Sept. 29, 1931. J. L. HEROLD ET AL 1,824,994

BOTTLE WASHING BRUSH

Filed June 21, 1929

Fig. 1.

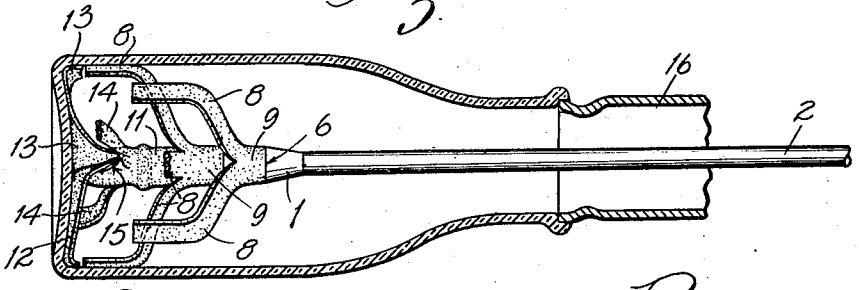


Fig. 2.

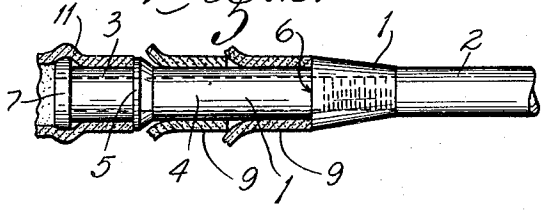


Fig. 3.

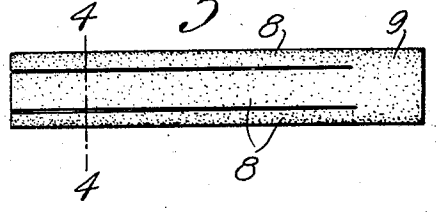


Fig. 4.

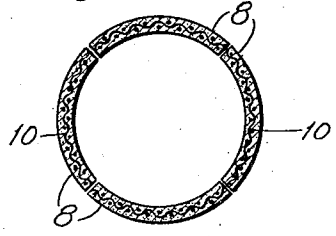


Fig. 5.

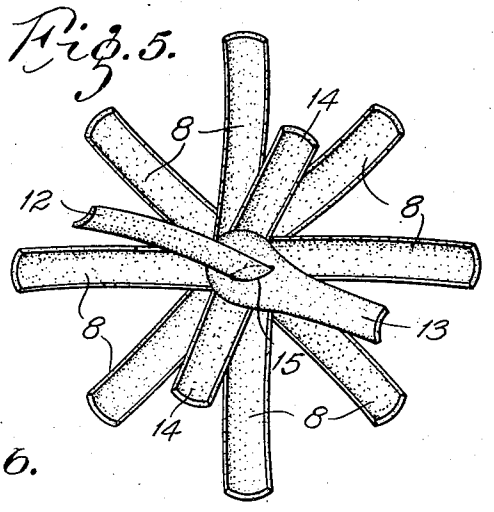
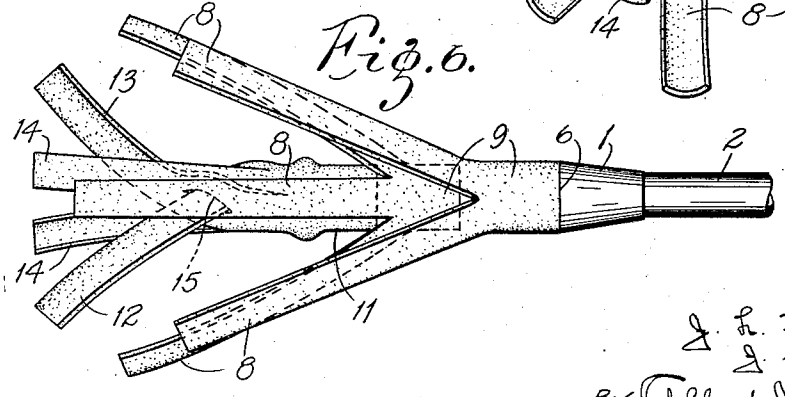


Fig. 6.



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UNITED STATES PATENT OFFICE

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BOTTLE-WASHING BRUSH

Application filed June 21, 1929. Serial No. 372,558.

This invention relates to bottle-washing brushes, and more particularly to a brush adapted to be rotated inside of a bottle.

One of the objects is to produce a strong, simple, durable and inexpensive brush, adapted to act very forcibly upon the bottom and side faces of the bottles. A further object is to produce a durable brush of this kind whereby the forcible brushing pressure is effectively distributed throughout the inner faces of the bottles, so that the entire area of the side faces of the bottles, and the entire area of the bottom faces, as well as the internal corners, are all subjected to the forcible brushing action.

