

Sept. 29, 1931.

J. L. HEROLD ET AL

1,824,993

MEANS FOR WASHING BOTTLES

Filed Dec. 5, 1928

2 Sheets-Sheet 1

Fig. 1.

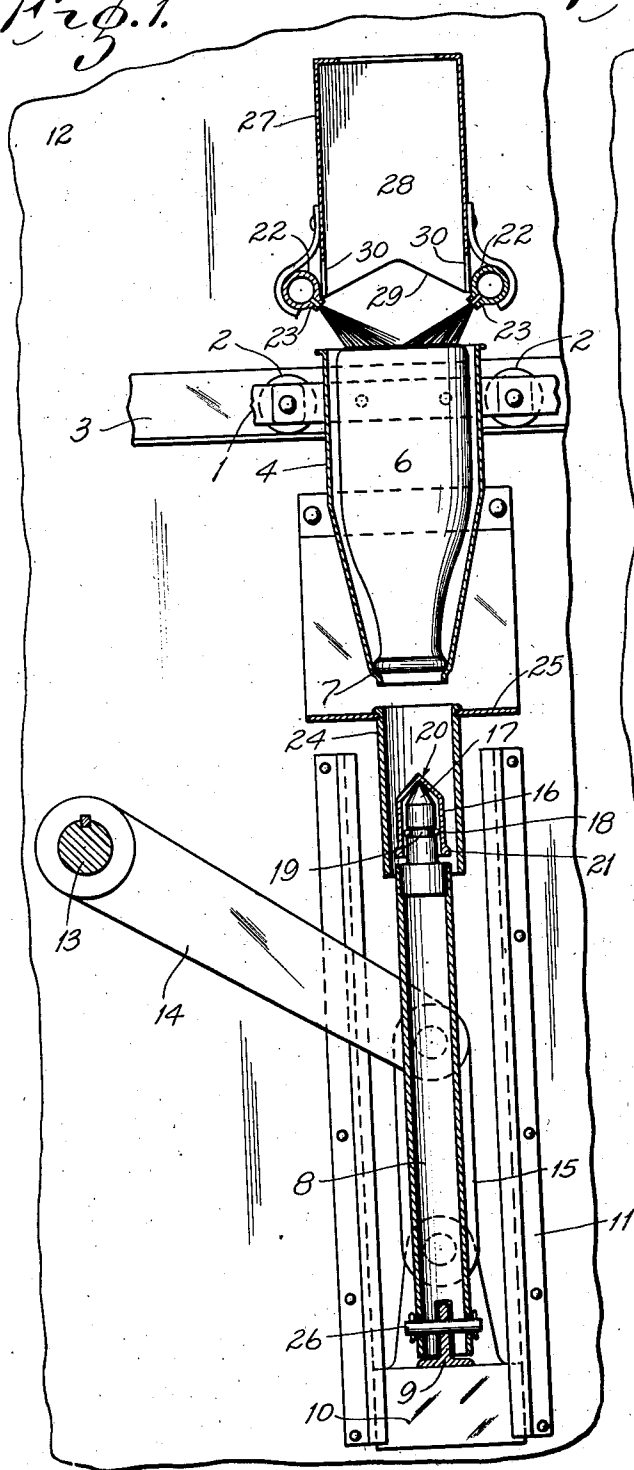
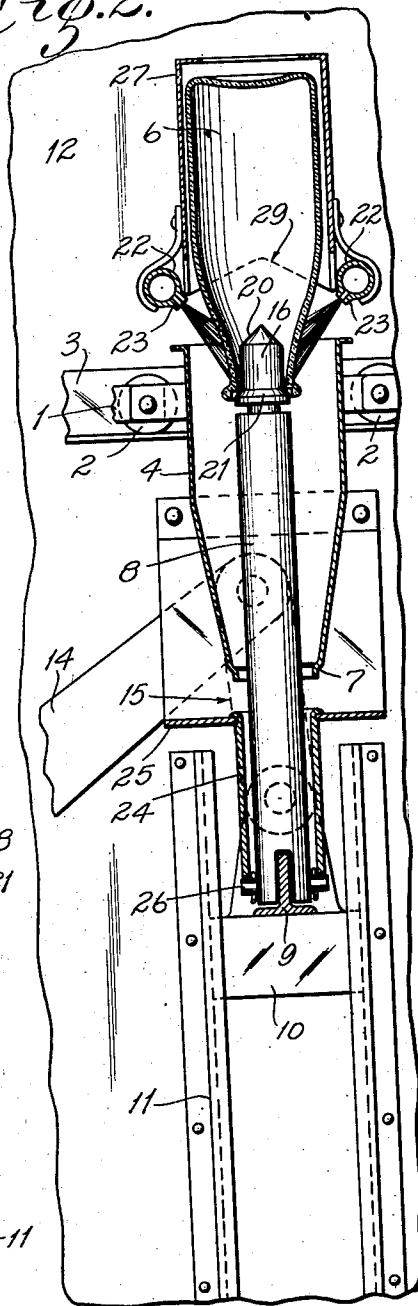


