June 9, 1964 G. A. YENDLEY 3,136,324

CONTAINER RINSING APPARATUS

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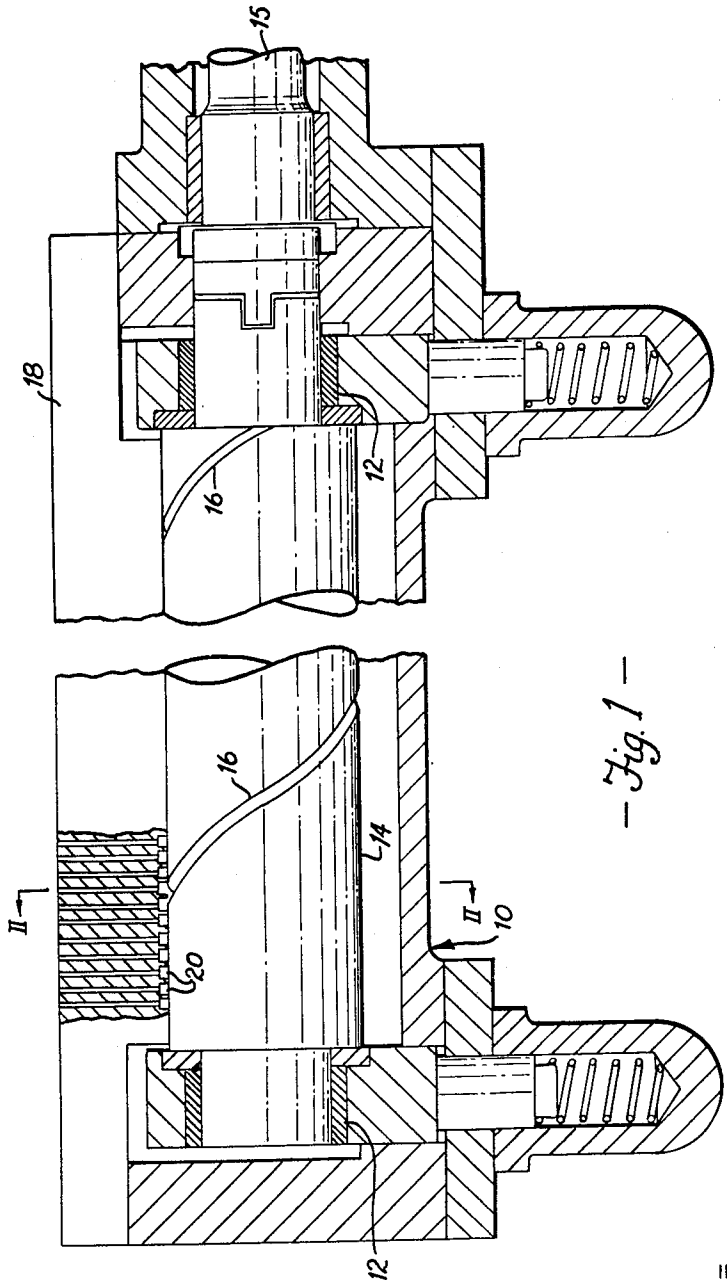


