July 3, 1951 W. S. CAMPBELL 2,558,818

ROTARY CAN WASHER

Filed Aug. 19, 1940 2 Sheets-Sheet 1

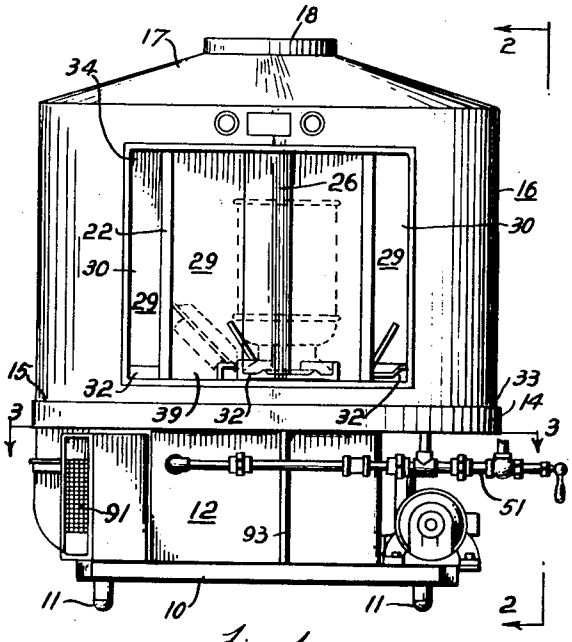


Fig. 1.

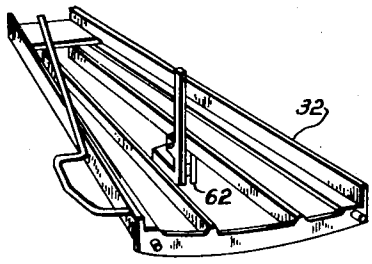


Fig. 4.

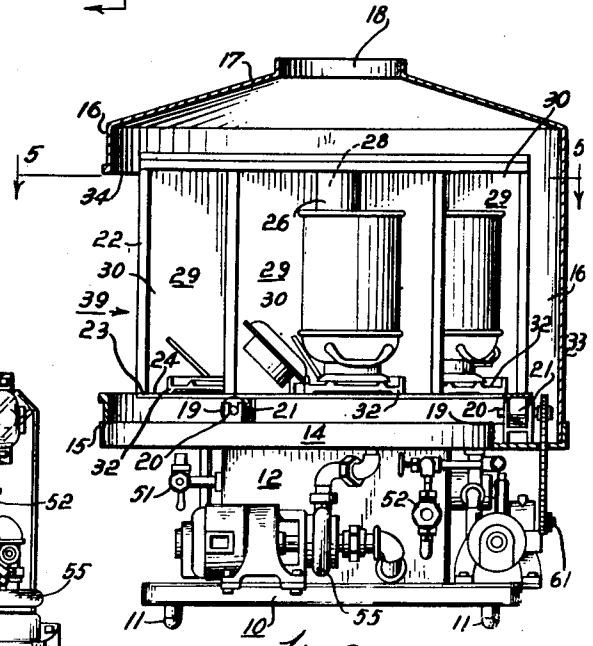


Fig. 2.

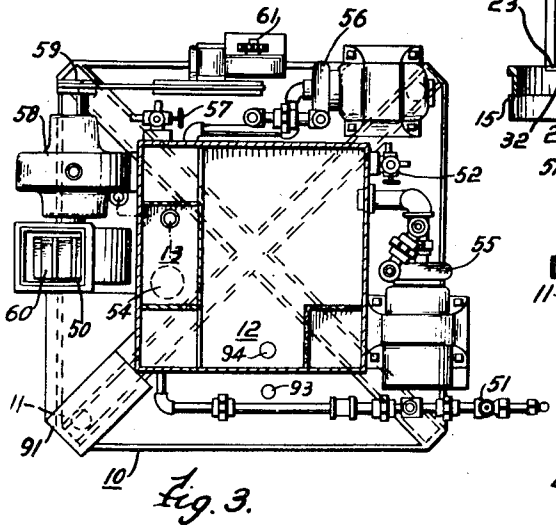


Fig. 3.