Fig. 2.



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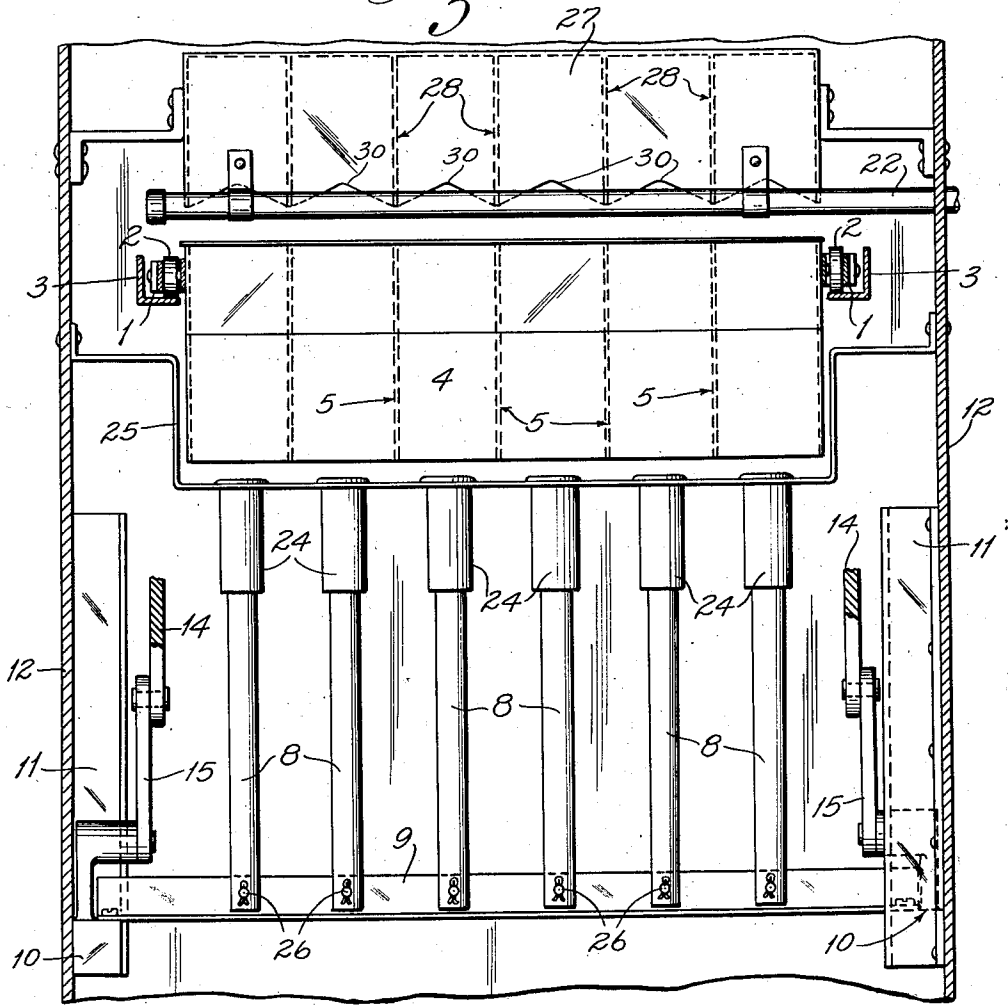
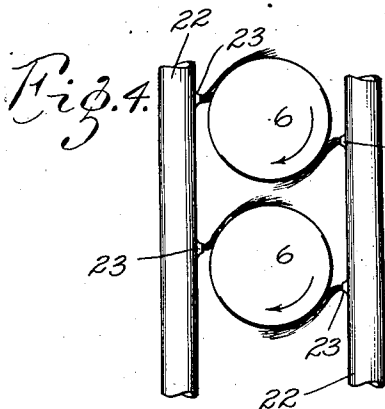
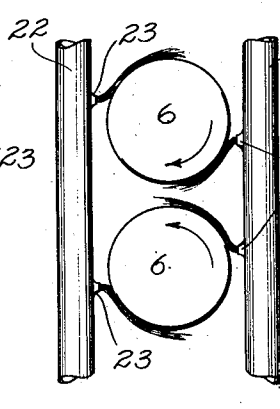
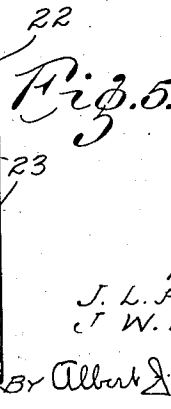
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2 Sheets-Sheet 2

