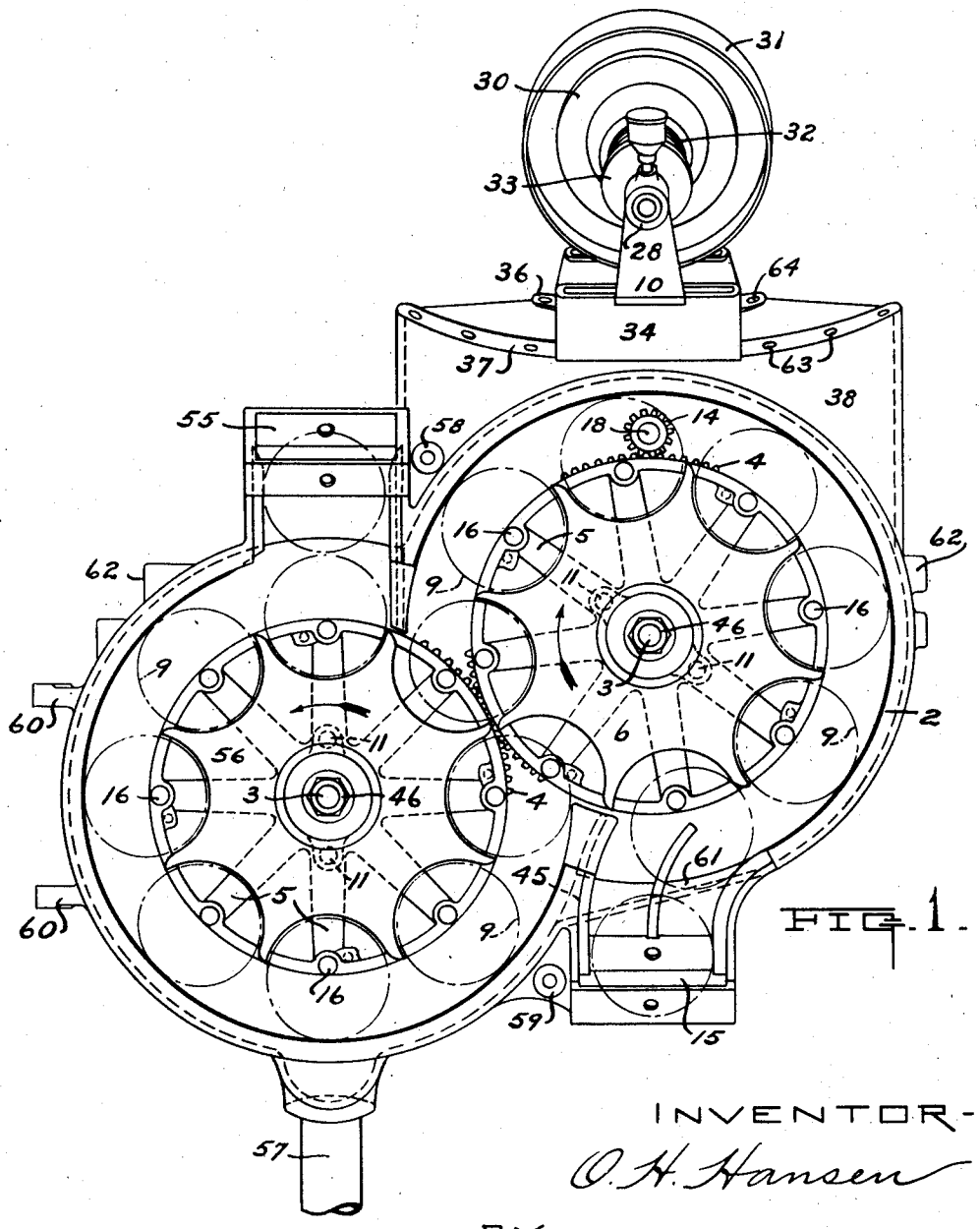


FIG. 1.

