United States Patent

Stumpf

[15] **3,638,253**

[45] **Feb. 1, 1972**

[54] DEVICE FOR FILLING AND SEALING FLEXIBLE CONTAINERS

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[21] Appl. No.: **857,041**

[52] **U.S. Cl.** **5/337,** 5/348, 251/4

[51] **Int. Cl.** **A47c 27/08**

[58] **Field of Search** 137/223; 251/4; 46/90; 273/65.4; 5/337, 338, 348–350

[56] **References Cited**

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[57] **ABSTRACT**

There is disclosed a tubular valve used to fill and seal inexpensive, disposable, inflatable containers such as pillows and the like. Sealing of this valve is accomplished by folding it to collapse its walls.

9 Claims, 9 Drawing Figures

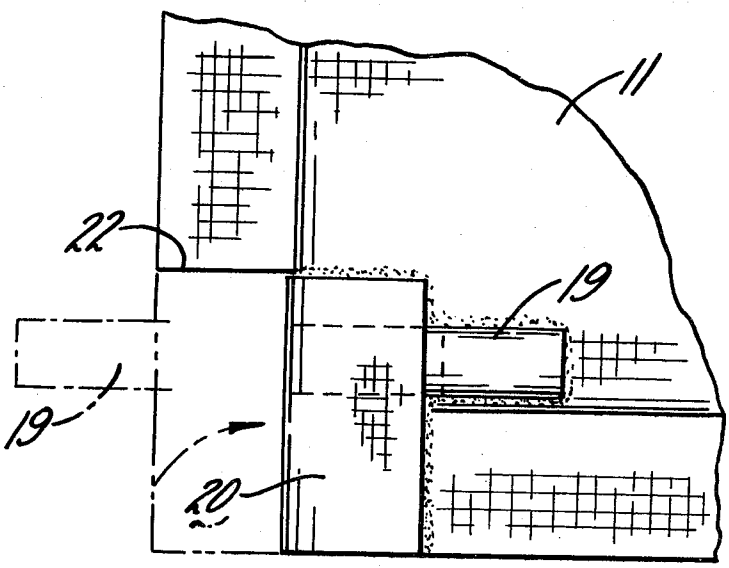


Fig. 1.

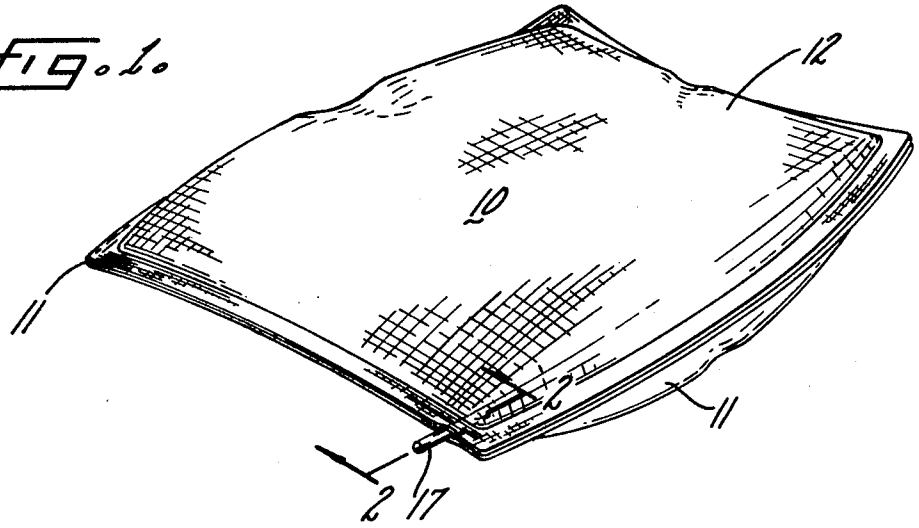
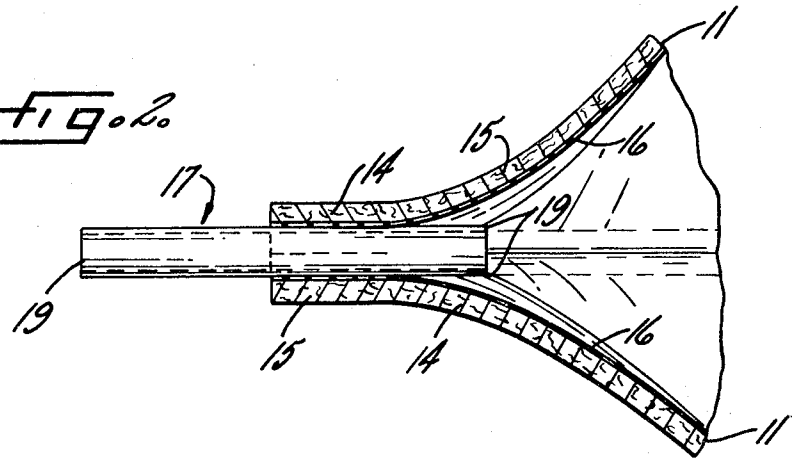


