

Nov. 15, 1966

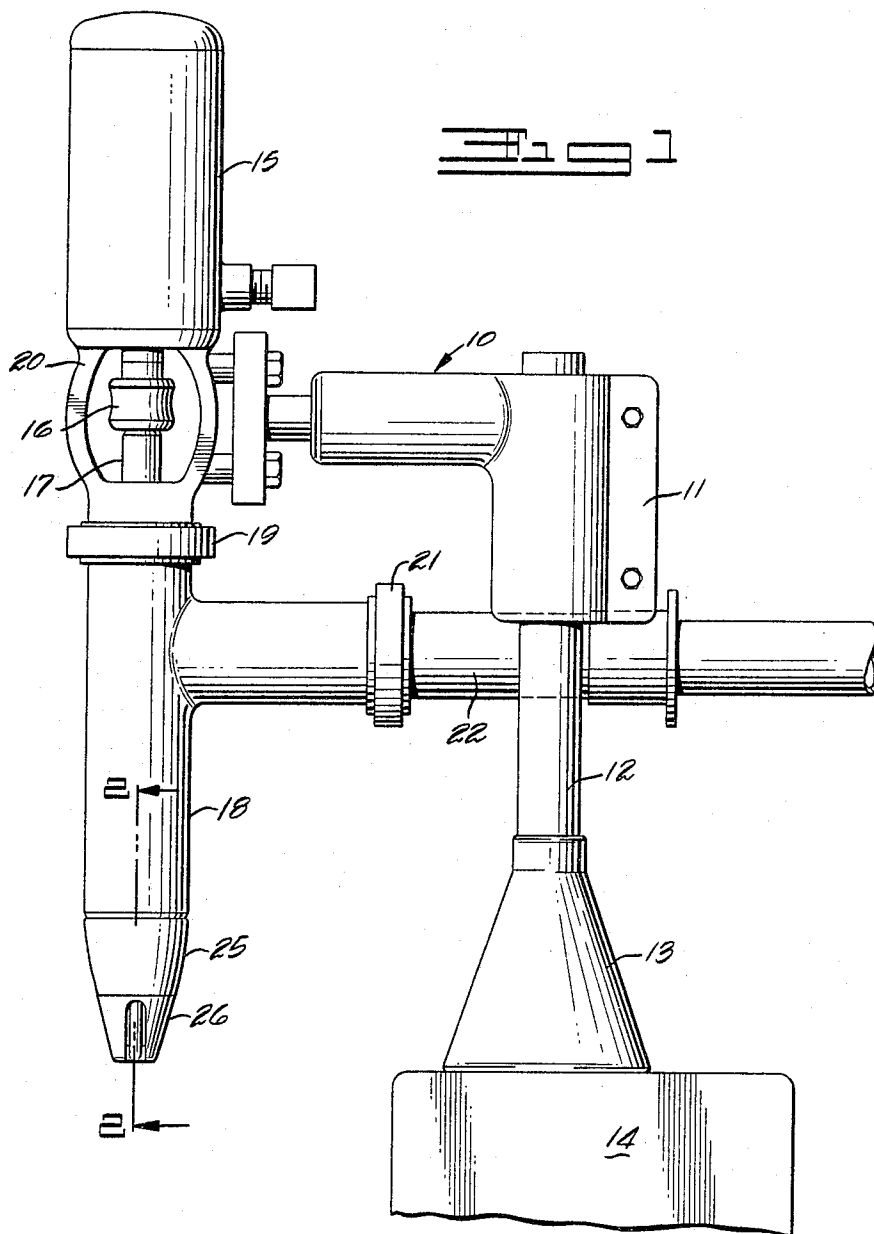
W. N. HENRY ET AL

3,285,299

CONTAINER SEALING AND FILLING MEANS

Filed April 30, 1964

2 Sheets-Sheet 1



INVENTORS.
WALTER N. HENRY
JOHN N. SRAMCIK
BY
MAHONEY, MILLER & RAMBO
BY *Wm. V. Muller*
ATTORNEYS.

