April 26, 1966 R. G. KOCH 3,247,647

APPLICATOR DEVICE

Filed Sept. 4, 1962 2 Sheets-Sheet 1

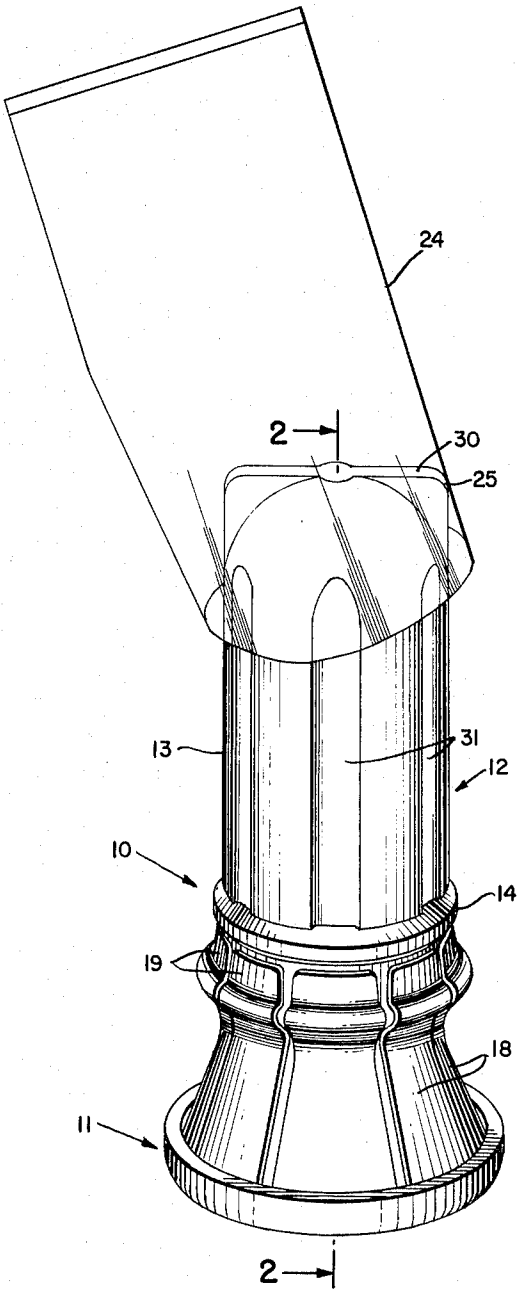


FIG. 1.

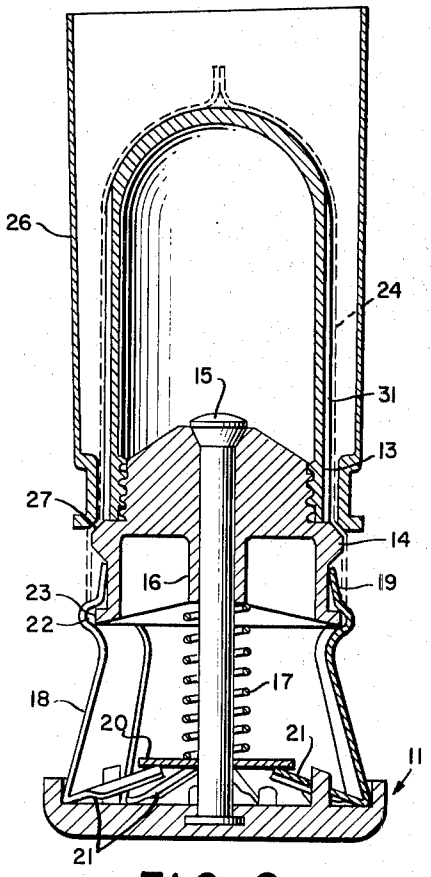


FIG. 2.