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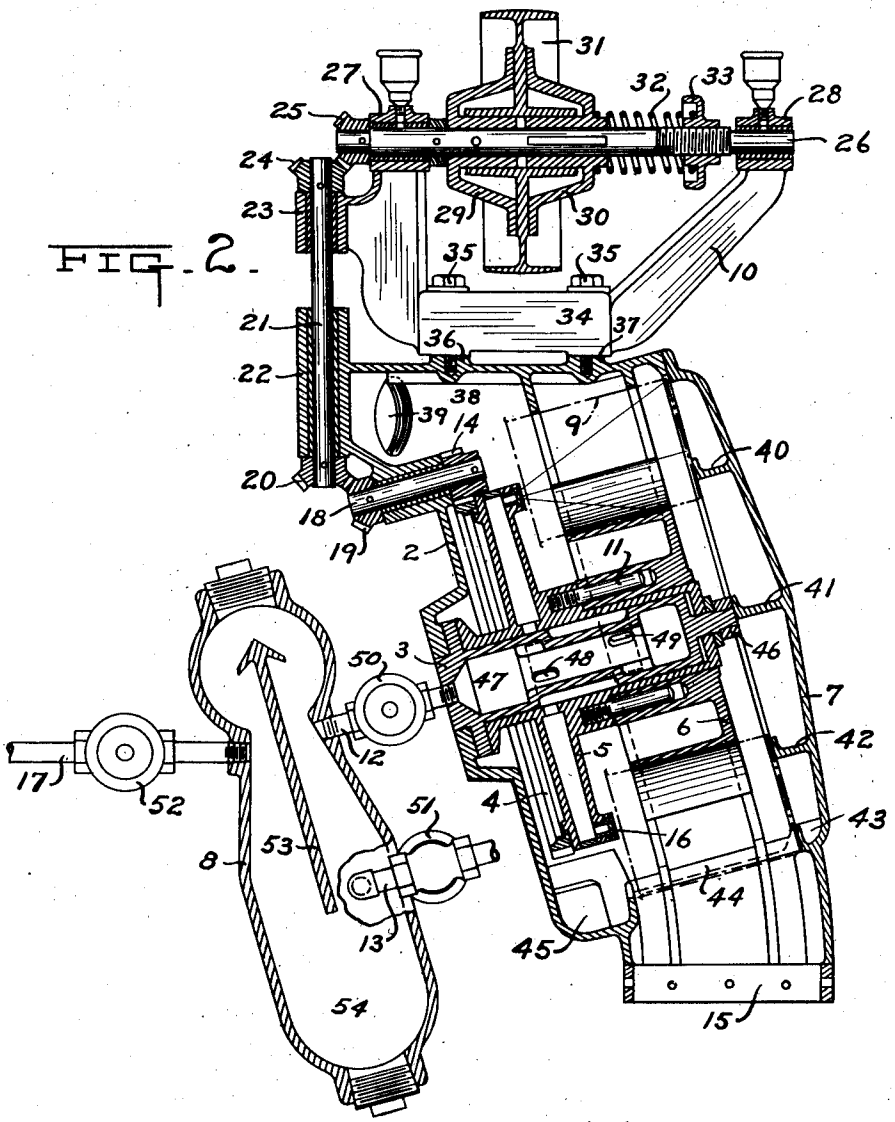
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CAN WASHER

Filed June 19, 1920 3 Sheets-Sheet 2

FIG. 2.



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CAN WASHER

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FIG. 3.

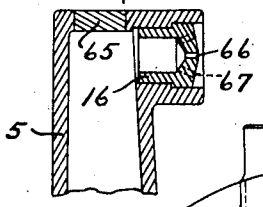


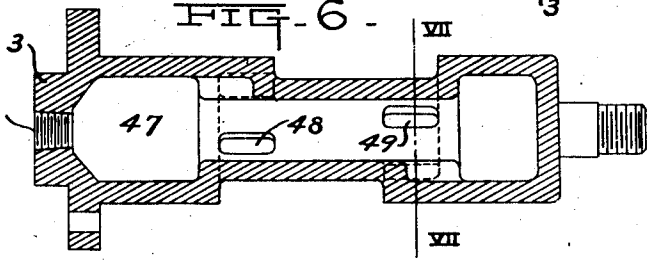
FIG. 4.



