Jan. 7, 1941. G. J. MEYER 2,227,734

BOTTLE RINSING TUBE

Filed May 14, 1938

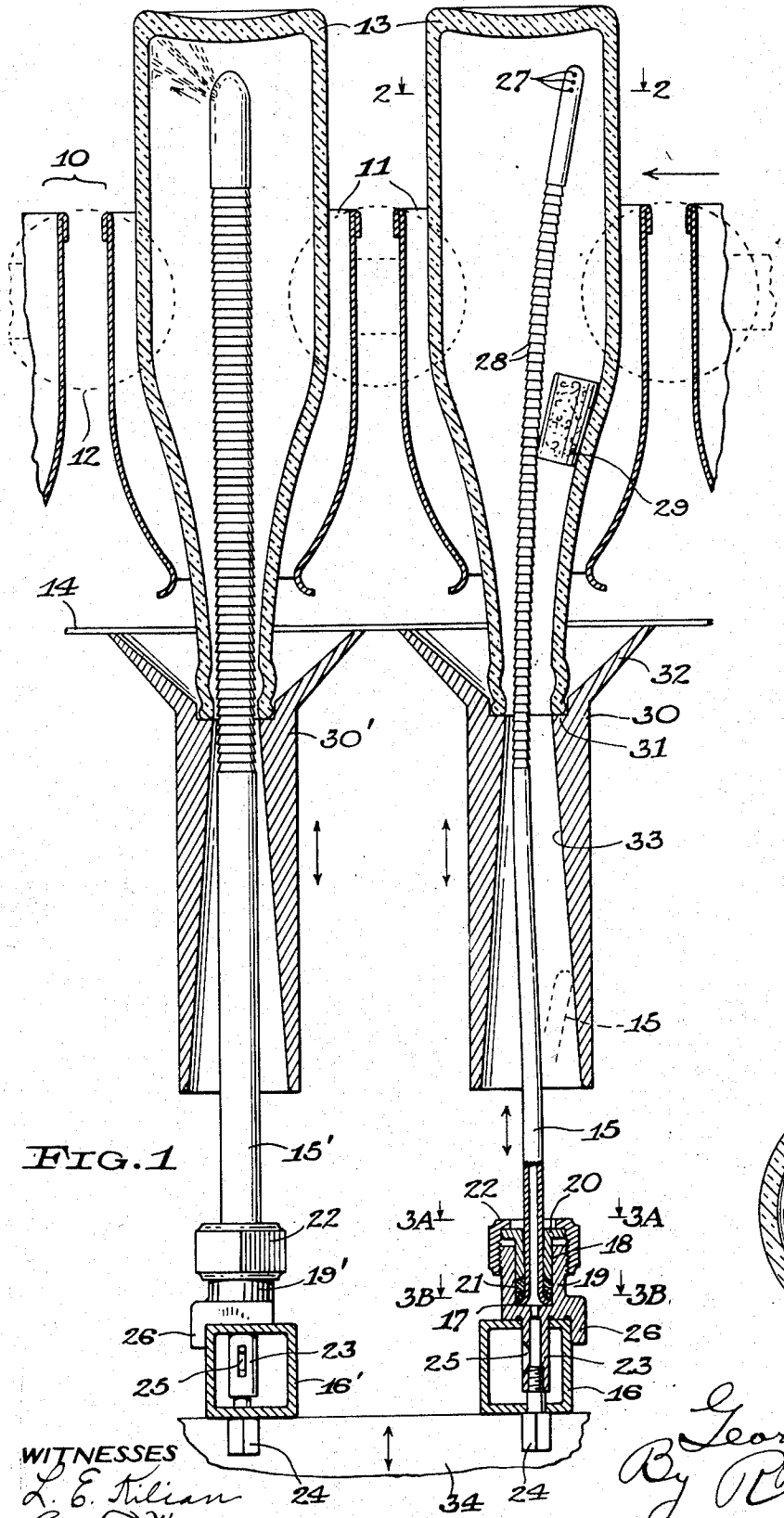

FIG. 1

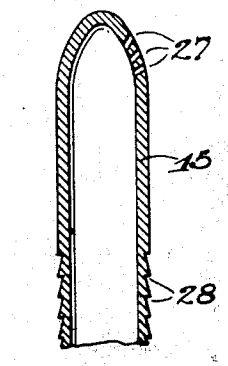

FIG. 4

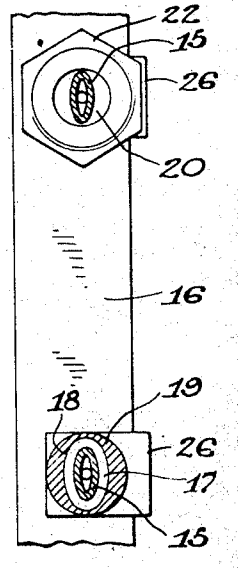

FIG. 3

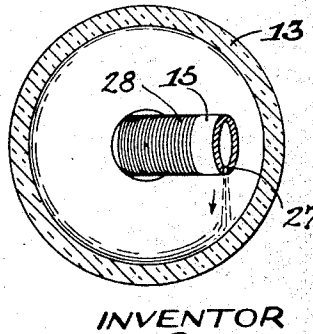

FIG. 2

WITNESSES

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BOTTLE RINSING TUBE

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9 Claims. (Cl. 141—7)

This invention relates to bottle cleaning apparatus and more particularly to rinsing or injection tubes for cleaning bottle interiors.

It has heretofore been suggested to subject the interior of an inverted container to a tangential cleaning spray, so as to cause the water or other cleaning liquid to whirl around the container walls and thereby loosen and carry down foreign matter. However, in the case of a bottle or other narrow-necked container the discharge portion of the usual central injection tube is spaced too far from the inner side wall of the bottle to permit an effective tangential spray to be obtained.

It is an object of the present invention to provide an improved rinsing or injection tube capable of producing an effective tangential cleaning spray in the interior of a bottle without interfering with the entrance and exit of the tube with respect to the bottle.

Another object of the invention is to provide a bent resilient rinsing tube which is of oblong or flattened cross-section, so as to permit easy entrance of the tube into the bottle and to reduce obstruction to the discharge of liquid and foreign matter from the mouth of the bottle.

A further object is to provide the rinsing tube with a toothed exterior for extracting corks, paper and other foreign articles from the interior of the bottle, the oblong or flattened cross-section of the tube avoiding undue obstruction of the bottle mouth during the extracting operation.

The invention further consists in the several features hereinafter described and claimed.

An embodiment of the invention is illustrated in the accompanying drawing, wherein

Fig. 1 is a sectional elevation of bottle cleaning apparatus of the invention, rinsing or injection tubes thereof being shown in rinsing position with respect to the bottles;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1, parts being omitted;