Fig. 2.



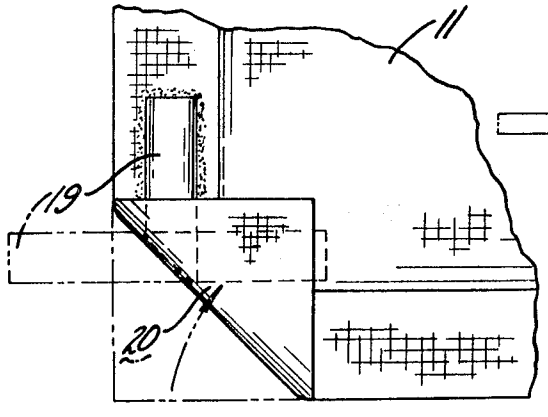


Fig. 4.

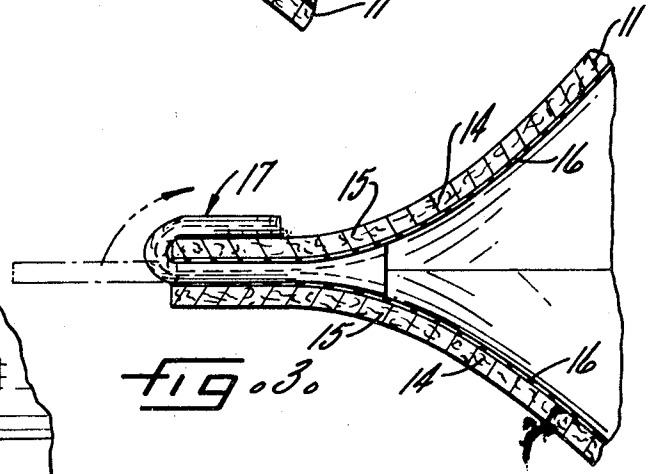


Fig. 3.

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FIG. 5.

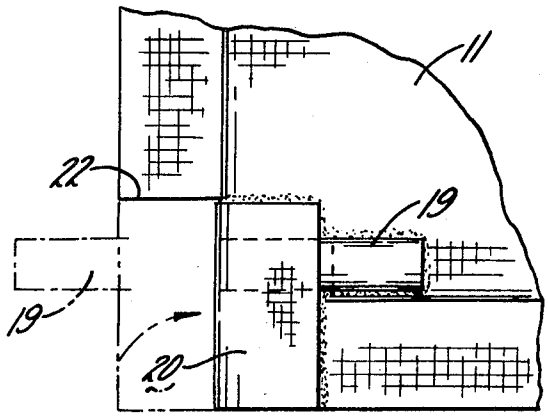
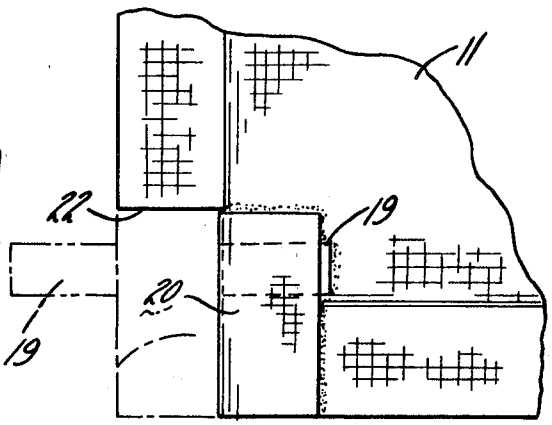