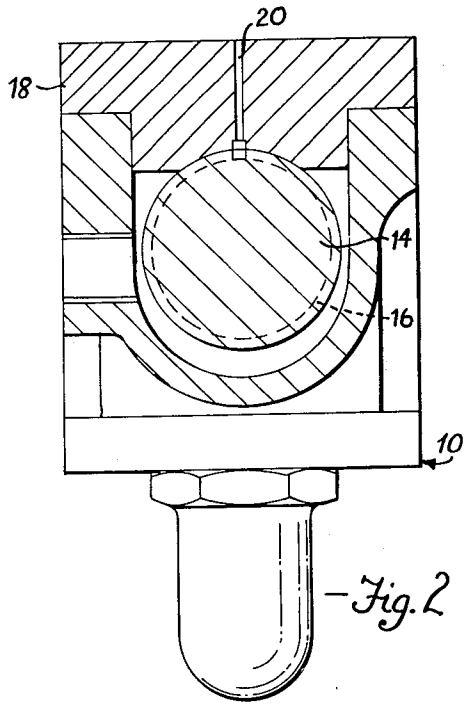
Fig. 1

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-Fig. 2-

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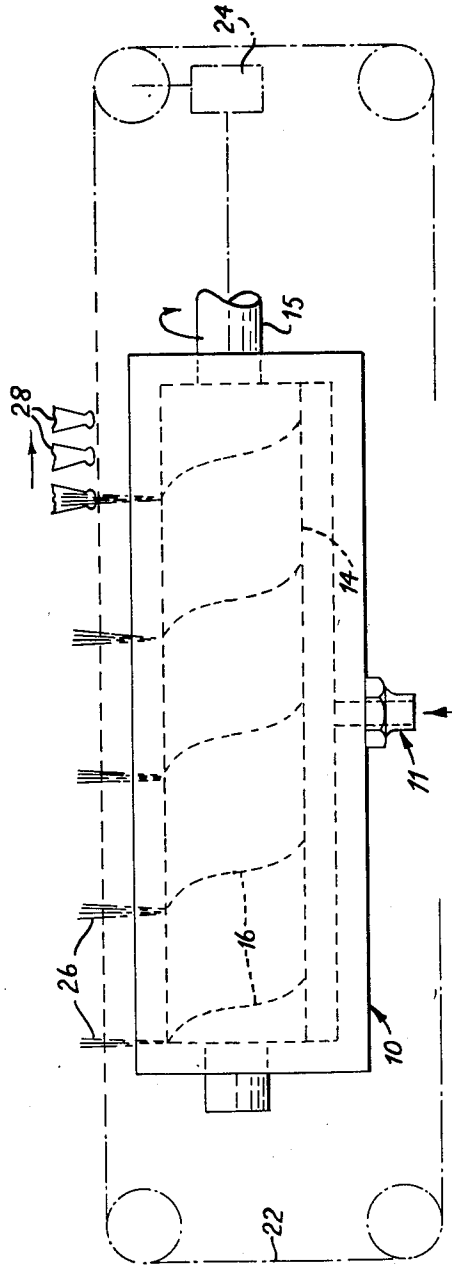


Fig. 3

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CONTAINER RINSING APPARATUS

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6 Claims. (Cl. 134—129)

This invention concerns bottle and other container washing and rinsing machines.

It is usual practice in a bottle washing machine for bottles to be conveyed to a washing station at which they are each halted for a short period while a jet of washing fluid is injected into the halted bottle. When this washing operation has finished the bottle is moved on by the conveyor. Bottle washing machines have also been proposed in which bottles from a feed conveyor are sequentially brought into register with jet nozzles circumferentially spaced around a rotary table, each bottle being carried around by the table and subjected to a jet of washing fluid during that period, and thereafter being removed from its engagement with the jet nozzle by a further conveyor.

The capacity of such bottle washing machines, however, has an obvious upper limit as regards the rate at which bottles can be accepted for washing, and the need for greater input capacity is being felt as the tendency grows to use new bottles exclusively, rather than to wash and sterilise soiled bottles. Thus, new bottles do not require to be washed to the same extent as used ones, nor with such strong detergent solutions, nor at the same high temperatures. This implies the possibility of dealing much more quickly with new bottles than with used ones, and calls for a greater throughput capacity on the part of the washing machine.

According to the present invention, a container washing machine includes a housing having an inlet for cleaning fluid together with a portion situated remotely from said inlet and formed with elongated slot means, and helix means supported for rotation within said housing in sealed engagement with said slotted portion and intersecting said slot means, said helix means at least in part defining a path for conducting cleaning fluid from said inlet to said slot means, and said intersection constituting a travelling jet orifice for the discharge of said fluid.

Preferably the length of the slot means and the pitch of the helix means are such as to define a plurality of jet orifices spaced along the slot. The helix means may, for example, be a self-supporting helix wound from slotted conduit and engaged in a cylindrical chamber provided with the above-mentioned slotted portion, but it is preferably a helical groove or grooves formed in a roller bearing against said slotted portion of said housing.

In one particular container washing machine embodying the invention, the housing comprises an elongated box having a sump portion provided at each end with a floating bearing for a roller supported in said sump portion and capable of being rotated therein. The roller is formed with a helical groove, and its floating bearings are arranged to press it resiliently against a cover fitting over the sump portion, the internal surface of the cover being provided with a part-cylindrical recess snugly to receive the roller in liquid-tight engagement. Centrally and longitudinally of the recess, the cover is formed with a plurality of almost contiguous holes constituting the aforementioned slot means, each of these holes being shaped in such a manner as to be capable of producing a desired configuration of liquid jet.

The invention will be described further, by way of example with reference to the accompanying drawings in which:

FIG. 1 is an elevation, generally in axial section, of a container washing or rinsing machine embodying the invention.

FIG. 2 is a transverse section taken on the line II—II of FIG. 1, and

FIG. 3 is a diagrammatic elevation of the container washing machine of its accompanying conveyors and drive means.