Inventor
Willard S. Campbell
by James R. McKnight
Attorney

July 3, 1951 W. S. CAMPBELL 2,558,818

ROTARY CAN WASHER

Filed Aug. 19, 1940 2 Sheets-Sheet 2

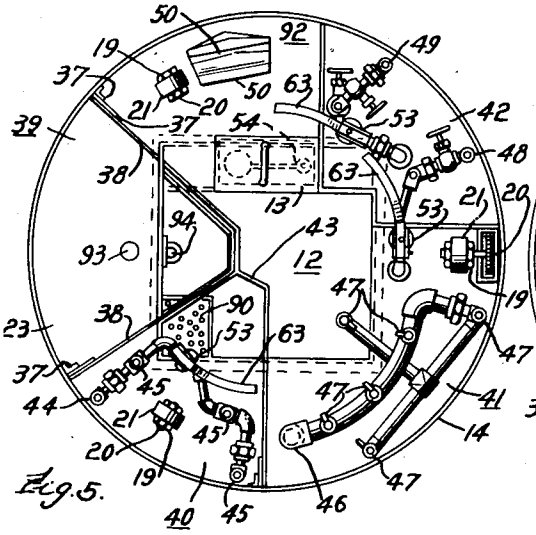


Fig. 5.

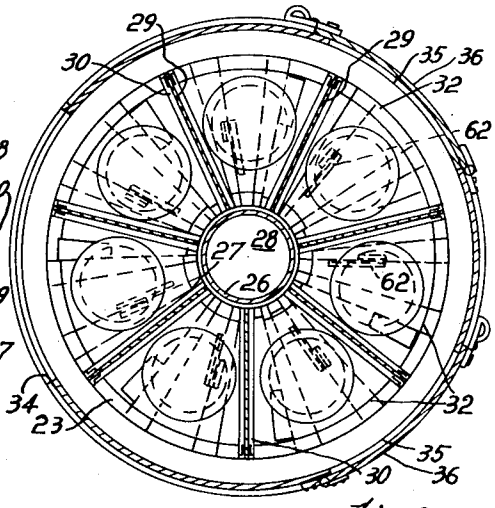


Fig. 6.