Fig. 3.



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UNITED STATES PATENT OFFICE

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MEANS FOR WASHING BOTTLES

Application filed December 5, 1928. Serial No. 324,005.

This invention relates to means for wash-
ing bottles, and the like, the main object be-
ing to produce a highly efficient cleansing op-
eration, in a simple manner and at a relative-
ly low cost, without using complex or ex-
pensive mechanism.

More specifically stated, an object is to use
the cleansing liquid as a means for imparting
rotary motion to the bottles during the wash-
ing operation. The bottles may be rotatably
mounted on suitable supports, and the
streams of cleansing liquid may be so directed
that the liquid itself acting directly on the
bottles, will cause them to rotate at a high
speed. The forcible cleansing action due to
the impact of the cleansing liquid, is thus dis-
tributed over a large surface area, and this
may be accomplished without using special
mechanism to turn the bottles.

A further object is to extend the forcible
cleansing action to approximately all of the
surface area to be washed by these streams,
and this is preferably accomplished by mov-
ing the rotating bottles relative to the streams.
For example, if the streams are projected
from a stationary conductor, the rotating bot-
tles may be moved longitudinally to receive
the forcible impacts of the streams at all
points on the surface between the ends of the
bottles. We will hereafter show how this
may be accomplished in washing one end and
the entire outer surface of each bottle.

With the foregoing and other objects in
view, the invention comprises the novel con-
struction, combination and arrangement of
parts hereinafter more specifically described
and illustrated in the accompanying draw-
ings, wherein is shown the preferred embod-
iment of the invention. However, it is to be
understood that the invention comprehends
changes, variations and modifications which
come within the scope of the claims hereunto
appended.

Fig. 1 is a vertical section illustrating a
bottle washing device embodying the features
of this invention, and showing a portion of
the tank or housing in which the device is
located.

Fig. 2 is a view similar to Fig. 1, showing
the bottle in its elevated position.

Fig. 3 is a transverse vertical section show-
ing a row of the bottle-operating devices be-
tween two side walls of the housing.

Fig. 4 is a detail view showing how the
streams of cleansing liquid may be projected
onto the bottles to rotate them in the direction
indicated by arrows.

Fig. 5 is a view similar to Fig. 4, illus-
trating a different arrangement of the dis-
charge ports, or nozzles.

We will now describe details which have
been shown to illustrate one form of the in-
vention.

The bottles to be washed may be located in
a suitable carrier, or conveyor, adapted to
carry the bottles to and away from the wash-
ing device. This bottle carrier comprises
chains 1 provided with rollers 2 which travel
on tracks 3. An elongated bottle holder 4
is carried by the chains 1, and it will be un-
derstood that any desired number of these
bottle holders may be secured to the chains.

The bottle holder shown is provided with
partitions 5 (Fig. 3) whereby it is divided
into compartments, each adapted to receive
a bottle 6, as shown in Fig. 1, the bottom of
each compartment being contracted to form
a seat 7 for the bottle. The upper end of
each compartment is open, so the bottle
can be lifted from the position shown in Fig.
1 to the position shown in Fig. 2.

Before describing the manner in which the
bottles are rotated by the cleansing fluid, we
will refer to a supporting device on which
the bottles are rotatably mounted during the
washing operation, and show how this device
may be operated to lift the bottles from the
bottle carrier when the latter is at rest.