The strength, durability and forcible brushing action are due partly to the use of relatively large and heavy brushing fingers, instead of fine bristles or thin webs. The distribution of the forcible brushing pressure is due to the arrangement of these large fingers, which enables each finger, or each group of fingers, to effectively perform its particular function. For example, one group of fingers is so designed and so arranged that it brushes the entire bottom face in the bottle and the circular corner at the periphery of the bottom, while a different group of the fingers is designed to forcibly brush the inner cylindrical face of the bottle. The several groups perform their respective functions to distribute the forcible pressure throughout all of the faces to be brushed, as will be hereafter described.

In the preferred form of the invention, all of these results are accomplished by a simple and inexpensive rubber brush, and as an illustration of a suitable structure a section of simple rubber tubing is shown to provide a group of rubber fingers integral with an attaching collar, the tubing being split from the collar to the tips of the fingers. Many features of the invention are not limited to this detail, but very satisfactory results have been obtained by this simple brush structure. A further advantage in strength and durability is gained by a fabric reinforcement extending from the attaching means to the brushing tips of the rubber fingers.

With the foregoing and other objects in view, the invention comprises the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown the preferred embodiment 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 side elevation of the brush as it appears when subjected to centrifugal force in a bottle, the latter being shown in section.

Fig. 2 is a detail view showing the stem and portions of the brushing elements secured thereto.

Fig. 3 is a side view of one of the brushing elements as it appears before it is applied to the stem.

Fig. 4 is an enlarged transverse section on the line 4—4 in Fig. 3, showing the fabric reinforcing member which extends from end to end of the brushing element.

Fig. 5 is an end view of the brush.

Fig. 6 is a side view of the brush.

In the form of the invention shown by the drawings, a metal stem or core 1 is screwed onto a rotatable rod 2 (Fig. 2) and this stem is provided with annular seats 3 and 4, and abutment shoulders 5 and 6 at the inner ends of the respective seats. The outer end of the stem is enlarged as shown at 7 in Fig. 2.

The side brushing elements, which act upon the side faces of the bottles, preferably include two circular rows or groups, of flexible rubber fingers 8, each group being formed integral with a rubber collar 9 tensioned on the elongated seat 4, as shown in Fig. 2. One of these collars 9 engages the abutment shoulder 6 to prevent longitudinal displacement of said collar, and the other collar 9 lies between the aforesaid collar and the abutment shoulder 5.

The flexible fingers 8 extend from the sides of the rotatable stem 1, and the free end portions of said fingers have brushing faces which are thrown by centrifugal force onto the side faces of the bottle, while the brushing device is rotated in the bottle. This condition is suggested in Fig. 1.

The fingers 8 in one of the circular groups preferably alternate with, or lie between, the companion fingers 8 in the other group, as shown in Figures 5 and 6. This alternating arrangement of the fingers prevents them from interfering with each other and distributes the brushing elements around the periphery of the brush.

As shown by Figs. 3 and 4, each group of brushing fingers 8 and its attaching collar 9 can be conveniently made from a section of rubber tubing, split lengthwise to provide free, flexible brushing fingers, arcuate in cross section.

An important reinforcing element is obtained in a simple manner by the use of rubber tubing reinforced by fabric 10 as shown in Fig. 4. This fabric is enclosed by the rubber and it extends throughout the length of the tubing. Therefore, each brushing element is provided with a substantial reinforcement extending from its attaching collar 9 to the brushing tips of its fingers. The strong and durable rubber fingers are large enough to cover a relatively large area of the face to be brushed, and they are heavy enough to be very forcibly held on this face by the action of centrifugal force. Moreover, the forcible brushing action is well distributed over the entire inner face of the bottle as the large brushing tips move in wide spiral paths while the rotating brush moves lengthwise of the bottle. However, another problem arises from the different condition at the bottom of the bottle, the object being to obtain an effective brushing action at the bottom of the bottle and in the corner where the bottom merges into the side, or peripheral, portion of the bottle. It is important to thoroughly brush the entire area of this bottom, including its central portion as well as the corner at the periphery of the bottom.

This function is effectively performed by an end brushing element extending from the end portion of the stem and having its brushing fingers arranged in a peculiar manner to positively accomplish the desired results.

In the preferred form of the invention, this end brushing element comprises a rubber attaching collar 11 tensioned on the seat 3 (Fig. 2) and engaging the abutment 5 to prevent longitudinal displacement of the collar relative to the stem. Flexible rubber fingers 12, 13 and 14 extend from this collar 11, and these fingers are long enough to project into the circular corner at the bottom of the bottle, as shown in Fig. 1.

At this point it may be well to observe that if the brushing fingers are not positively directed into the circular corner, they might lie in an irregular mass, more or less remote from the corner. Therefore, a peculiar arrangement of elements has been devised to insure a brushing of the central area of the bottom, as well as the corner remote from the center.