FIG. 6.



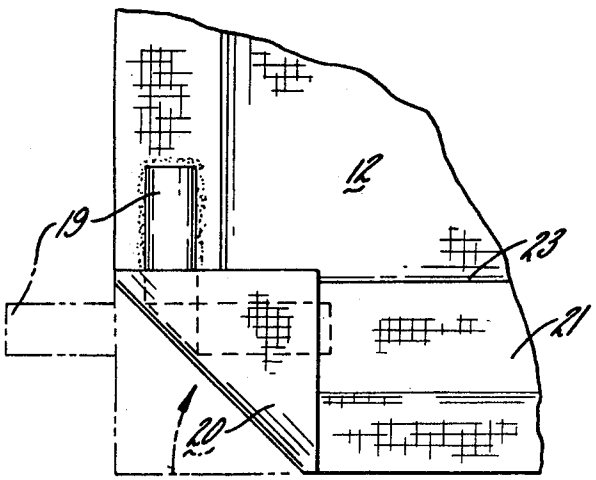


FIG. 7.

FIG. 8.

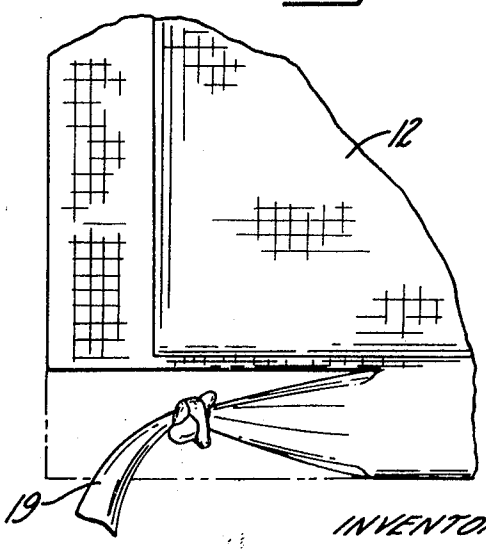
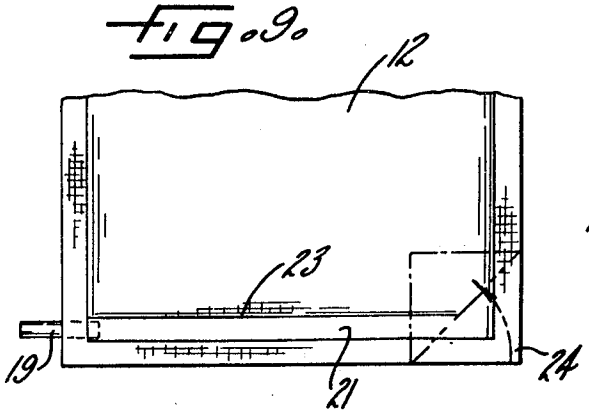


FIG. 9.



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DEVICE FOR FILLING AND SEALING FLEXIBLE CONTAINERS

This invention relates to devices for filling and sealing inflatable fluid containers and, more particularly, to tubular valves for inflating and sealing low-cost, disposable pillows and the like.