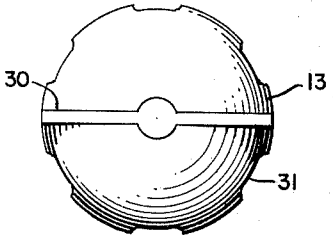


FIG. 4

INVENTOR.
Robert G. Koch

BY

Lewis H. Lanman
ATTORNEY

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APPLICATOR DEVICE

Filed Sept. 4, 1962 2 Sheets-Sheet 2

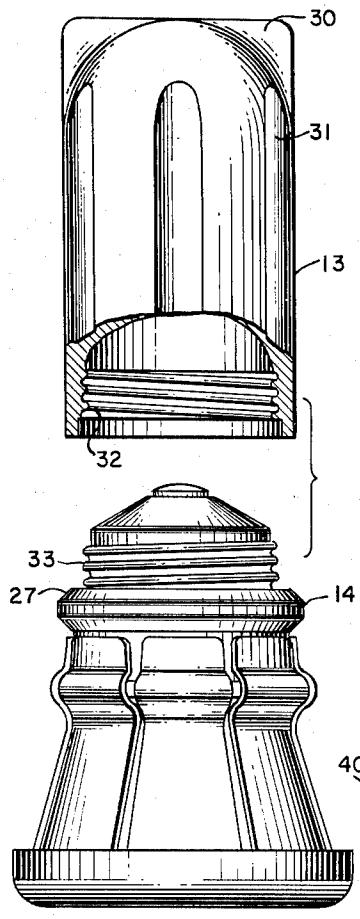


FIG. 3.

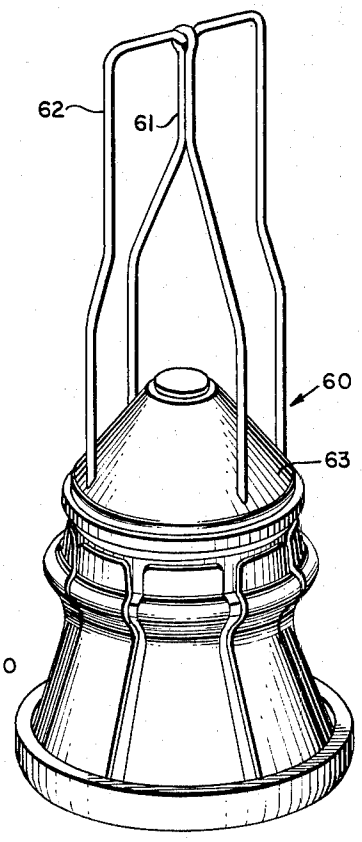


FIG. 6.

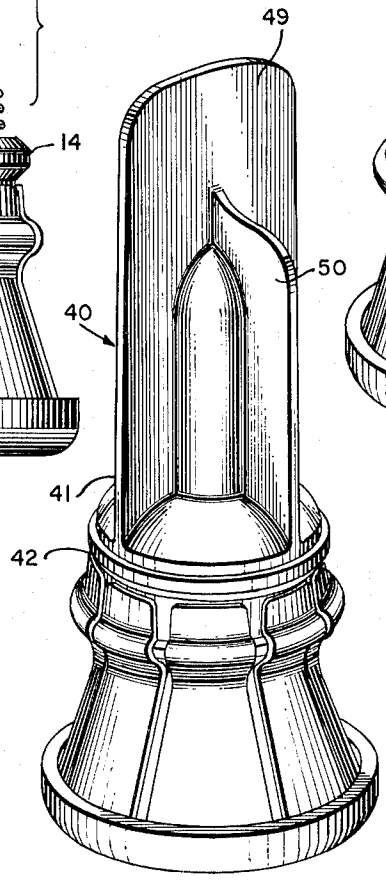


FIG. 5.