Attention is directed to the pair of end fingers 12 and 13 having flaring inner faces diverging from the axis of the brush, as shown in Figures 5 and 6 and adapted to spread apart when forced onto the bottom of the bottle, as shown in Fig. 1. These fingers 12 and 13 are secured in the diverging positions to predetermine the directions in which they are to spread. To retain said fingers in the diverging positions, they may be united at the axis of the brush, and this union may be obtained by extending the finger 12 through an opening 15 formed in the finger 13, thereby providing a continuous brushing face extending across the junction of the intersecting fingers.

This continuous brushing face is approximately V-shaped in Fig. 6, but when the end of the brush is forced onto the bottom of the bottle, the diverging fingers 12 and 13 spread apart and conform to the bottom. Said fingers then extend in a continuous line entirely across the bottom to provide the desired brushing at the center and at all other points throughout the bottom.

Furthermore, the rubber portions between the junction of the fingers 12 and 13 and the end of the metal stem are free to yield in response to pressure exerted longitudinally of the stem, so the material at said junction is yieldingly forced onto the center of the bottom, and this condition not only results in a brushing of the center, but also avoids the danger of breakage while the desired brushing pressure is obtained at this point.

It will now be understood that the diverging fingers 12 and 13 are positively spread apart on the bottom of the bottle, instead of being bent into an uncertain irregular condition, and that the arrangement shown provides a continuous brushing face extending across the junction of these fingers to brush the center of the bottle, while end portions of the same fingers are positively located in the circular corner around the bottom.

The other pair of end fingers 14 lie at opposite sides of the junction of the intersecting fingers 12 and 13, and all of these fingers cooperate to brush the bottom of the bottle. This end brushing device is preferably made of reinforced rubber tubing substantially as shown in Figures 3 and 4.

The simple brushing device herein shown can be easily manufactured, and its elements can be quickly assembled by merely forcing the rubber attaching collars 9 and 11 onto the stem 1 where they are frictionally secured and held against longitudinal displacement by the shoulders 5 and 6. The large, heavy fingers provide for the desired forcible brushing action, and they have the strength and durability to withstand the severe service conditions to which they are subjected.

Furthermore, the novel brush includes the side-brushing fingers 8 especially adapted to perform the function of brushing the sides of the bottle, while the end brushing elements are differently arranged to positively provide the desired brushing throughout the bottom and corner of the bottle. The different groups of fingers thus cooperate with each other to effectively perform all of the desired functions.

To provide for the insertion of the flaring brushing device into the bottle, a tube 16 (Fig. 1) may be forced into the open end of the bottle, and the brushing device is reciprocated into and out of the tube, all of which may be accomplished by any suitable mechanism.

We claim:

1. A bottle-washing brush having flexible fingers at one end to brush the bottom of the bottle, said fingers crossing and being joined to each other at a point between their ends to provide a continuous brushing face extending across the junction of the crossed fingers and adapted to brush the bottom of the bottle.

2. A bottle-washing brush having flexible fingers at one end to brush the bottom of the bottle, said fingers crossing and being joined to each other at a point between their ends to provide a continuous brushing face extending across the junction of the crossed fingers and adapted to brush the bottom of the bottle, and free, flexible brushing fingers at opposite sides of said junction adapted to cooperate with the crossed fingers in brushing the bottom of the bottle.

3. A bottle-washing brush comprising a stem, a rubber collar surrounding and secured on an end portion of said stem, and flexible rubber fingers integral with and extending from said collar to brush the bottom and corner of the bottle, one of said fingers being provided with an opening beyond said stem and the other being extended through said opening to provide brushing faces extending across and flaring from the axis of the brush, said flaring faces being exposed at the end of the brush, so as to spread apart on the bottom of the bottle.

4. A bottle-washing brush comprising a metal stem provided with annular seats and abutment shoulders at the inner ends of said seats, an end brushing element comprising an elastic rubber collar tensioned on the seat nearest the inner end of said stem and adapted to engage one of said shoulders to prevent displacement of said rubber collar, and rubber fingers integral with and extending from said collar to brush the bottom and corner of the bottle, two of said fingers being united in intersecting lines to provide a continuous brushing face across the axis of the device, and a side brushing element comprising another elastic rubber collar tensioned on one of said seats and provided with a circular row of free rubber fingers to brush the sides of the bottle.

5. A bottle-washing brush comprising a stem provided with seats, an end brushing element in the form of a split rubber tube comprising an elastic rubber collar tensioned on the seat nearest the inner end of said stem and rubber fingers integral with and extending from said elastic collar to brush the bottom and corner of the bottle, and a side brushing element comprising another split rubber tube having an elastic rubber collar tensioned on another of said seats and provided with a circular row of free rubber fingers integral with and extending from the last mentioned elastic collar to brush the sides of the bottle.

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

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