FIG. 5.

FIG. 7.

FIG. 6.



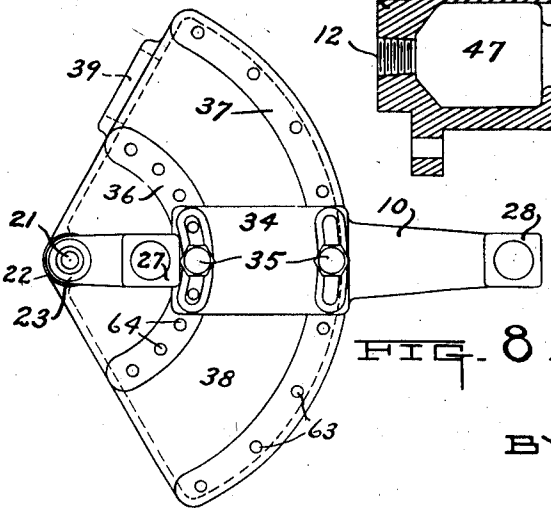


FIG. 8.

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Patented Oct. 12, 1926. 1,602,667

UNITED STATES PATENT OFFICE.

OSWALD H. HANSEN, OF PORT WASHINGTON, WISCONSIN, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO HANSEN CANNING MACHINERY CORPORATION, A CORPORATION OF WISCONSIN.

CAN WASHER.

Application filed June 19, 1920. Serial No. 390,148.

This invention relates in general to improvements in the art of cleansing receptacles, and relates specifically to an improved method of and apparatus for automatically washing and sterilizing the interiors of metal cans prior to filling thereof with edible substances.

An object of the invention is to provide a simple and efficient method of automatically washing and sterilizing the interiors of receptacles, in succession. Another object of the invention is to provide simple and efficient apparatus for automatically cleansing the interiors of successive receptacles while being advanced in series through the machine.

Some of the more important specific objects of the present invention are as follows:—

To provide a method of automatically and thoroughly washing the interiors of metal cans by introducing therein whirling sprays of fluent cleanser such as steam or hot water, and without the aid of a mechanical scrubber such as a brush.

To provide simple means for automatically producing and delivering whirling sprays of fluent cleanser against the interiors and into the corners of successive cans as they are advanced in series through a suitable chamber.

To provide for rotation of the cans on their own axes during washing thereby insuring cleansing of all parts of the cans.

To provide a can washer in which each can is subjected to the cleansing action of jets of wet and dry steam in succession, and in which the steam consumption is reduced to a minimum.

To provide a machine which delivers the cans in dry condition, and in which undesirable precipitation of excessive quantities of water through the can chutes and from the machine, is positively prevented.

To provide a steam washer in which the use of stuffing boxes and other elements requiring attention and adjustment, is avoided.

To provide a can washer operable and controllable in conjunction with any standard can filling machine and associable with line shafts and can chutes disposed at any angle.

To provide a can washer drive which will automatically start and stop the mechanism in accordance with like operations of the filling machine to which the washed cans are delivered.

To provide a mechanism which may be readily inspected, dismantled and assembled, without disturbing the can chutes leading to and from the washer.

To provide a can washer in which injury to the cans is avoided and in which the cans are held in suspension by the fluid jets while being gently guided from one compartment to another and delivered from the machine.

To provide other details of improved construction of can washers whereby the cost of manufacture and of operation is reduced to a minimum and the efficiency is increased to a maximum.

A clear conception of the novel method and of one embodiment of apparatus for exploiting the same, may be had by referring to the drawings accompanying and forming part of this specification in which like reference characters designate the same or similar parts in the various views.

Fig. 1 is an end elevation of a can washing machine looking in a direction perpendicular to the plane of the casing cover, the cover being removed from the machine.

Fig. 2 is a transverse vertical section through the can washer and steam separator, the section being taken through the discharge or drying chamber of the washer.

Fig. 3 is an enlarged central vertical section through a fragment of one of the steam feed spider arms and through the spray nozzle associated therewith.

Fig. 4 is an enlarged end view of one of the spray nozzles, looking toward the steam delivering orifices.