INVENTOR.
Robert G. Koch

BY

Louis A Lanman

ATTORNEY

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3,247,647

APPLICATOR DEVICE

Robert George Koch, Dover, Del., assignor to International Latex Corporation, Dover, Del., a corporation of Delaware

Filed Sept. 4, 1962, Ser. No. 221,042
7 Claims. (Cl. 53—384)

This invention is an improvement in a device for mounting a collapsible thin-walled receptacle upon a supporting member. In particular, the invention provides an improved tool for expanding the open mouth of a flexible bag of stretchable film material and folding it over the rim of a tubular supporting holder.

Devices of this type are shown and described in U.S. Patent 2,900,779 granted August 25, 1959 to Thomas R. Baxter and Bonnie C. Miller for Opening and Expanding the Mouth of a Flexible Receptacle. Accordingly, the description in the aforementioned patent is incorporated herein by reference.

The device of the invention is particularly adapted for use in assembling a nursing bottle unit such as shown and described in copending application Serial No. 810,049 filed April 30, 1959, now Patent No. 3,075,666. The unit consists of a flexible disposable bag of somewhat stretchable material, a relatively rigid tubular holder over the rim of which the open mouth of the disposable bag is mounted and a nipple closure secured thereto after the bag is filled. In some cases, a bag supporting ring such as shown in U.S. Patent 2,604,222 may be used instead of an elongated tubular holder. The disposable bag is made of polyethylene or similar plastic film material which is collapsible and therefore the bag must be mounted upon the supporting holder before filling. This assembly operation is performed in an improved manner by the device of the invention.

Basically, the tool described in U.S. patent 2,900,779 and the tool of this invention both consist of a base member and a movable head piece which is connected to the base in spaced relation and movable toward the same against spring tension. A plurality of bag mouth-expanding fingers are pivotally mounted on the base with free upper end portions engaging the periphery of the lower portion of the head piece so that the fingers are moved radially outwardly by downward movement of the head piece. The head piece has a peripheral offset above the upper ends of the fingers upon which the rim of the bag holder is placed in inverted position after placing the mouth of a bag over the head piece and the upper free end portions of the fingers. Movement of the head piece toward the base of the tool moves the fingers radially outwardly and causes the bag mouth to expand. As downward movement of the head piece continues the expanded mouth of the bag held by the fingers is folded over the rim of the bag holder. Retraction of the head piece leaves the bag securely mounted upon the rim of the holder.

Experience with the bag opening and expanding tool of U.S. Patent 2,900,779 has proven that there are shortcomings in the construction and operation of such a tool, particularly in the respects noted below.

The disposable bags normally come in a flattened condition and should be substantially fully opened before filling. The weight of the filling liquid does not accomplish a full opening of the bag and errors in desired volume of liquid are commonly experienced unless the bag is fully opened before hand. The tool of Patent 2,900,779 opens only the mouth of the bag.

Also, where an elongated tubular holder is utilized, it must be placed over the collapsible bag. The bag in more or less flattened condition has a width greater than the

diameter of the holder. Consequently, in placing the bottle holder over the collapsible flexible bag, the bag tends to collapse and the bag mouth is often pushed below the proper position over the ends of expanding fingers. When this occurs the device cannot function properly without repositioning the bag. To avoid this, the closed end of the bag must be grasped with one hand while the holder is placed over the bag.

In addition, with the bag in normally flattened condition, it is difficult to initially open the bag mouth for placing it on the head piece of the tool shown in 2,900,779. In fact, there is danger of desterilizing the inner surface of the bag in placing the bag mouth on the tool as shown in FIGURE 1 of the patent.

This invention eliminates all the mentioned disadvantages and provides an improved tool for mounting the open end of a flexible receptacle, such as a disposable bag for a nursing unit, over the rim of a supporting holder by means of a head piece of particular construction. The head piece produces a substantially full opening of the bag during the assembly operation and before filling thereby eliminating errors in liquid volume.

The construction of the head piece also facilitates initial opening of a bag in normally flattened condition without touching the mouth of the bag so that danger of desterilizing is eliminated.