Conventional pillows filled with feathers, down, synthetic fibers, latex foam rubber and the like are provided by the hundreds of thousands by public institutions, such as schools and hospitals, and by public carriers, such as airlines and railroads, to the public each day. Each pillow represents a capital investment of at least several dollars that must be protected, stored, and inventoried. In addition, hygiene dictates that the outer covering must be removed after each use and replaced with a clean covering. The used or soiled covering being either discarded or sent to a laundry for washing.

It is therefore not surprising that recently hospitals, schools, railroads, airlines, and the like have begun to use inflatable, disposable pillows. These pillows have several advantages over the conventionally stuffed pillow stemming from the fact that they are either disposed of or taken by the user when he leaves the plane, train, bus, hospital, etc. They eliminate the need for separate pillow slips or coverings and, hence, also the need for either replacing or laundering these pillow slips or coverings. As they are inexpensive they eliminate the need for investing in and preserving a large stock of pillows. Since they can be stored deflated and inflated just prior to use they occupy less space during storage. In addition, these disposable, inflatable pillows may also be imprinted with a particular design so that when carried away by the user, either in an inflated or deflated state, from a bus, train, or plane they may serve as a means for publicizing the busline, railroad, airline, etc. Such pillows are conventionally constructed of a bladder covered with a soft absorbent material.

A valve used for inflating, or deflating and sealing a disposable pillow should be inexpensive, easy to use when either inflating or deflating the pillow, and, most importantly, should provide an airtight seal of the pillow. Heretofore, two-piece valves consisting of a valve stem and either a cap or plug such as is described in U.S. Pat. No. 3,283,343 have been used. The principal disadvantage with this construction is that the cap or plug, being a separate piece, can be easily lost or mislaid rendering the valve useless for sealing purposes.

It is, therefore, a primary object of this invention to provide an improved valving device for disposable, inflatable pillows that affords both easy inflation or deflation of the disposable pillow and, yet, provides a complete seal for the disposable pillow once it has been inflated.

Another object is to provide a valving device for a disposable, inflatable pillow that is reusable so that the user can unseal the pillow, deflate it, transport it elsewhere, reinflate it, reseal it and use it again with a minimum of difficulty.

Still another object of the invention is to provide a one-piece valving device for a disposable, inflatable pillow that can be manufactured at a nominal cost.

Other objects and advantages will become apparent as the following description proceeds, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is perspective view of a disposable, inflatable pillow including the valving device of the invention.

FIG. 2 is an enlarged section taken along line 2—2 of FIG. 1.

FIG. 3 is similar to FIG. 2 except the valve is shown in a folded or collapsed position.

FIG. 4 is an enlarged fragmentary plan view showing the valving device of the invention bent at a 45° angle to itself to effect sealing of the pillow.

FIG. 5 is an enlarged fragmentary plan view showing the valving device of the invention bent over on itself, with a slit in the heat sealed portion of the pillow just above the valve, to effect sealing of the pillow.

FIG. 6 is similar to FIG. 5, but shows the valving device bent over on itself twice to ensure a leakproof seal of the pillow.

FIG. 7 shows the valving device sealed as in FIG. 4, but with an inner air channel that extends almost all the way down one edge of the pillow.

FIG. 8 shows the valving device sealed by tying a knot in it.

FIG. 9 is similar to FIG. 1 but with an inner air channel that extends almost all the way down one edge of the pillow.

While the present invention is susceptible of various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the drawings and will herein be described in detail. It should be understood, however, that it is not intended to limit the invention to the particular forms disclosed, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention.

Turning now to the drawings, there is illustrated in FIG. 1 a disposable, inflatable pillow, generally indicated at **10**, which in the exemplary form of the invention here shown includes walls of a bilayered sheet material **11** whose edges have been heat sealed to form a fluid compartment, generally indicated at **12**. As shown in FIG. 2, the bilayered sheet material **11** comprises an outer layer of nonwoven fibrous material **14** having a texturally soft exterior surface **15**, on to which has been extruded an inner layer of airtight polyethylene film **16**. It is this inner layer of polyethylene film **16** that is utilized during the heat-sealing operation. In forming the pillow compartment, two separate sheets of bilayered material or one large sheet folded in half may be employed.