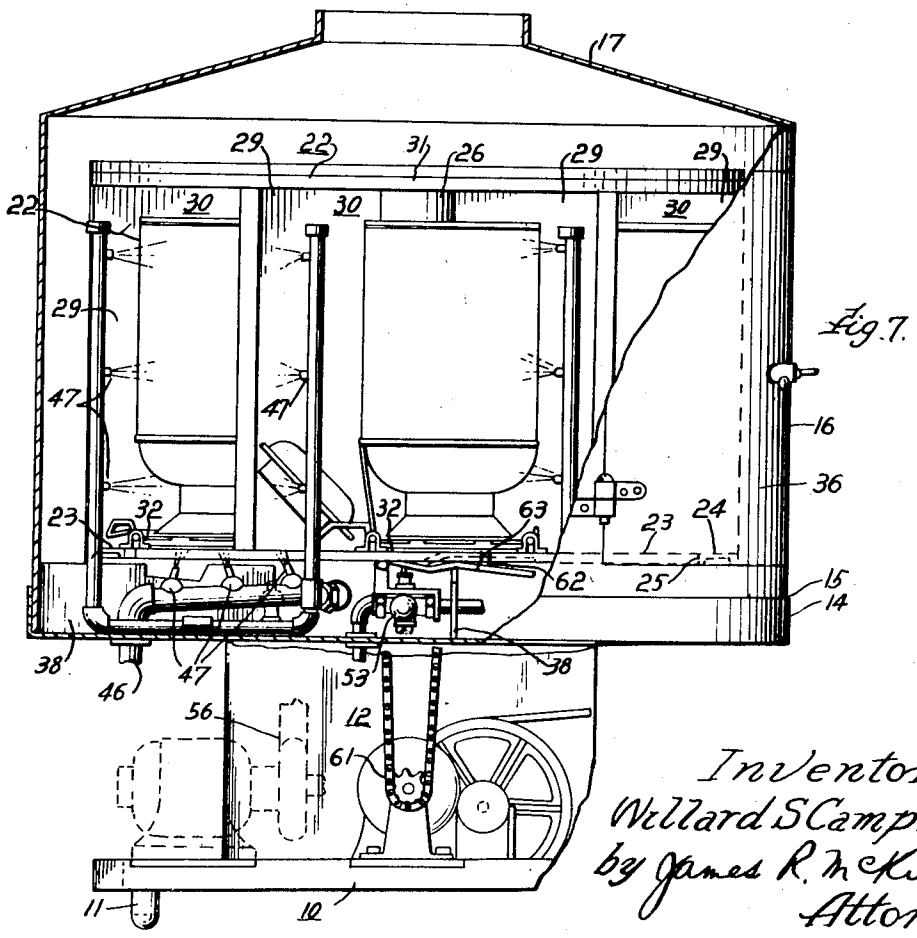


Fig. 7.

Inventor
Willard S Campbell
by James R. McKnight
Attorney

Patented July 3, 1951

2,558,818

UNITED STATES PATENT OFFICE

2,558,818

ROTARY CAN WASHER

Willard S. Campbell, Hampshire, Ill., assignor, by mesne assignments, to Cherry-Burrell Corporation, Chicago, Ill., a corporation of Delaware

Application August 19, 1940, Serial No. 353,240

7 Claims. (Cl. 134—53)

1

This invention relates to an apparatus for washing, sterilizing and drying containers and covers, including milk cans, in a continuous operation.

The objects of this invention are to provide a rotary can washer which washes, sterilizes and dries in an uninterrupted, continuous operation without the loud and jarring stops and starts of the intermittent apparatuses of the prior art; to supply a construction in which the parts are arranged without the use of additional space adjacent the positions and parts they serve, said parts all being more readily accessible for attention as well as more efficiency and economically serving their particular functions; to create a construction in which intersplashing between divisions or stages of the operation cycle is eliminated, thereby preventing mixing of solutions and temperatures and insuring maximum results; to provide a can controlled and operated valve construction, thereby saving water and heat; to provide a steam turbine which not only operates the rotary drive, but also provides steam for heating the sterile rinse, and such other objects, advantages and capabilities as will later more fully appear and which are inherently possessed by this invention.

While the accompanying drawings illustrate a preferred form of the invention, yet it should be understood that the same is susceptible of modification and change without departing from the spirit of the invention.

Referring to the drawings, Fig. 1 is a front elevational view of a rotary can washer; Fig. 2 is an elevational view drawn on line 2—2 of Fig. 1 with the upper part in sectional view to illustrate the spider; Fig. 3 is a top plan view of the frame illustrating the position of the pumps and motors; Fig. 4 is a detail perspective view of an improved grid for supporting containers; Fig. 5 is a plan view of the collecting pan and associated devices illustrating the details of construction; Fig. 6 is a sectional plan view of the spider; Fig. 7 is an enlarged partial sectional view of the device in operation.

The embodiment selected to illustrate the invention comprises a frame 10 of structural steel or other suitable material supported on a plurality of spaced ball feet 11. A large substantially rectangular tank 12 is supported on the frame 10. Within tank 12 is built a smaller tank 13. A substantially circular pan 14 is attached to the upper portion of the large tank 12 and overhangs the outer wall theretof. The pan 14 slopes slightly downwardly from its outer edges

2

to the large tank 12 so as to permit drainage of liquid from pan 14 into tank 12. Extending upwardly from the outer edges of pan 14 are abbreviated side walls 15. A housing 16 is removably supported on pan 14 with the lower part of the side walls 33 of the housing 16 resting within side walls 15. A conical hood 17 is welded or otherwise attached to the upper portion of the housing 16. An opening 18 is provided in the top portion of the hood 17 for the accommodation if desired of an exhaust draft system for the removal of vapors and steam from within the housing 16.