The invention provides an elongated head piece which supports the bag against collapse when the bag holder is placed over the bag into bag-mouth-receiving position on the tool. The head piece has a length so proportioned to the bag length that the top of the head piece engages the closed end of the bag and supports the inverted bag with the bag mouth in proper position over the free ends of the expanding fingers of the tool. In this manner the bag is always properly positioned, and the speed and accuracy of the whole bag opening and mounting operating is greatly improved.

The invention also provides a head piece having an elongated upper portion detachable from the lower portion connected to the base of the tool. Thus, head pieces to accommodate bags of various sizes, for example, 4 and 8 ounce nursing bottles, are provided simply by interchanging the upper portion.

The improved bag-to-holder applicator tool is more particularly described with reference to complete specific embodiments thereof shown in the accompanying drawings, it being understood the invention is not limited thereto, in which

FIGURE 1 is a perspective view of the improved device of the present invention showing a bag being placed over the top of the head piece and the bag mouth being initially opened;

FIGURE 2 is a cross-sectional view taken on line 2—2 of FIGURE 1 showing the bag and bag holder in position on the tool for assembly;

FIGURE 3 is an elevational view, partly in section, showing the preferred two part detachable construction of the head piece of the tool;

FIGURE 4 is a plan view of the upper part of the head piece shown in FIGURE 3;

FIGURE 5 is a perspective of a modified form of a two part head piece for the tool in accordance with the invention; and

FIGURE 6 is a perspective view of a one part head piece for the device of the invention.

Referring now to FIGURES 1 and 2 there is shown generally at **10** the bag and bag holder assembling tool of the invention having a base member **11** and a movable head piece **12**. The head piece **12** has an elongated upper portion **13** and a lower portion **14** connected to base member **11** by means of a headed central guide pin **15** which passes through sleeve **16** and is mounted on

base 11. Spring 17 mounted on the pin 15 below sleeve 16 of the head piece 12 resiliently spaces it from base 11. A plurality of fingers 18 are pivotally mounted in spaced relation on base 11. The upper free end portions 19 of fingers 18 are resiliently pressed into contact with the periphery of lower portion 14 of head piece 12 by engagement of plate 20 on pin 15 with inwardly bent leg portions 21 on the fingers 18. The fingers 18 have a peripheral groove 22 near their upper free ends 19 into which fits a peripheral flange 23 on the base of head piece 12 and below which the fingers are inwardly slanted as shown at 18.

A disposable stretchable plastic bag 24 in normally flattened condition is initially opened by the wedging action of edge means 25 on the top of head piece 12 while holding the bag at its closed end. The bag is then pushed down over elongated head piece 12 until the bag mouth engages the tops of the grooves 22 of the fingers 18. The bag is substantially fully opened by the elongated upper portion 13 of the head piece. An elongated bottle holder 26 shown in outline in FIGURE 2 is then placed inverted over the bag on head piece 12 and the rim seats on the peripheral offset 27 of the head piece in position to receive the folded over mouth of the disposable bottle.

When head piece 12 is moved downwardly by pressing down on the rigid holder 26, the fingers 18 are moved radially outwardly as the base of 14 of head piece 12 moves downwardly toward the base and contacts the inwardly slanted surfaces of the fingers. This outward movement of the fingers expands the mouth of the stretchable plastic bag and as the head piece continues its downward movement, the stretched bag mouth is engaged by the tops of the fingers and folded over onto the downwardly moving rim of the holder 26.

The elongated upper portion 13 of head piece 12 has a length which is so proportioned to the length of the bag that when the mouth of the bag is in position over the free upper ends of the bag-expanding fingers and the bag holder is pushed down over the bag, the closed end of the bag is contacted by the top of the head piece 12 which supports the bag against collapse and in proper position on the fingers for expansion and folding over onto the rim of the holder.

The particular embodiment of head piece 12 shown in FIGURES 3 and 4 provides an elongated upper portion 13 which is substantially cylindrical in shape. It has a diameter only slightly less than that of the disposable bag and the bag holder which with its proportioned length gives a volume sufficient to substantially fully open the bag when the bag is placed over the head piece into position on the tool.