Fig. 3 is a sectional view, the upper portion of which is taken on the line 3A—3A of Fig. 1, and the lower portion of which is taken on the line 3B—3B of Fig. 1, and

Fig. 4 is a sectional elevation of the discharge end of one of the rinsing tubes.

In the drawing, 10 designates a bottle support, preferably in the form of a traveling conveyor of a bottle washing machine. By way of illustration, the conveyor includes bottle holding pockets 11 and is here indicated to be of the well-known side chain type in which the pockets are arranged in transversely extending rows, and in which the chains are provided with supporting rollers 12. The pockets 11 are adapted to receive bottles 13 therein, two being shown, and in that part of the conveyor illustrated the bottles are arranged in inverted position to be subjected to various cleaning operations. If desired, the necks of the bottles in each file may be laterally positioned in any well known manner, as by guide strips 14, one being shown.

An upwardly projecting injection or rinsing tube 15 is adapted to enter the successive inverted bottles and is supported at its lower end on a hollow manifold 16 which also carries one or more similar tubes, Fig. 3. Each tube, which is of elliptical or oblong cross-section for all or a part of its length, has a flared lower end 17 non-rotatably fitting and seated in a recess 18 of elliptical cross-section formed in a base member 19. A gland 20 and packing 21 fit in the recess 18, the packing engaging the flared lower end 17 of the tube, and the gland being tightened by a nut 22 threaded onto the base member. The base member is seated on the manifold and carries a downwardly projecting nipple 23 aligned with the rinsing tube and communicating therewith. The nipple extends into the manifold and is rigidly secured thereto by a screw 24 extending into the manifold from below. A lateral port 25 formed in the nipple communicates with the interior of the manifold. A downturned flange 26 on the base member engages a side wall of the manifold to angularly position the base member and tube.