Mounted on the pan 14 inwardly from walls 15 and at spaced intervals are three cradles 19, within each of which a shaft 20 rotatably supports a wheel 21. One of the shafts 20 and its associated wheel 21 are driven as hereinafter set forth. The other two shafts 20 and associated wheels 21 are idlers.

A spider or can carrying construction 22 rotates on said wheels 21. The spider 22 has at its bottom a substantially circular track or channel 23 formed of a structural channel with a substantially flat body portion or web 24 between downwardly extending flanges 25. The web 24 rides on the wheels 21 which are faced to fit the internal profile of the channel 23. The flanges 25 prevent accidental lateral disengagement. The spider 22 has a substantially centrally located and circular core 26 with a rolled structural angle frame or reinforcing ring 27 at the top and bottom. The core 26 forms a hollow central space 28.

Extending radially outwardly from the core 26 is a plurality of partitions 29 dividing the spider 22 into sections or compartments or chambers 30. The partitions 29 are attached at their inner edges to the core 26 and at their outer lower edges to the top of the track 23 and at their outer upper edges to an upper member 31. The partitions may be fixed in position as by welding, or they may be removably secured in position by suitable slot and pin means at the top and bottom points of the elements 29 where they engage the supporting and spacing elements 23, 26 and 31.

In each compartment 30 a removable grid 32 is provided, having portions to support a milk can and cover in inverted position.

An entrance and exit opening 34 is provided in side walls 33 of housing 16. Spaced from opening 34 and from each other are two openings 35 with removable or hinged access doors 36.

Within the pan 14, and below the spider 22, the space is divided by partitions 37 and vertical splash guards 38 into the following five divisions

or positions: First, the feed and discharge position 39; second, the pre-rinse position 40; third, the wash position 41; fourth, the sterile rinse and steam position 42; and fifth, the air drying position 92. A splash guard 43 is provided at the inner edges of positions 39 and 40 and extending upwardly from an inward extension of the pan 14 which overlaps the part of the tank 12 underneath the stations 39 and 40, as illustrated in Figure 5 of the drawings. The partitions 37 and splash guards 38 are provided to prevent intersplashing and mixing of waters between positions, to insure a perfect cleansing of cans and covers, and to conserve heat and water.

In the feed position 39 a milk can and cover are positioned on a grid 32.

Within the cold water rinse or pre-rinse position 40 and extending through and above the pan 14 is a header 44 and nozzles 45 for internally and externally rinsing and spraying the can and cover with cold water.

The flow of water is can controlled as follows. Pivotally attached to each grid 32 is a lever or dog 62 weighted to normally be in upright position as shown in Fig. 4. It is adapted upon receipt of the weight of a milk can or the like thereon to move to horizontal position. When in horizontal position and upon rotation of the spider 22 lever 62 is adapted to contact a second lever 63 attached to the whistle valve 53 to thereby open the valve. Upon removal of the can the counterweighted dog 62 moves to normal upright position and a spring attached to the valve lever 63 moves the lever off the valve so that the valve is closed and the water passing therethrough is stopped, thereby resulting in substantial and automatic saving of water. A similar closing of the valve results upon the disengagement of lever 62 and 63 during the rotation of the spider 22.

Within the wash position 41 and extending through and above the pan 14 is a header 46 with a plurality of nozzles 47 adapted to provide a continuous flow of water impregnated with a suitable cleansing agent. The used liquid collects in the pan 14 and drains into the large tank 12 from whence it is drained through strainer 90 which communicates with the pump 55 for purposes of recirculation by pump means 55 into conduits in feeding connection with header 46 and nozzles 47. Excess accumulation of wash water in tank 12 drains therefrom into the drain or overflow 94 which is so adjusted as to maintain a desired level of fluid in tank 12.