Fig. 5 is a plan view of the enclosing cover, showing the cover clamp and the can guides associated with the cover.

Fig. 6 is an enlarged central vertical section through one of the fluid distributing headers or valves.

Fig. 7 is an enlarged transverse vertical section through one of the distributing headers or valves, the cross-section being taken along the line VII—VII of Fig. 6.

Fig. 8 is a top view of the vapor exhaust chamber casing and of the adjustable drive shaft supporting bracket supported by the casing.

The specific form of the can washer disclosed in the drawings and embodying the present invention, comprises in general a main casing 2 forming a pair of contiguous chambers, a stationary steam header or feed valve 3 located centrally within each of the chambers, a steam distributing spider 5 rotatably supported upon each valve 3, a can transporting rotor 6, 56 adapted to be rotated by each spider 5, a hinged cover 7 for permitting access to the interiors of the chambers, a steam separator 8 having connections leading to each feed valve 3, and suitable driving mechanism for communicating rotary motion to the spiders 5 and the rotors 6, 56.

The initial washing chamber formed in the casing 2 is located with its axis somewhat below that of the final washing and drying chamber. The wall of the casing 2 adjacent to the peripheries of the two chambers, forms can guiding tracks which guide the cans 9 along a definite course of S shape. The initial washing chamber is provided at its upper extremity with a can inlet 55 to which the can supply chute may be connected in any suitable manner. The lower extremity of the initial washing chamber which is also the lowermost portion of the casing 2 is provided with a condensate exhaust pipe or drain 57. The final washing and drying chamber is provided at its lower extremity with a can discharge 15 to which the can discharge chute leading to the can filling machines, may be connected in any suitable manner. The upper extremity of the drying chamber which is also the uppermost portion of the casing 2, communicates with a vapor collecting chamber 38 having a vapor exhaust 39.

The two steam headers or feed valves 3 which are located centrally within the washing chambers, are of like construction as shown in detail in Figs. 6 and 7. These valves 3 are rigidly attached to the front wall of the casing 2 and have their axes inclined as shown in Fig. 2. Each of the valves 3 comprises a hollow body having an interior chamber 47, an annular peripheral outer recess, and four steam ports 48, 49 connecting the chamber 47 with the outer recess. The ports 48, 49 are of sufficient area to insure proper supply of steam to the spiders 5, and the valves 3 are so constructed that all pressures thereon are balanced. The valve 3 located within the initial washing chamber is so positioned that no steam is delivered to the adjacent spider arms while passing the can inlet 55.

The two steam distributing spiders 5 which are rotatably supported upon the inclined valves 3, are of like construction but are rotatable in opposite directions as indicated by arrows in Fig. 1. Each of the spiders 5 comprises a hub and a series of eight hollow arms radiating from the hub and communicable at predetermined intervals with the annular peripheral outer recesses of the valves 3. The outer end of each spider arm is closed by means of a plug 65 and is provided with a transverse opening extending parallel to the axis of rotation of the spider 5, see Fig. 3. Within each of these transverse openings is located a spray nozzle 16 having a central orifice 66 and a series of tangential or inclined orifices 67, see Figs. 3 and 4. The central orifices 66 of all of the nozzles 16 are substantially parallel to each other and to the axes of the valves 3, and are adapted to deliver jets of cleansing fluid approximately coaxially of the cans 9. The tangential orifices 67 of each nozzle 16 are inclined at different angles and are adapted to deliver tangential jets of cleansing fluid against different portions of the interiors of the adjacent cans 9 as shown by the light lines in Fig. 2. The spray nozzles 16 are secured to the spider arms in any suitable manner. The spiders 5 are held against endwise displacement upon the valves 3, by means of washers and nuts 46 coacting with threaded extensions on the valves 3.

The two can transporting rotors 6, 56 are mounted upon and secured to the hubs of the spiders 5 being drivingly associated with these hubs by means of pins 11 secured to the spider hubs and fitting openings in the rotors 6, 56. Each of the rotors 6, 56 comprises a central body portion and a series of eight can hooks radiating from the body portion. The can hooks are so spaced and positioned that the cans 9 engaged thereby will be located approximately in line with the adjacent nozzles 16 on the spiders 5.