As shown in the drawings, the container washing or rinsing machine proposed by the invention includes an internally part-cylindrical trough or sump **10** having a pair of resiliently mounted sleeve bearings **12** longitudinally spaced therein and supporting between them, a cylindrical roller **14** which is peripherally formed with a multiple turn, helical groove **16**. The trough **10** is open at its upper side, which is closed by a cover **18** having its inner face of part-cylindrical shape to fit snugly against the roller **14**, and the cover **18** is formed along its longitudinal bisector with a line of stepped bores **20**, of which the larger diameter portion of each bore opens into the arcuate inner face part of the cover **18** and has a diameter equal to the transverse width of the groove **16**.

FIG. 3 shows one arrangement of complete washing or rinsing machine, including the necessary conveyor and drive means. For convenience, the trough **10** and roller **14** are shown below the upper run of a conveyor **22**, but it will be appreciated that any other run of the conveyor could be used, although horizontal runs are preferred since they permit a vertical direction of the washing or rinsing liquid. The conveyor **22** is driven from any suitable motor and gearbox combination **24**, to which the roller **14** is also connected by a keyed shaft **15**. The trough **10** is provided with an inlet **11** for washing or rinsing liquid.

In operation, liquid supplied to the trough **10** through the inlet **11** is fed by the helical groove **16** to the upper part of the trough, where the groove intersects the line of holes **20**, so that liquid is forced out at each intersection of the groove **16** with a hole **20**, and is accelerated as it passes through the hole **20** due to the decrease in diameter of the latter. Since the roller **14** is rotated by the drive shaft **15**, these intersections, each of which produces a jet **26** of washing liquid, travel lengthwise of the trough **10**, and by suitable choice of the gear ratios in the motor and gearbox means **24**, the speed of travel of the jets **26** can be synchronised with the speed of the conveyor **22**, and each jet **26** can be caused to register with a container **28** on the conveyor **22** as the container passes over the trough **10**. Effectively, therefore, each jet **26** travels with and acts to wash the container **28** during the time that the latter takes to travel the length of the trough **10**.

In this way, the invention provides a washing machine which enables container washing to be carried out continuously rather than intermittently, and which is capable of higher operating speeds than have hitherto been usual.

It will be appreciated that the width and depth of the helical groove **16** are determined by the desired rate of flow of washing liquid and the intended operating speed of the machine and at the intended liquid supply pressure. Again, the shape of the holes **20** may differ from the stepped bore configuration illustrated in the drawings, dependent on the desired shape of the jets **28**, and subject only to a narrowing of the hole in a direction towards the outer face of the cover **18**.

I claim:

1. A container washing machine comprising a housing having an inlet for cleaning fluid together with a portion situated remotely from said inlet and formed with

elongated opening means, and helix means supported for rotation within said housing in sealing engagement with said opening means and intersecting said opening means, said helix means at least in part defining a path for conducting cleaning fluid from said inlet to said opening means, and said intersection constituting a travelling jet orifice for the discharge of said fluid, said helix means comprising a multiple turn helix of a pitch which cooperates with the length of said opening means to produce a plurality of jet orifices spaced along said opening means, a conveyor for conveying articles to be washed adjacent said opening means, and means for moving the conveyor at the same speed as the travelling jet orifices.

2. A machine as set forth in claim 1, wherein said opening means is a plurality of substantially contiguous holes formed in said remotely situated housing portion.

3. In container washing apparatus of the type comprising a washing station and driven conveyor means for carrying containers deposited thereon through said washing station, the improvement wherein said washing station comprises an elongate, open-sided trough adjoining and parallel to a surface of the conveyor, said trough having an inlet connection for washing fluid, a roller floatingly journalled in said trough and substantially coextensive therewith, said roller being peripherally formed with a helical groove describing a plurality of complete turns along the length of said roller, a cover member closing the open side of said trough and having its inner face of part cylindrical shape to engage in sealed relation with the cylindrical surface of the roller, said cover member being formed along its longitudinal bisector with a line of nearly contiguous holes extending between its inner and outer faces, said holes being in the form of stepped bores with their larger diameters open to and of the same width as the roller groove, and roller drive means for driving said roller to displace the intersections of said groove with said line of holes in the same sense as the direction of travel of said conveyor.

4. Apparatus as set forth in claim 3, wherein said conveyor drive means and said roller drive means are synchronized to displace said intersections at the speed of travel of said conveyor means.

5. A container washing machine comprising a hollow housing, elongated opening means in a wall of the housing, a cylindrical surface formed in said housing adjacent said opening means, a cylindrical member formed with the helical groove mounted for rotation in said housing, and means biasing the cylindrical member into bearing and sealing engagement with said cylindrical surface.

6. A container washing machine comprising a hollow housing having an internal cylindrical surface, opening means communicating said surface with the exterior of the housing, a cylinder having a helical groove rotatably mounted in said housing and means biasing the cylinder into bearing and sealing engagement with said internal cylindrical surface, said mounting and biasing means comprising a spring pressed bearing at each end of the cylinder.

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