The lifting means comprises a row of spin-
dles 8 (Figs. 1 and 3) carried by a bar 9
having its ends secured to blocks 10 which
are movable in vertical guides 11, said guides
being at the side walls 12 of the housing. The
operating means may include an oscillatory
shaft 13 (Fig. 1) which may be driven from
any suitable source of power, arms 14 extend-
ing from said shaft, and links 15 connecting
said arms to the blocks 10, as shown in Figs.
1 and 3. It will now be understood that the

arms 14 may be oscillated to raise and lower the spindles 8.

These spindles are located below and approximately in alinement with the inverted bottles in the bottle holder 4, and the upper end of each spindle is provided with a device on which a bottle is rotatably supported during the washing operation. The bottle supports preferably include a suitable anti-friction device to permit free rotation of the bottles in response to the energy derived from the streams of cleansing fluid.

Each of the bottle supports just referred to may be made as shown in Figures 1 and 2, wherein 16 designates a bottle support in the form of a cap rotatably mounted on the upper end of the spindle 8. The spindle has a conical upper end 17 and the point at its tip contacts with the top wall of the bottle support 16, said top wall having a conical inner face larger than the conical element 17. The bottle support 16 is, therefore, quite free to rotate on the apex of the conical element 17.

As a further safeguard to reduce friction, rolling elements such as balls 18 (Fig. 1) are preferably interposed between the bottle support 16 and the upper portion of the spindle, said balls being confined by an annular groove 19.

The upper end of the bottle support 16 is tapered, as shown at 20, to freely enter the bottle, and the lower end of said support is provided with an annular flange, or shoulder, 21 forming a seat for the bottle.

During the washing operation, each spindle 8 and its bottle support 16 are raised and lowered to lift a bottle from the position shown in Fig. 1 to the position shown in Fig. 2, and thence back to the position shown in Fig. 1.

The means for rotating and at the same time washing the bottles preferably comprises a pair of tubes, or pipes, 22 located at opposite sides of the vertical courses of bottles, and provided with nozzles 23 having discharge ports from which the cleansing liquid is forcibly discharged onto the bottles. This liquid may be delivered to the pipes 22 under pressure from any suitable source.

Figures 1 and 4 show how the ported nozzles 23 may be arranged with relation to the bottles 6, and it will be important to observe that each of the discharge ports associated with any given bottle, lies at an angle to a vertical plane extending radially from the axis of the bottle and passing through the port. This non-radial condition is illustrated by Fig. 4, which shows that each bottle is acted upon by two oppositely disposed streams tending to rotate the bottle, and actual use of the device has shown that the speed of rotation is very rapid.

In Fig. 4 the nozzles 23 are arranged to turn

all of the bottles in the same direction, but the nozzles may be arranged as shown in Fig. 5, and in this event adjacent bottles will turn in opposite directions, as indicated by arrows.

Bottle carriers of the general type herein shown, including chains 1 connected to bottle holders 4, are usually very long and rather cumbersome structures, and they are usually driven step by step, with intermittent pauses, to provide for successive washing operations. Mechanism of this kind as ordinarily made, is not accurate enough to exactly predetermine the stopping point of a bottle holder, and a further inaccuracy results from the fact that the loose bottles are not always centrally located in the compartments of the bottle holders.

We have, therefore, devised a means to compensate for these inaccuracies, with the object of positively directing the elements at the upper ends of the spindles 8 into the bottles.

The upper portion of each spindle is surrounded by a stationary guide tube 24, said tubes being arranged in a row as shown in Fig. 3, and secured to a member 25 which may be attached to the side walls 12 of the housing. The lower end of each spindle 8 is loosely secured to the bar 9 by means of a pin 26, as shown most clearly in Fig. 1, the spindle being free to "wobble" on the bar.

When a spindle moves vertically, it is loosely guided by a tube 24 until the tapered upper end of its bottle holder 16 strikes either the end of a bottle or the adjacent end of the bottle compartment. The loose spindle is then easily deflected as the bottle holder enters the bottle, and the beveled seat 21 on the bottle holder is finally positioned with sufficient accuracy at the lower end of the bottle. Thereafter, as the loose spindle moves upwardly, it is guided by the surrounding tube 24.