Within the sterile rinse position 42, a sterile rinse header 48 extends upwardly through pan 14 for the spraying of water within the can and cover at an extremely high temperature. Used hot water collects in pan 14 and drains into large tank 12 to replenish and freshen the supply therein. Beyond the sterile rinse header 48 is a steam header 49. The flow of hot water and the flow of the steam in the sterile rinse position 42 is can controlled in the same manner that the flow of cold water is can controlled in the cold water rinse position 40. In the fifth or air drying posiiton 92 there is provided an air duct 50 within pan 14 for continuously supplying either hot or cold air to dry the inside surface of a can and cover as they pass by on the moving spider 22.

As the washed, sterilized and dry can and cover move to the entry and exit position 39 the

can and cover are removed and another can and cover to be cleaned are placed on grid 32.

The large tank 12 acts as a reservoir for solution to be used at the wash position. The smaller tank 13 is used for the purpose of providing make-up water for the sterile rinse position.

Water is supplied to the large tank 12 by a water inlet pipe 51. This water is heated and maintained at a given temperature by a thermostatically controlled steam supply member 52.

In the small tank 13 the water supply is controlled by a float valve 54 whereby a constant lever of water is maintained in tank 13.

Hot air may be provided through the air duct 50. When hot air is provided radiator 91, positioned in the inlet to the fan 60, is heated in a conventional manner by steam supplied from a suitable source of supply (connections not shown) with provisions for draining the condensate (connections not shown) into tank 13.

On the frame 10 is positioned a pump 55. Pump 55 is positioned directly under the wash position 41 and is provided for the recirculation of the wash water. The thermostatically controlled supply member 52 is positioned adjacent to said pump 55 and under wash position 41.

Pump 56 and a thermostatically controlled steam supply member 57 for securing and maintaining a high temperature in the sterile rinse water are positioned on the frame 10 below the sterile rinse position 42.

Also on the frame 10 below the sterile rinse position 42 there is provided a steam turbine 58 having an extended shaft 59. One end of the shaft 59 drives the fan 60 for providing drying air to the air duct 50. The other end of the shaft 59 drives the adjacent transmission 61 which in turn drives one of the wheels 21 to rotate the spider 22. The steam turbine 58 also provides exhaust steam, the condensate from which, through suitable piping (not shown), drains into the small tank 13 to aid in heating the sterile rinse solution and uncondensated steam passes by suitable piping (not shown) to sterile rinse make-up tank 13.

The duct 50 is also supported on the frame 10 and positioned directly below the drying station 92.

It will be noted that the spider 22 moves continuously during the various stages of the operation cycle. The movement of the spider 22 is timed and the circumferential extent of the several operation positions is such that a container being processed is within the cold water rinse position 40 for approximately seven seconds, the wash position 41 for approximately fourteen seconds, the sterile rinse and steam position 42 approximately seven seconds for sterile rinse, and approximately five seconds for steam treatment and in the drying position 92, for ten seconds for hot or cold air treatment. Feed and removal of cans and covers in position 39 may easily be made during movement of the spider. The above periods of time are merely illustrative and may be increased or decreased according to the size of the positions, the treatments to be given, and other factors. The important feature is the continuous, quiet movement during the operations of the complete cycle.

Safety as a feature of this invention is secured by providing that the area of the rollers 21, particularly the driving roller, in contact with track 23 combined with a desired co-efficient of friction as exists between cast iron and steel is such that any additional force or load

in excess of that required for the normal operation of the improved washer will immediately stop the rotation of the otherwise continuously moving spider 22. This safety feature is permissible for the reason that there is no timing for interrupted intermittent movement.