On the top of elongated upper portion 13 of head piece 12 is a ridge 30 which provides a flat edge or blade for insertion into the bag mouth to facilitate initial opening of the bag when in normally flattened condition. The upper portion 13 of head piece 12 shown in FIGURES 3 and 4 is provided with recesses or flutes 31 on its outer surface which extend parallel to its axis. These facilitate the escape of air from the bag when the bag is placed over the head piece 12. More important, they prevent collapse of the bag due to suction created by pulling the assembled holder and bag from the tool. Where the upper portion 13 of head piece 12 is hollow, the fluting may be eliminated and perforations provided near the top of part 13 to obtain the same result.

As shown in FIGURE 3, the elongated upper portion 13 and lower portion 14 of head piece 12 are detachable. Part 13 is formed as a hollow shell of plastic or other suitable rigid material and is internally screw threaded at 32. The mating lower portion 14 is provided with external screw threads 33 above the peripheral offset 27. In this manner, head pieces of different size may be used for bags of different length for proper opening, positioning and support of the bag.

Referring to FIGURE 5 there is shown a modified form of head piece for the improved bag expanding and folding device of the invention. The head piece 40 is comprised of two parts, an elongated upper portion 41 detachable from base portion 42 by means of internal threading (not shown) similar to the construction shown in FIGURE 3.

In this construction, the detachable upper portion 41 of head piece 40 has a pair of blades 49 and 50 positioned at right angles intersecting on the vertical center line. The blade 49 is longer than blade 50 so that a flattened top edge is provided on head piece 40 for initial opening of the mouth of the normally flattened bag by wedging action.

The blades are effective to substantially fully open a bag placed thereover, because of their widths which together provide an effective circumference only slightly less than that of the bag and the rim of the bag holder. Also the length of blade 50 is sufficient to contact the closed end of the bag and support the same in position when the mouth of the bag is placed in position on the tool.

In FIGURE 6 is shown a one part head piece for the bag and holder assembly tool. The upper portion of the head piece 60 consists of two wire loops 61 and 62 arranged in planes intersecting at right angles on the vertical center line. The ends of the wire loops 61 and 62 are mounted in base member portion 63 of the head piece 60. Loop 61 is flattened at its upper portion, while loop 62 at its upper end has substantially the same diameter as at its base. This provides a flat edge or blade at the top of the head piece 60 for insertion into a normally flattened bag for initially opening the bag mouth. The effective circumference of the wire loop 61 and 62 is only slightly less than that of a bag and bag holder and this with their length proportioned to the length of the bag provides for substantially full opening and support of the bag on the assembly tool.

Still another advantage in operation of the device results from the elongated head piece of the invention. At times the bag mouth tends to slip off the bag expanding fingers when operating the device. When this occurs the bag cannot be folded into proper position over the rim of the bag holder. To prevent this, the frictional coefficient of the finger surfaces may be increased, for example, by sand blasting. However, with a head piece as in 2,900,779, the edge of the bag mouth then tends to remain on the fingers and the bag is pulled down within the holder and improperly positioned. The elongated head piece of the invention with its proportioned length contacts the closed end of the bag and prevents any pulling down of the bag while the fingers with higher friction prevent slipping. Together this insures fast, positive, and accurate positioning of the bag and folding of the bag mouth over the rim of the holder.

Various other modifications may be made to the device of the invention while still obtaining the advantages set forth above. These are to be construed as within the spirit of the invention and with the scope thereof as defined in the appended claims.