The hinged cover 7 shown in detail in Figs. 2 and 5, coacts with a plane rear surface of the casing 2 and has lugs 71 which coact with and are pivotally connected to the lugs 60 on the casing 2. The cover 7 may be clamped in closed position by means of a transverse bar or clamp 68 having hooked ends adapted to engage bolts inserted in the bosses 58, 59 of the casing 2. This clamp 68 is pivotally connected at its medial portion, to the cover 7. The cover 7 may be opened without interfering with the can chutes which are associated with the inlet 55 and the discharge 15 of the casing 2. The interior of the cover 7 is provided with a can guide 69 located in close proximity to the rear surface of the can transporting rotor 56 and adapted to engage the ends of the cans 9 and to gently transfer the successive cans from the rotor 56 to the rotor 6. A second can guide 70 which is also attached to the cover 7, is located in close proximity to the rear surface of the can transporting rotor 6 and is adapted to engage the ends of the successive cans 9 and to deliver the

cans from the rotor 6 down the can discharge 15.

The cover 7 and casing 2 are provided with suitable troughs and gutters for collecting the water of condensation and for delivering this water to the drain 57. The water of condensation collecting on the inner wall of the cover 7 is collected by the gutters or troughs 40, 41, 42, 43 and is drained into the initial washing chamber of the casing 2, being thereby prevented from flowing down the can discharge 15. Water of condensation which accumulates in the bottom of the final washing and drying chamber, is collected in the gutters 44, 61 and is delivered through an opening 45 into the lower portion of the initial washing chamber, being thereby prevented from flowing down the can discharge 15. It will be noted that due to the inclination of the washing chambers and of the cans 9, any water delivered from the cans 9 in the drying chamber will be precipitated into the gutter 61 which is below the can openings.

The steam separator 8 which is shown in Fig. 2, comprises a casing forming a chamber the upper portion of which is divided by means of a wall 53. The live steam is admitted through a pipe 17 and valve 52 to the space at the left of the wall 53. Upon striking the wall 53, the moisture contained in the admitted steam is deflected downwardly toward the basin 54, while the dry steam passes upwardly and over the hood at the top of the wall 53. The portion of the steam which flows around the bottom of the wall 53 collects moisture from the basin 54 and is delivered from the separator 8 through the pipe 13 and valve 51, to the valve 3 of the initial washing chamber of the casing 2. The dry steam passing over the wall 53 is delivered from the separator 8 through the pipe 12 and valve 50, to the valve 3 of the drying chamber of the casing 2. It will be obvious that if insufficient moisture is contained in the steam admitted through the pipe 17, moisture may be added to the steam admitted to the initial washing chamber at the elbow in the pipe 13. The valves 50, 51, 52 permit regulation of the amounts of steam admitted to the several chambers and are also adapted to completely cut off the steam supply.

The driving mechanism for imparting rotary motion to the spiders 5 and the rotors 6, 56 comprises a pulley 31 adapted to be belted to any suitable line shaft, preferably that which drives the can filling machines. The pulley 31 has a central web frictionally engaged on one side by a clutch element 29 rigidly attached to the main drive shaft 26, and frictionally engaged on the other side by a similar clutch element 30 slidably associated with the main shaft 26. The element 30 is splined upon the shaft 26 and is urged toward the web of the pulley 31 by means of a compression spring 32 which reacts against an adjustable collar 33 having screw thread coaction with the main shaft 26. The main shaft 26 is mounted in bearings 27, 28 formed on the swingably adjustable bracket 10, see Figs. 1, 2 and 8. The forward end of the shaft 26 is provided with a bevel gear 25 which meshes with a bevel gear 24 secured to the upper end of the vertical driving and pivot shaft 21. The shaft 21 engages an upper bearing 23 formed integral with the bracket 10, and a lower bearing 22 formed integral with the main casing 2. The lower end of the shaft 21 is provided with a bevel gear 20 which meshes with a bevel gear 19 secured to one end of the counter shaft 18. The counter shaft 18 is supported in a bearing formed integral with the main casing 2 and has a pinion 14 secured to its end within the vapor chamber 38. The pinion 14 meshes with a spur gear 4 secured to the spider 5 within the drying chamber. This spur gear 4 meshes with a similar spur gear secured to the spider 5 located within the initial washing chamber, thereby completing the drive from the pulley 31 to the spiders 5.