Having thus described my invention, I claim:

1. In a rotary can washer, a tank for wash water, a housing in which to wash a can, said housing being superimposed and supported upon said tank and laterally overhanging a portion of said tank, a plurality of stationary partition means dividing the lower portion of the interior of said housing into a feed and discharge division, a pre-rinse division, a wash division, a sterile rinse and steam division and a drying division, means for supplying cold water into the housing above the pre-rinse division, means for supplying water with a cleansing agent from said tank for wash water into the housing above the wash division, means for supplying hot water and steam into the housing above the sterile rinse and steam division, and means for providing drying air into the housing above the drying division, a spider within said housing and adapted to removably support a plurality of containers and covers, and means for continuously rotating said spider so that said containers and covers may be continuously treated while moving continuously over said divisions.

2. A rotary can washer according to claim 1, wherein the partition means are so constructed and arranged as to prevent the cold water in the pre-rinse division and the water and cleansing agent in the wash division from freely passing from such respective divisions into other divisions.

3. In a rotary can washer a tank for wash water, a housing in which to wash a can, said housing being superimposed and supported upon said tank and laterally overhanging a portion of said tank, a plurality of stationary partition means dividing the lower portion of the interior of said housing into a feed and discharge division, a pre-rinse division, a wash division, a sterile rinse division and a drying division, means for supplying cold water into the housing above the pre-rinse division, means for supplying water with a cleansing agent from said tank for wash water into the housing above the wash division, means for supplying hot water and steam into the housing above the sterile rinse and steam division and means for providing drying air into the housing above the drying division, a spider within said housing and adapted to removably support a plurality of containers and covers, and means for continuously rotating said spider so that said containers and covers may be continuously treated while moving continuously over said divisions, said means for supplying cold water into the housing above the pre-rinse division including a header, a whistle valve attached to and adapted to control the flow of liquid through said header and means operable by a container carried on said spider for actuating said whistle valve as the container is carried over the valve by said spider.

4. A rotary can washer comprising a frame, a substantially rectangular tank mounted on said frame, a substantially circular pan attached to and overlapping said tank about a portion of the outer periphery of said tank, said pan having downwardly and inwardly sloping portions and abbreviated side walls at its outer edge, a housing supported on said pan with the lower extremity of its side walls positioned within the abbreviated side walls of said pan, a conical hood attached to the upper portion of said housing, a plurality of spaced wheels rotatably mounted on said pan, a spider having a track positioned so that said track contacts and is supported on said wheels, said spider being radially divided by a plurality of partitions into a plurality of compartments, grid means removably positioned at the bottom of each of said compartments, said grid being adapted to support a container in inverted position and concurrently support a cover for said container in inclined position, partitions dividing the space between said pan and said spider into a feed and discharge division, a pre-rinse division, a wash division, a sterile rinse and steam division and a drying division, a header and nozzles in the pre-rinse division communicating with a cold water supply, a header and nozzles in the wash division for providing water impregnated with a cleansing agent and communicating with a wash water compartment of said tank, a sterile rinse header in the sterile rinse and steam division for providing high temperature water from a sterile rinse compartment of said tank, and a steam header in the sterile rinse and steam division for providing steam thereinto, and an air duct in the drying division for providing drying air thereinto, and means mounted on said frame and connected by a transmission with one of said wheels for continuously rotating said spider so that containers and covers on the grids within the compartments of said spider may be continuously treated while moving continuously over said divisions.