Nov. 15, 1966

W. N. HENRY ET AL

3,285,299

CONTAINER SEALING AND FILLING MEANS

Filed April 30, 1964

2 Sheets-Sheet 2

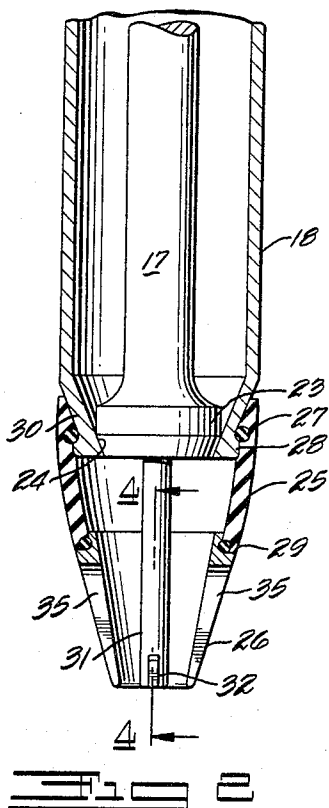
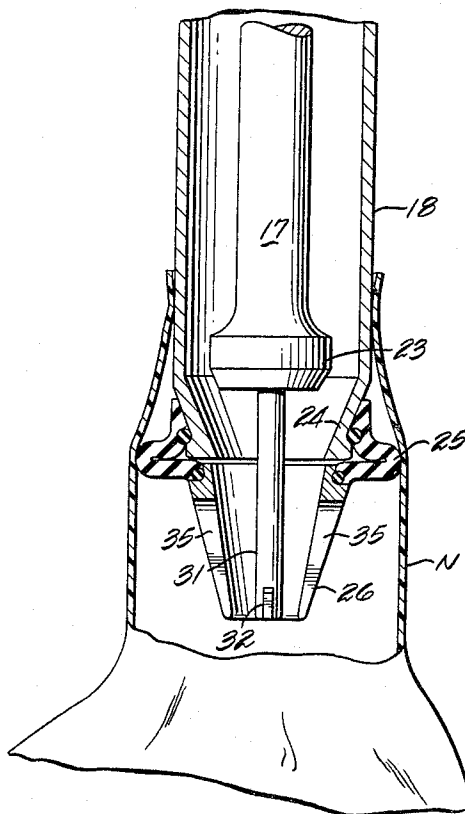


Fig. 2

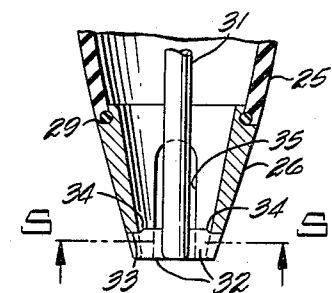


Fig. 3

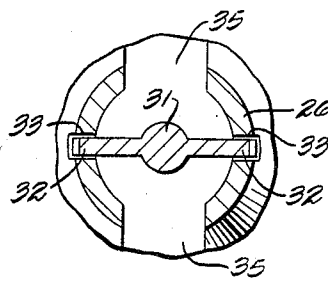


Fig. 4

INVENTORS.
WALTER N. HENRY
JOHN N. SRAMCIK
BY
MAHONEY, MILLER & RAMBO
BY
Wm. V. Muller
ATTORNEYS.

1

3,285,299

CONTAINER SEALING AND FILLING MEANS
Walter N. Henry, Groveport, and John N. Sramcik, Co-
lumbus, Ohio, assignors to National Industrial Products
Company, Columbus, Ohio, a corporation of Ohio
Filed Apr. 30, 1964, Ser. No. 363,737
7 Claims. (Cl. 141—312)

Our invention relates to a container sealing and filling means. It has to do, more particularly, with nozzle means for insertion into and sealing in the neck of a container so as to fill the container without leakage or spillage of the product being supplied thereto. The device of this invention is especially useful in connection with containers having flexible necks, for insertion into each neck to fully expand it and engage it with a sealing contact to maintain it in expanded and supported filling position.

In its preferred embodiment, our invention is incorporated in a filling device in the form of a filling valve which is connected to a source of the material or substance to be supplied to the containers. For example, this may be liquid, such as milk or water, and the containers may be of the flexible plastic type, each of which, for example, has a flexible neck through which it may be filled and which may be used for dispensing the contents after filling. Up to the present time, these containers have been filled by inserting a nozzle into the mouth of each and clamping the neck to the exterior of the nozzle by a mechanical encircling clamp. Usually, this results in wrinkling of the plastic sheet material of the neck and thereby makes it difficult to seal it, especially against leakage of the liquid supplied under pressure. Our present invention overcomes this difficulty by providing a nozzle tip with an associated boot which is of suitable hollow cross section and is of compressible or yieldable flexible material, so that an axial force thereon, tending to bring its ends together, causes it to expand outwardly into sealing contact with the surrounding flexible neck of the container so as to support said neck in sealed filling position relative to the nozzle tip.

Various other objects and advantages will be apparent from the attached drawings and the following description and claims.