The bracket 10 is provided with a base 34 which rests upon inner and outer quadrants or segments 36, 37 respectively, formed integral with the casing 2. The segments 36, 37 are provided with equally spaced threaded openings 64, 63 adapted to receive clamping cap screws 35 which coact with the base 34 and extend through openings in the base. These openings 64, 63 and the elongated openings in the base 34, provide for location of the bracket 10 at various positions around the vertical shaft 21, thereby facilitating driving of the mechanism from various directions.

The washer may be supported from the factory by means of rods or brackets, not shown which may be connected to lugs 62 formed integral with the casing 2. The structure is provided with suitable grease cups for lubrication.

During the normal operation of the washer, power is applied to the pulley 31, thereby producing rotation of the spiders 5 and of the transporting elements 56, 6 in the directions indicated by the arrows in Fig. 1. The cans 9 are delivered by gravity in succession through the can inlet 55, to the upper portion of the rotor 56. The can hooks of the rotor 56 engage and gently slide the successive cans 9 along the peripheral wall of the initial washing chamber. As the cans 9 are advanced around this chamber, moist steam is delivered from the steam separator 8 through the pipe 13 and valve 51 to the lower valve 3. The initial chamber valve 3 delivers the moist steam to the arms of the adjacent spider 5 from which the steam is

delivered through the nozzles 16 to the interiors of the advancing cans 9. As the jets of moist steam discharged from the inclined nozzle orifices 67 strike the interior surfaces of the cans 9 at an angle, and due to the free suspension of the cans, the cans 9 are caused to rotate about their own axes, thereby effecting uniform cleansing.

Upon reaching a point substantially horizontally of the axis of the second transporting rotor 6, the cans 9 are engaged and automatically lifted away from the can hooks of the rotor 56, by the can guide 69 associated with the cover 7. During this lifting of the cans 9 away from the rotor 56, the can hooks of the rotor 6 advance and gradually engage the cans. The can hooks of the rotor 6 then slide the successive cans 9 along the peripheral wall of the final washing and drying chamber. As the cans 9 are advanced around this chamber dry steam is delivered from the steam separator 8 through the pipe 12 and valve 50 to the upper valve 3. The drying chamber valve 3 delivers the dry steam to the arms of the adjacent spider 5 from which the steam is delivered through the nozzles 16 to the interiors of the advancing cans 9. As the jets of dry steam discharge from the inclined nozzle orifices 67 strike the interior surfaces of the cans 9 at an angle, and due to the free suspension of the cans, the cans 9 are caused to rotate about their own axes, thereby thoroughly cleansing and finally drying them. The finally cleansed and dried cans 9 are engaged by the can guide 70 associated with the cover 7 and are delivered from the washer through the can discharge 15.

It will thus be noted that the successive cans 9 passing through the machine are first subjected to the washing action of the moist steam in the initial washing chamber, and are subsequently finally cleansed and dried in the drying chamber. Thorough cleansing of all portions of the cans 9 is insured by the automatic rotation of the cans about their own axes due to the injection of whirling jets or sprays of cleansing fluid. Each of the cans 9 is given like treatment and no steam is delivered to the machine without being utilized to cleanse the cans.

The troughs and gutters formed on the cover 7 and casing 2 effectively convey all water of condensation from the washing chambers to the drain pipe 57. The inclined disposition of the washing chambers also insures rapid drainage of the cans, thereby positively preventing precipitation of excessive quantities of water from the machine. The elements are so constructed and assembled that escape of live steam is prevented, and the use of stuffing boxes is avoided. The adjustability of the bracket 10 supporting the driving pulley 31, permits operation of the mechanism from line shafts disposed at various angles, and the friction drive associated with the pulley 31 prevents breakage of parts in case an imperfect can 9 or other obstruction enters the machine. The cover 7 permits ready inspection of the interior of the washer, and also permits dismantling and assembly of the inner washer structure without disturbing the can chutes leading to and from the washer. The rotors 6, 56 and the guides 69, 70 gently transport and guide the cans 9 through the washer without injuring them. The rotation of the cans 9 about their own axes also aids in preventing jamming of the cans and consequent damage thereof.