In accordance with one of the important aspects of this invention, provision is made for inflating or deflating and sealing an inflatable pillow **10** through a valving device **17** which comprises a tube **19** that has been inserted into the inflatable pillow **10** so that it is disposed between the walls of bilayered sheet material **11** with one end portion of the tube **19** extending inwardly beyond the heat sealed edges of the disposable pillow into the fluid compartment **12**, and with the other end portion of tube **19** extending outwardly beyond the sealed edges of the disposable pillow for providing fluid communication with the pillow compartment. If it is desired, tube **19** can be coated with a thermoplastic material or heat activatable adhesive to facilitate heat sealing it to the inner polyethylene film layer **16** of the bilayered sheets **11**. After inflation, the tube **19** and an adjacent portion of bilayered sheet material, shown generally at **20**, can be folded at either a 90° or 45° angle to collapse the tube **19** and form a fluid- or airtight seal as is shown in FIGS. **4**, **5**, **6**, and **7**.

When a 90° fold is being made, a slit **22** is made in the heat sealed edge of the pillow as is shown in FIGS. **5** and **6**. This slit should extend from the edge of the pillow to a point not quite through the heat sealed edge into the fluid compartment and be parallel to the next adjacent sealed edge of the pillow. In addition, the tube can also be folded first and then the folded tube and adjacent portion of bilayered sheet material can be folded again to provide a double seal, as is shown in FIG. **6**.

In accordance with a further aspect of the invention this fluid or airtight seal is maintained by coating a predetermined area of the outside surface of one of the sheets of the bilayered sheet material adjacent to the tube **19** with a cohesive and then folding this coated area and the tube at a 45° or 90° angle to collapse the tube and thus adhere the cohesive-coated areas to each other and hold the tube in it collapsed condition as is shown in FIGS. **4**, **5**, **6**, and **7**. As an alternative to the cohesive coating, a suitable double-faced tape could be used.

In FIGS. **7** and **9** there are illustrated variations on the sealing technique as described above. In this embodiment an air channel **21** is provided inside the pillow between the heat-sealed edges and the fluid compartment **12** and extending down one of the sealed edges of the pillow adjacent to the valve tube **19** as shown in FIG. **9**. The channel **21** is formed by a heat seal **23** that extends along one of heat-sealed edges adjacent to the valving device, the edge being shown generally at **25** (See FIG. **9**). Heat seal **23** is parallel to edge **25**. The heat seal **23** extends to a point about an inch from the next pillow edge **24**. The channel **21** is open at both ends allowing fluid to

flow through the valve into the channel and then into the compartment to inflate it. The corner **24** can then be folded, after inflation, and at a 45° angle to collapse the end of the channel, and maintained in this folded position by cohesive or tape as was done with the valve corner to provide a second seal of the pillow. The other seal being that formed by the folded valve and adjacent bilayered material.

The valving device of the invention may be made of polyethylene straws, polypropylene straws, wax-coated paper straws or any other collapsible tubing material. However, in the preferred embodiment of the invention inexpensive paper straw is used.

This paper straw, commercially available from the Sweetheart Paper Company of Baltimore, Maryland, is coated with a wax having a melting point of 192° F. The wax-coated paper straw can be completely collapsed to give a tight, crisp, nonleaking seal. The seal obtained with the collapsed wax-coated paper straw is so crisp that the paper straw may be merely folded, without folding an adjacent portion of bilayered material, and cohesively held to effect sealing of the pillow. It has been found that when polyethylene or polypropylene straws are collapsed they do not form as sharp a seal as does the wax-coated paper straw, and that as a result some air seeps out of the inflated pillow compartment through the collapsed straw. This is thought to be due to the fact that a drawn film, such as a polyethylene or polypropylene straw, has a springing action, and does not completely collapse in the center when folded over. While the diameter of the tube used is not thought to be too critical, and any diameter tubing that affords an airtight seal when collapsed may be employed in practicing the invention, in the preferred embodiment a wax-coated paper straw having an outside diameter of about one-fourth inch is used.