As indicated above, the preferred embodiment of our invention is illustrated in the accompanying drawings but it is to be understood that specific details may be varied without departing from basic concepts of the invention.

In these drawings:

FIGURE 1 is a side elevation of the head of a filling machine embodying our invention.

FIGURE 2 is an enlarged axial sectional view through the filling nozzle of the filling valve of the machine taken along the vertical line 2—2 of FIGURE 1, showing the valve in closed condition with the nozzle boot in its normal position when the nozzle is without a container.

FIGURE 3 is a view similar to FIGURE 2 but showing the valve in opened condition with the boot expanded into sealing and retaining engagement with the neck of a container slipped over the nozzle.

FIGURE 4 is an axial sectional view taken through the nozzle boot and tip along the line 4—4 of FIGURE 2.

FIGURE 5 is a transverse sectional view taken along line 5—5 of FIGURE 4 through the nozzle tip.

With reference to the drawings, in FIGURE 1 there is illustrated the head 10 of a filler machine of a type to which this invention is applicable although it will be understood that the invention is not limited to this type of head alone. The head may be supported by a suitable bracket 11 adjustably clamped to the upper end of a tubular standard 12 which has its lower end portion

2

fixed in a conical socket member 13 on the upper wall of a base housing 14.

The head 10 itself supports a filler valve unit which may comprise a valve control units 15 which may be of the solenoid-actuated type and which is coupled by a quick-connect and disconnect coupling 16 to the upper end of the stem or plunger 17 of a valve which includes a body or nozzle 18 in which the stem reciprocates. The upper end of the nozzle is connected by a quick-action coupling 19 to a downward extension or yoke 20 which depends from the housing of the control unit 15. The nozzle 18 is also connected by a quick-action coupling 21 to a liquid-supplying conduit 22.

As indicated in FIGURES 2 and 3, the stem 17 is disposed concentrically within the tubular nozzle 18 for vertical or axial movement therein. Its lower or inner end is enlarged to provide a valve portion 23 which cooperates with a tapered valve seat 24 on the lower inwardly converging end of the nozzle. According to our invention, at this lower end of the nozzle, there is provided a flexible or yieldable boot 25. This member 25 is made of compressible material, such as rubber or plastic which has a substantial wall thickness. The member 25 is of annular transverse cross section and substantially parabolic vertical cross section. Directly below the boot 25 and axially aligned therewith, a nozzle tip 26 is provided. This tip may be of substantially rigid material the same as the nozzle 18, for example, metal. The tip 26 is of inverted frusto-conical form and its wall is of annular cross section and converges toward its lower end. Its wall merges at its upper edge with the lower edge of the wall of the boot 25. Together, the members 25 and 26 provide a lower or tip end on the nozzle 18 which is of inverted frusto-conical form and which is adapted to receive the flexible neck of a container to be filled which is indicated at N in FIGURE 3.

The upper or inner end of the boot 25 is inwardly tapered so that when it is slipped over the lower tapered end of the nozzle 18, it will snugly engage therewith, and it carries, in a groove on the inner tapered surface thereby provided, an O-ring 27. This O-ring 27 will snap over a retaining shoulder 28 on the lowermost extremity of the nozzle 18. The lower or outer end of the boot 25 slips over the reduced upper or inner extremity of the nozzle tip 26 against a stop shoulder 29 and an O-sealing ring is provided within such extremity of the boot 25 in a groove in the reduced portion of the tip around the shoulder. Thus, the flexible boot 25 is disposed between the stop shoulder 29 of the nozzle tip 26 and the inwardly tapered surface 30 of the nozzle body 18. The annular shoulder 28 will also extend slightly into the adjacent inner surface of the compressible member 25 since it will tightly grip it. Thus, the boot 25 is mounted between the nozzle tip 26 and the nozzle body 18 and will not slide axially of either member.

Normally, the boot 25 will be extended axially, as shown in FIGURE 2, and the valve 23 will be seated but it can be contracted axially inwardly and upwardly and will simultaneously expand peripherally or radially outwardly as indicated in FIGURE 3. At the same time, the valve 23 is unseated and, in fact, in operation, unseating of the valve actually brings about the outward radial expansion of the boot. Since the boot is curved outwardly, inward pressure exerted on its outer or lower edge will expand it radially outwardly.