As the bottle is lifted from the traveling bottle carrier, it enters a housing, or hood 27 where the upper end of the bottle is confined during the washing operation. This housing 27 is provided with partitions 28 which divide it into compartments, there being one compartment for each bottle. The lower edge of each partition is approximately in the form of an inverted V, as shown at 29 in Fig. 1, and the same is true of the side walls of each compartment, as seen at 30 in Fig. 3. Therefore, if a bottle is unduly displaced, its round upper end will strike these inclined edges, and this will cause the bottle to enter the housing 27.

The nozzles 23 are preferably directed downwardly (Fig. 1) to first wash the inverted bottom of the bottle. As the bottle rises, the streams of cleansing fluid strike its peripheral face, with the result of rapidly rotating the bottle while it moves upwardly

and then downwardly. The entire surface of the bottle is thus exposed to the forcible action of the liquid, so as to positively remove all particles of dirt and other material clinging to this surface.

Under the ordinary conditions, the rotating bottle will be vertical during the washing operation, and all of its weight will be supported on the apex of the cone 17 (Fig. 1), so the bottle will turn very freely. The rolling members 18 reduce friction due to any lateral thrust on the rotating bottle, and the housing 27 serves as a guide, or support, to prevent excessive displacement of the bottle.

We claim:

1. In a bottle washing device, a spindle having a pointed upper end, a bottle-holder surrounding and resting upon said pointed upper end, rolling members between the outer face of said spindle and the inner face of said bottle-holder, said bottle-holder having a shoulder on which the bottle is seated, and means comprising a device through which cleansing liquid is discharged onto the periphery of the bottle to rotate said bottle and bottle-holder during the washing operation.

2. In a bottle washing device, a support on which the bottle is mounted, means acting on the bottle itself to rotate said bottle during the washing operation, said means comprising a nozzle directed toward the periphery of the bottle at an angle to a radial plane extending from the axis of rotation of the bottle through said nozzle, through which nozzle cleansing liquid is discharged onto the bottle thereby to rotate and at the same time wash the bottle, and means whereby said support is raised and lowered during the operation of said first named means.

3. In a bottle washing device, a bottle carrier, a lifting device adapted to lift the bottles from said carrier, said lifting device including bottle supports on which the bottles are rotatably supported, and means acting directly on the bottles to rotate them on said supports, said means including a device having discharge ports, each of which is directed toward the periphery of a bottle at an angle to a radial plane extending from the axis of rotation of the bottle through said discharge port, through which ports cleansing liquid is discharged onto the bottles to rotate and at the same time wash the lifted bottles, and each of said discharge ports being at an angle to the axis of the bottle support associated therewith.

4. In a bottle washing device, a bottle carrier, a lifting device adapted to lift the bottles from said carrier, said lifting device including bottle supports on which the bottles are rotatably supported, and means acting directly on the bottles to rotate them on said supports, said means including a device having discharge ports through which cleansing liquid is discharged onto the bottles to rotate

and at the same time wash said bottles, said discharge ports being above said carrier and inclined downwardly to wash the upper end faces of the bottles, and each of said discharge ports being directed toward a bottle at an angle to a plane extending radially from the axis of rotation of the bottle through the port, so as to impart a rotative thrust through the cleansing liquid to the bottle.

5. In a bottle washing device, a bottle carrier adapted to hold inverted bottles, a lifting device below said carrier adapted to enter and lift an inverted bottle, said lifting device including a rotatable bottle holder having a tapered upper end adapted to enter the bottle and a seat for the bottle below said tapered end, a loosely mounted spindle supporting said bottle holder and a guide cooperating with said spindle and bottle holder to direct said tapered end into the bottle, and means acting upon the peripheral faces of the bottle to rotate both the bottle and said bottle holder, said means comprising a discharge device having a port through which cleansing liquid is discharged onto the periphery of the bottle, and said port being at an angle to a vertical plane extending radially from the axis of rotation of the bottle through said port so as to transmit a rotary motion from the cleansing liquid to the bottles.

6. In a bottle washing device, a bottle carrier adapted to hold inverted bottles, a lifting device below said carrier adapted to enter and lift an inverted bottle, said lifting device including a seat on which the bottle is rotatably supported when lifted from said carrier, means acting directly on the lifted bottle to rotate it on said seat, and a guard located above said carrier to receive the lifted bottle during the washing operation, said guard comprising a compartment having inclined lower edges whereby the bottle is directed into said compartment.

In testimony that we claim the foregoing we hereunto affix our signatures.

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