It should be understood that it is not desired to limit the invention to the exact steps of the process and to the exact details of construction herein shown and described, for various modifications within the scope of the appended claims may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:—

1. In a can washer, means forming a pair of contiguous chambers, means for advancing cans in succession and in opposite directions about the axes of said chambers, means for delivering the cans into the upper portion of one of said chambers, and means for delivering said cans from a lower portion of the other of said chambers.

2. In a can washer, means forming a pair of contiguous chambers, means for advancing cans in succession and in opposite directions about the axes of said chambers, means for delivering the cans into the upper portion of one of said chambers, means for positively transferring the cans from one of said chambers to the other, and means for delivering said cans from a lower portion of the other of said chambers.

3. In a can washer, a casing forming a pair of contiguous substantially cylindrical chambers having inclined axes, a rotor for advancing cans in succession about the axis of one of said chambers, a stationary guide for positively transferring said cans from one of said chambers to the other, and a rotor for advancing said cans in succession about the axis of said other chamber.

4. In a can washer, means forming a pair of contiguous chambers, a can inlet chute communicating with one of said chambers, a can discharge chute communicating with the other of said chambers, and a single cover for permitting access to all portions of said chambers without disturbing said chutes.

5. In a can washer, a casing forming a pair of contiguous chambers, means associated with the lowest portion of said casing for removing water from said chambers, a single cover for permitting access to both of said chambers, means on said cover for

collecting water, and means for conveying water collected by said means toward said water removing means.

6. In a can washer, means forming a pair of contiguous chambers having parallel inclined axes, a stationary valve member located coaxial with each of said chambers, a spider rotatably associated with each of said valve members, and a can transporting rotor secured to each of said spiders.

7. In a can washer, a casing forming a washing chamber, a fluid admission valve supported at one end only and projecting into said chamber, a fluid distributing spider rotatably supported by said valve and removable axially from the free end thereof, driving means associated with the supported end of said valve, and a cover adjacent to the opposite end of said valve for effecting access to said chamber for removal of said rotor and said spider.

8. In a can washer, a pair of can washing chambers, a steam separator formed to separate the moist from the dry steam admitted thereto, means for admitting steam to said separator, means for delivering the moist steam from said separator to one of said washing chambers, and means for delivering the dry steam from said separator to the other of said chambers.

9. In a can washer, a pair of can washing chambers, a steam separator formed to separate the moist from the dry steam admitted thereto, means for admitting steam to said separator, means for delivering moist steam only from said separator to one of said chambers, means for delivering dry steam only from said separator to the other of said chambers, and means for transporting cans successively through said chambers.

10. In a can washer, a stationary support having transverse axially staggered ports communicating with a single fluid supply chamber formed within said support, and a fluid distributing spider rotatable about said support, said spider having hollow distributing arms formed to intermittently receive fluid from said chamber through some of said ports only, and a portion of said spider being spaced from said support to form a counterbalancing chamber adapted to receive fluid from said supply chamber through other of said ports.

11. In a can washer, means for simultaneously rotating a plurality of cans about parallel axes which are inclined upwardly and for subjecting said cans to the washing action of moist cleansing medium, and means for subsequently subjecting the rotating inclined cans to the drying action of relatively dry cleansing medium.

12. In a can washer, means for simultaneously rotating an annular series of cans about parallel upwardly inclined axes and for revolving said series about a common central axis while subjecting said cans to the washing action of jets of moist steam delivered against the interior of said cans, and means for subsequently subjecting the rotating inclined cans to the drying action of jets of relatively dry steam.

13. In a can washer, a casing forming a chamber having an inclined axis, means for supporting cans on their sides and for transporting said cans through said casing, a stationary valve member located coaxially within said chamber, and a spider for delivering cleansing fluid to said cans, said spider being rotatably associated with said valve member and being freely endwise removable therefrom, and said can supporting and transporting means being drivingly connected to said spider.