I claim:

1. In a device for folding the open end of a flexible thin-walled bag of stretchable material over the rim of a tubular supporting member comprising a base member, a head piece for receiving the bag mouth connected to and resiliently spaced from said base, a plurality of radially movable fingers disposed around the periphery of said base with their upper free end portions engaging the periphery of the lower portion of said head piece, said fingers having inwardly directed surfaces adapted to be contacted by downward movement of said head piece and a peripheral offset on said head piece above the upper ends of said fingers for seating the rim of the supporting mem-

ber in bag mouth-receiving position, whereby when a bag mouth is placed over the upper end portions of the fingers movement of the head piece toward the base causes outward radial movement of the fingers to expand the bag mouth into rim-receiving position, the improvement which comprises an elongated upper portion on said head piece for receiving and opening a bag and for positioning said tubular supporting member relative to said bag mouth, said upper portion having an edge member extending across the top thereof for initially wedging open said bag, and said upper portion being proportioned to the length and diameter of said bag so that it contacts the closed end thereof and supports the opened bag in position to be folded over the rim of the tubular supporting member as the device is operated.

2. A device according to claim 1 in which the top of the upper portion of the head piece has a flat edge means for initially wedging open a bag mouth.

3. A device according to claim 1 in which the elongated upper portion of the head piece comprises a pair of flat intersecting blades having an effective bag-opening circumference, one blade being longer than the other to provide a flat edge means for initial opening of a bag.

4. A device according to claim 1 in which the head piece comprises a lower base portion and an upper portion of two wire loops disposed in intersecting vertical planes, one loop being flattened at the top to provide an edge means for insertion into the mouth of a bag in normally flattened condition, the ends of the wire loops being mounted on said lower portion, said loops having an effective circumference and a length sufficient to substantially fully open and support a bag in position on said device.

5. In a device for folding the open end of a flexible thin-walled bag of stretchable material over the rim of a tubular supporting member comprising a base member, a head piece for receiving the bag mouth connected to and resiliently spaced from said base, a plurality of radially movable fingers disposed around the periphery of said base with their upper free end portions engaging the periphery of the lower portion of said head piece, said fingers having inwardly directed surfaces adapted to be contacted by downward movement of said head piece and a peripheral offset on said head piece above the upper ends of said fingers for seating the rim of the supporting member in bag mouth-receiving position, whereby when a bag mouth is placed over the upper end portions of the fingers movement of the head piece toward the base causes outward radial movement of the fingers to expand the bag

mouth into rim-receiving position, the improvement which comprises an elongated upper portion on said head piece for receiving and opening a bag, said upper portion having a length proportioned to the bag length so that it contacts the closed end of said bag and supports the bag against collapse and maintains the bag mouth in position while positioning the supporting member and operating the device, said upper portion of the head piece being substantially cylindrical with a diameter only slightly less than that of said bag and supporting member so as to substantially fully open a bag placed thereon.

6. A device according to claim 5 in which the outer surface of the upper portion of the head piece is longitudinally recessed to permit escape of air from a bag placed thereon and to prevent suction from collapsing the bag when removed with the holder from the device.

7. In a device for folding the open end of a flexible thin-walled bag of stretchable material over the rim of a tubular supporting member comprising a base member, a head piece for receiving the bag mouth connected to and resiliently spaced from said base, a plurality of radially movable fingers disposed around the periphery of said base with their upper free end portions engaging the periphery of the lower portion of said head piece, said fingers having inwardly directed surfaces adapted to be contacted by downward movement of said head piece and a peripheral offset on said head piece above the upper ends of said fingers for seating the rim of the supporting member in bag mouth-receiving position, whereby when a bag mouth is placed over the upper end portions of the fingers movement of the head piece toward the base causes outward radial movement of the fingers to expand the bag mouth into rim-receiving position, the improvement which comprises an elongated upper portion on said head piece for receiving and opening a bag, said upper portion having a length proportioned to the bag length so that it contacts the closed end of said bag and supports the bag against collapse and maintains the bag mouth in position while positioning the supporting member and operating the device, the upper portion of the head piece being detachable from the lower portion connected to the base.

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FRANK E. BAILEY, *Primary Examiner.*