5. In a rotary can washer, a frame, a tank having wash water and sterile rinse compartments mounted on said frame, a pan attached to and overlapping said tank, a plurality of wheels rotatably mounted on said pan, a housing supported on said pan, a cover attached to said housing, a spider rotatably mounted on said wheels, partitions dividing the space between the pan and spider into a feed and discharge division, a pre-rinse division, a wash division, a sterile rinse and steam division, and a drying division, a header and nozzles in said pre-rinse division communicating with a cold water supply, a header and nozzles in said wash division for providing water impregnated with a cleansing agent and communicating with the wash water compartment of said tank, a sterile rinse header in the sterile rinse and steam division for providing high temperature water from the sterile rinse compartment of said tank, and a steam header in the sterile rinse and steam division for providing steam thereinto, and an air duct in the drying division for providing drying air into the drying division, a pump and thermostatically controlled steam supply element positioned below the wash division and communicating with the wash water compartment of said tank for supplying the header and nozzles in said division with heated water impregnated with a cleansing agent from the wash water compartment of said tank, a second pump and a second thermostatically controlled steam supply element positioned below the sterile rinse header and communicating with the sterile rinse compartment of said tank for providing the sterile rinse header with hot water from said sterile rinse compartment, and means positioned on the frame below the steam header and connected by a transmission to one of said wheels to rotate said spider, and an air duct construction positioned on the frame below the air drying division.

6. In a rotary can washer, a sterile rinse and steam treatment division, a sterile rinse water

tank, a sterile water header and a steam header in said division, means for supplying sterile rinse water from said tank to said sterile water header, a rotatably mounted spider adapted to hold containers and covers and arranged to move them for treatment in sequence first over said sterile water header and next over said steam header, a steam turbine arranged to rotate said spider, and means for conducting exhaust steam from said turbine to said sterile rinse water tank whereby to add heat to the sterile rinse water before it passes through the sterile water header.

7. In a rotary can washer, a tank for wash water, a housing in which to wash a can, said housing being superimposed and supported upon said tank and laterally overhanging a portion of said tank, a plurality of stationary partition means dividing the lower portion of the interior of said housing into a feed and discharge division, a pre-rinse division, a wash division, a sterile rinse and steam division and a drying division, means for supplying cold water into the housing above the pre-rinse division, means for supplying water with a cleansing agent from said tank for wash water into the housing above the wash division, means for supplying hot water and steam into the housing above the sterile rinse and steam division, and means for providing drying air into the housing above the drying division, a spider within said housing and adapted to removably support a plurality of containers and covers, means for continuously rotating said spider so that said containers and covers may be continuously treated while moving continuously over said divisions, header means associated with said means for supplying cold water into the housing above the pre-rinse division and with the means for supplying hot water and steam into the housing above the sterile rinse and steam division, whistle valve means attached to and controlling said header means, said whistle valve means being normally closed, valve lever means attached to said whistle valve means, said spider having a plurality of compartments, a grid in each of said compartments adapted to hold a container, and

dog means attached to each said grid, each said dog means being counterweighted to be in normally upright position, and each said dog means being adapted upon pressure of a container placed thereagainst on said grid to move into horizontal position and contact said valve lever means and cause it in turn to move said whistle valve means to open position, said dog means being adapted upon the removal of a container to swing to upright position and away from contact with said valve lever means, permitting the valve lever means to release the whistle valve means and allow the whistle valve means to return to normally closed position.

WILLARD S. CAMPBELL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,520,110	Blakeslee	Dec. 23, 1924
1,604,455	Larsen	Oct. 26, 1926
1,625,493	O'Connell et al.	Apr. 9, 1927
1,681,839	Breton	Aug. 21, 1928
1,703,946	Melish	Mar. 5, 1929
1,707,159	Burnham	Mar. 26, 1929
1,755,101	Clark et al.	Apr. 15, 1930
1,879,224	Hauk	Sept. 27, 1932
1,909,835	Kendall	May 16, 1933
1,910,931	Newsome	May 23, 1933
1,972,711	Kendall	Sept. 4, 1934
2,018,000	Williams	Oct. 22, 1935
2,082,285	Greer	June 1, 1937
2,122,018	Wolf	June 28, 1938
2,189,451	Peters	Feb. 6, 1940

FOREIGN PATENTS

Number	Country	Date
585,112	France	Feb. 21, 1925
5,985	Australia	June 14, 1927
66,732	Sweden	Feb. 5, 1929
52,793	Denmark	Mar. 8, 1937