The valving device of the invention may also be sealed by tying it off. This is illustrated in FIG. **8**. While the seal thus formed is effective, this method of sealing the valving device has certain disadvantages over the methods illustrated in FIGS. **3**, **4**, **5**, **6**, and **7**. The knot is difficult to untie and thus it is not easy to deflate the pillow. After the knot has been untied, the valving device is usually so crumpled that reinflation of the pillow is difficult. In addition, it has been found that unless care is taken while tying the knot, the valving device or pillow material may be torn and render the pillow unusable.

I claim as my invention:

1. An improved valve device for an inflatable pillow or the like comprising two sheets of flexible material sealed to each other around the edges thereof to form a fluid compartment, said improved valve device comprising tube means disposed between said two sheets with one end portion of the tube means extending inwardly beyond said sealed edges and the other end portion extending outwardly beyond said sealed edges for providing fluid communication with said fluid compartment, the intermediate portion of said tube means being sealed to said sheets to provide a fluid seal between said tube means and each of said sheets, said tube means being arranged so that folding said tube means and an adjacent portion of said sheets collapses said tube means and thereby effectively seals the space between said sheets, and means for holding said tube means and said adjacent portion in the folded position to maintain said fluid seal.

2. An improved valve device for an inflatable pillow or the like comprising two sheets of flexible material sealed to each other around the edges thereof to form a fluid compartment, said improved valve device comprising tube means disposed between said two sheets with one end portion of the tube means extending inwardly beyond said sealed edges and the other end portion extending outwardly beyond said sealed edges for providing fluid communication with said fluid compartment, an intermediate portion of said tube means being sealed to said sheets to provide a fluid seal between said tube means and each of said sheets, said tube means constructed of paper and arranged so that folding the tube means and an adjacent portion of said sheets collapses the paper thereby effectively seals the space between the two sheets, and means for holding said tube means and said adjacent sheet portion in said folded position to maintain said fluid seal.

3. An improved valve device as set forth in claim **2** wherein the tube means and an adjacent portion of said sheets are folded at a 45° angle.

4. An improved valve device as set forth in claim **2** wherein the tube means and an adjacent portion of said sheets including a slit in said adjacent portion are folded at a 90° angle.

5. An improved valve device as set forth in claim **2** wherein the tube means is folded on itself and then said tube means and an adjacent portion of said sheets are folded to collapse the paper and thereby effectively seal the space between the two sheets.

6. An improved valve device as set forth in claim **2** wherein at least the inside surfaces of said sheets of flexible material are made of a thermoplastic material, and said sheets are bonded to each other by heat-sealing the thermoplastic material on the opposed inside surfaces thereof around the edges of the sheets, and said thermoplastic material is also heat-sealed to the intermediate portion of said tube means to provide said fluid seal between said tube means and each of said sheets.

7. An improved valve device as set forth in claim **2** wherein said paper tube means is coated with a thermoplastic material to facilitate the heat sealing thereof to said thermoplastic material on said sheets.

8. An improved valve device as set forth in claim **2** wherein a predetermined area of the outside surface of one of said sheets is coated with a cohesive adjacent to said tube means, and said tube means and said coated area are folded to collapse said tube means and to adhere different portions of said cohesive-coated area to each other to hold said tube means in its collapsed condition.

9. An improved valve device as set forth in claim **2** wherein a channel is provided inside said inflatable pillow between said sealed edges and said pillow compartment and extending along said sealed edge adjacent to said valve device, said channel having open ends to allow fluid to pass through said valve device, through said channel and into said pillow compartment, said channel being sealed by folding the corner of said pillow adjacent to said open end to collapse it.

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