The injection tube 15 is bent to a long radius, so that when the tube is in rinsing position, the upper end thereof will be adjacent the inner side wall of the bottle, the tube being resilient to permit it to flex when entering the leaving the bottle. Spray openings 27 are formed at various angles in a side edge of the upper end of the tube, so as to produce a tangential spray in the bottle, the spray being directed at various upward angles. The spray openings extend in a plane substantially parallel to the long dimension of the cross-section of the tube. The tube 15, although being somewhat resilient, is sufficiently firm to maintain its free upper end in the desired spraying position after entry into the bottle.

The outer surface of the tube 15 is provided with numerous projections or teeth 28, here shown to be formed by annular grooves presenting sharp-edged downwardly facing shoulders. The purpose of the teeth is to extract a cork

29 or other foreign article from within the bottle when the tube is withdrawn from the bottle. In fabricating the tube, it is convenient to use straight tubing of circular cross-section and to form the teeth 28 before the tube is flattened and bent.

The bottle is lifted by a tubular guide member 30 which has a positioning seat 31 for the bottle neck and a funnel-like top 32 for centering the bottle neck on the seat. An upwardly converging conical bore 33 is formed in the guide member, the upper end of the bore opening at the seat 31 and having a diameter about equal to that of the bottle mouth. The bore forms a guide surface for smoothly entering the bent resilient rinsing tube 15 into the mouth of the bottle, the upper end of the tube being slidable along this surface. The lowermost position of the upper end of the rinsing tube is indicated by dotted lines in Fig. 1.

When two or more rinsing or injection tubes are used for each file of bottles, they are preferably placed in different angular positions with respect to the plane of bottle travel, so that the bottles will be rinsed from different angles. In the present instance, a second rinsing tube 15' is provided to enter the bottles after they have been rinsed by the tube 15, the tube 15' being similar to or identical with the tube 15 but turned to a different angle with respect to the tube 15. The tube 15' is movable through a bottle-lifting guide member 30' similar to the member 30, and is mounted in a base member 19' similar to the base member 19 and similarly mounted on a manifold 16', the manifolds being supported on a suitable carrier 34. If additional rinsing tubes are provided for each file of bottles, they are arranged at still other angles. For example, with four rinsing tubes for each file of bottles, the tubes may be arranged at 90° intervals.

Suitable cross-head means, such as that shown in United States Letters Patent 1,429,960 and 1,813,066 may be provided for vertically reciprocating the manifolds 16 and 16' and the bottle-lifting guide members 30 and 30'.

In operation, the guide members 30 and 30' are raised to center and lift the inverted bottles 13, the bottle necks being confined against lateral displacement by the seats 31 in the guide members. The manifolds 16 and 16' are raised to enter the bent resilient injection tubes 15 and 15' into the bottles, the upper ends of the tubes being guided into the mouths of the bottles by the tapered bores 33 of the guide members, and thereafter sliding upwardly along the neck portions of the bottles. The uppermost position of the tubes is indicated in Fig. 1, the upper ends of the tubes being adjacent the bottom walls and side walls of the inverted bottles. Water or other cleaning fluid is forced upwardly through the tubes from the manifolds, causing tangential sprays or jets to issue from the openings 27 and impinge on the bottom walls and side walls of the bottles. The water whirls around the interiors of the bottles, effectively loosening and carrying down foreign matter, the discharge dropping through the tubular guide members. With rising tangential jets the water whirls in an upwardly inclined direction before it descends, so as to more thoroughly clean the bottom portions of the inverted bottles. The tubes and guide members are then lowered from the bottles, and the cycle of operation is repeated on succeeding bottles. The conveyor may move either continuously or intermittently, as is well understood in this art, and as exemplified in United States Letters Patent 1,310,128 and 1,429,960.

The elliptical or oblong cross-section of the bent resilient tubes not only facilitates entry and withdrawal of the tubes with respect to the bottles, but also avoids undue obstruction to the discharge from the bottles.