To obtain radial outward expansion of the boot 25 when the filler valve is opened, means is provided for connecting it to the valve stem 17. This means includes a downward or outward retainer extension 31 on the stem 17 which projects concentrically through the boot 25 to the outer extremity of the nozzle tip 26. The outer or

3

lower end of this extension 31 carries the diametrically opposed lugs 32 which project into aligning notches 33 in the tip 26. The lugs 32 are provided with centering shoulders 34 on their inner edges for cooperating with the tip 26 at the adjacent inner ends of the notches. The retainer extension 31 may have its upper inner end removably threaded into the valve and stem 17 and the lugs 32 will engage with the inner ends thereof to prevent outwardly axial displacement of the boot 25 and nozzle tip 26 relative to the nozzle 18, the extension 31 being of the proper length to provide for this engagement. The tip 26 is further provided with diametrically opposed larger notches or slots 35, positioned at a right angle to the position of the opposed notches 33, and provided as lateral fluid passages in the nozzle tip.

In filling bags with this device, the neck N is first slipped upwardly over the projecting nozzle tip 26 and boot 25 and up over the body of the nozzle 18, as shown in FIGURE 3. If the control 15 is now operated to pull the rod 17 upwardly or inwardly, the valve 23 is unseated to allow the flow of filling fluid out the nozzle tip 26. However, simultaneously, the boot 25 is expanded radially outwardly by upward or inward pull on the lugs 32 which apply inward axial pressure to the outer or lower end of the boot 25 through the nozzle tip 26. The outward expansion of the boot 25 causes it to expand the container neck and eventually to engage it with a fluid-tight sealing engagement. All wrinkles in the material will be eliminated and there will be a continuous sealing contact between the peripheral folded edge of the boot and the inner surface of the container neck. The container neck will now be suspended or supported from the filler valve. As the stem 17 is returned to its lower or valve-closing position, the material of the boot 25 has sufficient resiliency to again extend it axially to the position shown in FIGURE 2 which will release the container neck and permit removal of the filled container.

It will be apparent that this invention provides a filler valve with a nozzle which is insertable in the neck of a container to fill it. The valve includes sealing means in the form of the expandable tubular boot which is expanded laterally or radially by axial inward pressure at opposed ends of the boot simultaneously with the opening of the valve. Thereafter, fluid will flow through the boot into the neck of the container and the boot seals the neck to prevent leakage. As soon as the container is filled and the valve is closed, the boot contracts radially inwardly and extends axially and the container neck is released.

Various other advantages will be apparent.

According to the provisions of the patent statutes, the principles of this invention have been explained and have been illustrated and described in what is now considered to represent the best embodiment. However, it is to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

Having thus described our invention, what we claim is:

4

1. A nozzle for use in filling a container having a neck adapted to be slipped over the nozzle during filling, said nozzle including a flexible tubular member, and mechanical means mounted for movement axially of said nozzle and connected to said flexible tubular member for subjecting said member to axial pressure to expand it outwardly into sealing engagement with the container neck so as to cause it and the neck to have complemental sealing contours.

2. The structure of claim 1 including a control valve in the nozzle which is normally closed, said mechanical pressure means being also connected to said valve for simultaneously opening said valve.

3. A nozzle according to claim 1 in which said nozzle includes a body and a tip with the flexible tubular member being a boot disposed therebetween, said mechanical pressure means being connected to said tip for moving the tip axially toward the body.

4. A nozzle according to claim 3 comprising a valve seat in the body, said mechanical pressure means including a valve stem in the body carrying a valve for cooperating with said seat, and means for connecting the stem to said tip.

5. A filler valve unit comprising a tubular nozzle body having a tip end and having a valve seat, a stem mounted in said body for axial movement therein and carrying a valve for cooperation with said seat, a flexible tubular boot having an inner end fixed to the body and an outer end fixed to a nozzle tip member, and mechanical means for operatively connecting the stem to said tip member so that axial movement of the stem to unseat the valve will simultaneously exert inward axial pressure on the boot to expand it outwardly and cause it and the neck of a container inlet in which it is to be inserted to have complemental sealing contours.

6. The structure of claim 5 in which the connecting means comprises a stem portion extending axially through the boot and into the nozzle, said portion having lug means for engaging the nozzle tip member to apply inward pressure thereto upon inward movement of the stem.

7. The structure of claim 6 in which the tip member has diametrically opposed notches in its outer end and said lug means comprises diametrically extending lugs fitting into said notches.

References Cited by the Examiner

UNITED STATES PATENTS

50	2,901,009	8/1959	Potter	141—295 X
	2,955,796	10/1960	Titchenal	141—68 X
	3,106,230	10/1963	Laun	141—314 X

FOREIGN PATENTS

55	838,123	11/1938	France.
	712,234	7/1954	Great Britain.

LAVERNE D. GEIGER, *Primary Examiner.*

H. BELL, *Assistant Examiner.*