14. In a can washer, means forming a pair of contiguous chambers having parallel inclined axes, means for supporting cans on their sides with their axes parallel to said chamber axes and for transporting said cans through said chambers, a stationary valve member projecting coaxially within each of said chambers, a fluid distributing spider rotatably associated with each of said valve members and with cans carried by said supporting means, and means for simultaneously rotating said supporting means and said spider.

15. In a can washer, means forming a pair of contiguous substantially circular chambers having parallel inclined axes, means for supporting a series of cans on their sides with their axes parallel to said chamber axes and for transporting said cans through said chambers, a stationary annular fluid distributing valve projecting centrally into each of said chambers, and a fluid distributing spider rotatably supported upon each of said valve members and adapted to deliver fluid into cans being transported by said supporting means.

16. In a can washer, a casing forming a circular chamber having an inclined axis, means for supporting a series of cans on their sides with their axes parallel to the axis of said casing and for transporting said cans through said chamber, and means movable simultaneously with said supporting means for delivering cleansing fluid into the interiors of successive cans of said series.

17. In a can washer, a casing forming a washing chamber, can transporting means for urging cans in succession through said chamber, a rotary transmission shaft drivingly associated with said transporting means and supported in fixed bearings secured to said casing, a rotary driving shaft extending radially relative to said transmission shaft and supported in bearings movably associated with said casing, bevel

gearing for transmitting rotary motion from said driving shaft to said transmission shaft, and means for effecting adjustment of said driving shaft and its bearings about the axis of said transmission shaft as a pivot.

18. In a can washer, a casing forming a washing chamber, a rotor for urging cans in succession through said chamber, a rotary transmission shaft supported in bearings fixedly associated with said casing, gearing connecting said shaft and said rotor, a rotary driving shaft extending radially relative to said transmission shaft and supported in bearings slidably associated with said casing, bevel gearing for transmitting rotary motion from said driving shaft to said transmission shaft, and means for effecting simultaneous adjustment of said driving shaft and its bearings about the axis of said transmission shaft as a pivot.

19. In a can washer, means forming a pair of contiguous chambers having parallel central axes, means for admitting cans to one of said chambers above the axis thereof, means for advancing the cans through said chamber and around the said axis in one direction, means for subsequently advancing the cans through the other of said chambers and around the axis thereof in the opposite direction, and means for discharging the cans from said other chamber below the axis thereof.

20. In a can washer, means forming a pair of contiguous chambers having central axes located at different elevations, means for admitting cans to the chamber having the lower axis at a point above said axis, means for advancing the cans through said chamber and around said lower axis in one direction, means for subsequently advancing the cans through the other of said chambers and around the upper of said axes in the opposite direction, and means for discharging the cans from said other chamber below said upper axis.

21. In a can washer, means forming a pair of contiguous annular chambers, means for admitting cans downwardly into one of said chambers, means for advancing the cans orbitally through said chamber in one direction and for discharging the cans upwardly into the other of said chambers, means for subsequently advancing the cans orbitally through said other chamber in the opposite direction, and means for discharging the cans downwardly from said other chamber.

22. In a can washer, means forming a pair of contiguous chambers, means for advancing cans in succession through said chambers, means cooperable with said advancing means to transfer the successive cans from one of said chambers to the other, and means for simultaneously subjecting the interiors of the successive cans to the action of independent jets of moist cleansing medium and of relatively dry steam while being transferred from chamber to chamber.

23. The method of washing cans which comprises, advancing cans in succession through adjoining orbits, subjecting the interiors of the cans to the washing action of jets of moist cleansing medium while traveling through one orbit, subsequently subjecting the interiors of the cans to the action of independent jets of moist cleansing medium and of relatively dry steam while passing from one orbit to the other, and finally subjecting the interiors of the cans to the action of jets of relatively dry steam while traveling through the other orbit.

In testimony whereof, the signature of the inventor is affixed hereto.

OSWALD H. HANSEN.