Any loose foreign articles, such as corks, cigar stubs, and papers in the inverted bottles fall toward the neck portions thereof, the cork 29 being indicated in the drawing as representative of the foreign articles. The cork becomes wedged between the side wall of the bottle and the toothed injection tube, and when the tube is withdrawn the cork is drawn downwardly, being deformed or mutilated as it is pulled out of the bottle neck. In many cases, the tearing action of the toothed tube will remove sufficient material from the cork to permit easy passage of the reduced cork through the bottle mouth, the cork being withdrawn by the toothed upper portion of the tube. The elliptical flattened cross-section of the tube avoids undue obstruction of the bottle mouth so as to facilitate passage of the cork. Any foreign articles tending to adhere to the interior surface of the bottle will be flushed toward the neck portion by the injected liquid, and any small fragments torn from the articles will be flushed out of the bottle. If the withdrawal of the bottle meets with excessive resistance, the movement of the injection tube may be stopped by suitable slip joint connections commonly used in various parts of bottle washing machines.

While the injection tubes are here described as being movable with respect to the bottles, it will be obvious that the bottles may be moved over the tubes, or both the tubes and bottles may be movable.

What I claim as new and desire to secure by Letters Patent is:

1. In a bottle washing machine having means for supporting an inverted reduced-mouth bottle, a fluid injection tube adapted to enter the inverted bottle and having a laterally shiftable discharge end extending at an angle to the bottle axis, said discharge end lying adjacent the inner side wall and bottom of the inverted bottle when the tube is entered into the bottle, and said discharge end being apertured at one side for directing a tangential spray onto the inner walls of the bottle.

2. In a bottle washing machine, a resilient fluid injection tube adapted to enter an inverted bottle and having an apertured discharge end bent laterally to lie adjacent the inner side wall of the bottle, said discharge end having a spray opening for directing a tangential spray onto the inner walls of the bottle.

3. In a bottle washing machine, a resilient fluid injection tube adapted to enter an inverted bottle and having an oblong cross-section, said tube having a discharge end and being bent transversely with respect to the long dimension of said cross-section to cause said end to lie adjacent the inner side wall of the bottle, and said tube having a spray opening extending in a plane substantially parallel to said long dimension for directing a tangential spray onto the inner walls of the bottle.

4. In a bottle washing machine, a resilient fluid injection tube adapted to enter an inverted bottle and having an oblong cross-section, said tube having an apertured discharge end and being bent transversely with respect to the long dimension of said cross-section to cause said end to lie

adjacent the inner wall of the bottle, said discharge end having a spray opening for directing a tangential spray onto the inner walls of the bottle.

5. In a bottle washing machine, a resilient fluid injection tube adapted to enter an inverted bottle, said tube having an apertured discharge portion and being bent to cause said portion to lie adjacent the inner wall of the bottle, said discharge end having a spray opening for directing a tangential spray onto the inner wall of the bottle, and means for guiding said bent tube into the mouth of the bottle.

6. In a bottle washing machine, a resilient fluid injection tube adapted to enter an inverted bottle, said tube having an apertured discharge portion and being bent to cause said portion to lie adjacent the inner wall of the bottle, said discharge end having a spray opening for directing a tangential spray onto the inner wall of the bottle, and bottle-lifting means for guiding said bent tube into the mouth of the bottle.

7. In a bottle washing machine, a resilient fluid injection tube adapted to enter an inverted bottle, said tube having an apertured discharge portion and being bent to cause said portion to lie adjacent the inner wall of the bottle, said discharge end having a spray opening for directing a tangential spray onto the inner wall of the bottle, and a bottle-neck-positioning member having a guide surface slidably engageable by said bent tube for guiding said tube into the mouth of the bottle.

8. In a bottle washing machine, a resilient fluid injection tube of oblong cross-section adapted to enter an inverted bottle and having a toothed exterior for drawing a cork or other foreign article from the bottle, the oblong cross-section of the tube facilitating the flexing of said tube and the withdrawal of the cork through the bottle mouth.

9. In a bottle washing machine of the type having means for conducting an inverted bottle, a plurality of bent resilient injection tubes for successively entering the bottle and having discharge ends adapted to lie adjacent the inner side walls of the bottle for directing tangential sprays onto the inner walls of the bottle, said bent tubes extending at different angles to cause the sprays of the successively acting tubes to impinge on different portions of the bottle.

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