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A. CHAKINE

2,977,973

INFLATABLE ARTICLE WITH ONE-PIECE VALVE BODY

Filed Dec. 5, 1958

FIG. 1

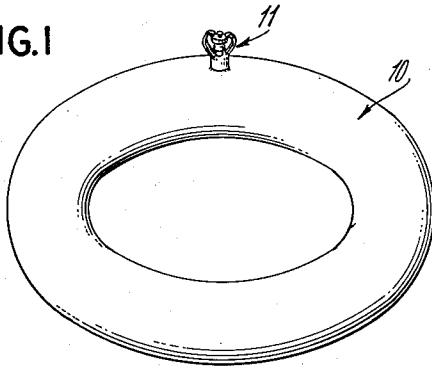


FIG. 2

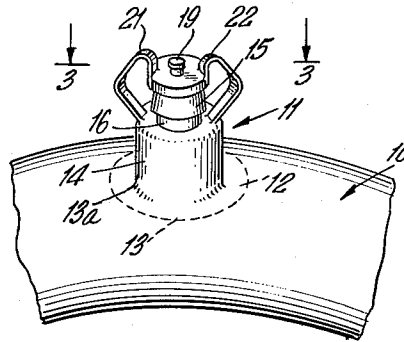


FIG. 3

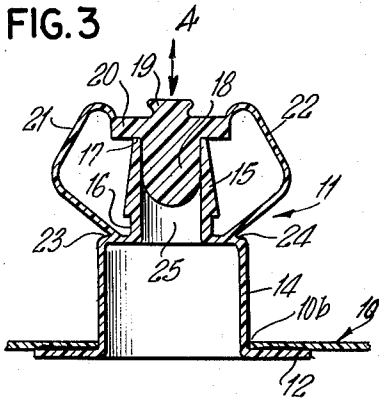


FIG. 4

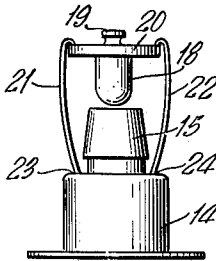
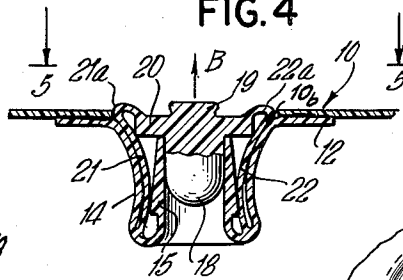


FIG. 6

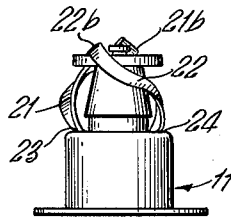


FIG. 8

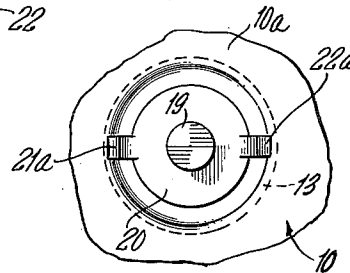


FIG. 5

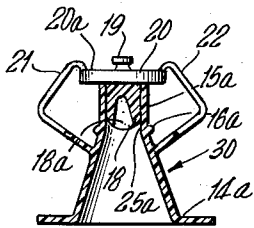


FIG. 7

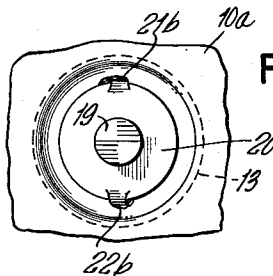


FIG. 9

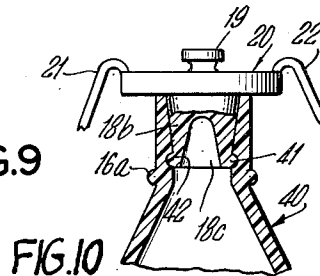


FIG. 10

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INFLATABLE ARTICLE WITH ONE-PIECE VALVE BODY

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6 Claims. (Cl. 137—223)

The present invention relates to inflatable articles such as toys, bladders and like rubber or plastic bodies.

The invention is more particularly directed to a valve construction combined with or forming part of the respective body.

It is one of the most important objects of the present invention to provide means envisaging substantially complete collapsibility of a one-piece valve structure into an opening of an inflated article with which said valve structure is in communication and connected, and further substantially automatic return or lead back of said valve structure from its collapsed or retracted position to its erected or projected position for effectuating either release of the fluid from or introduction of said fluid via said valve structure through said opening into said article.

It is another object of the present invention to provide means facilitating ready incorporation of the new valve structure in a hollow body to be inflated and the retraction of the valve structure into the interior of the body after the same has been inflated, so that the surface of the body will not be disturbed by any protuberances or undesirable protrusions.

It is another object of the present invention to provide means affording ready withdrawal of the valve structure from its retracted position to a projected position in which the same may be readily connected with any suitable pump device for inflation purposes.

It is still a further object of the present invention to provide a valve structure made of plastic material or any suitable plastic composition which may be easily manufactured through mass production methods, which is sturdy in construction and in balanced position when said valve structure is moved from a retracted position to a projected position and vice versa relative to the body to be inflated or deflated.

Yet a further object of the present invention is to provide means conducive to a valve structure which consists of a few parts only which, however, are permanently connected to each other but may be displaced relative to each other for opening and closing purposes.

Yet a still further object of the present invention is to provide means affording easy manipulation of the valve structure whether the same is employed in connection with a hollow article or in connection with the end of a hose and for controlling the fluid flow therethrough.

The above and other objects of the invention will become further apparent from the following detailed description, reference being made to the accompanying drawing showing preferred embodiments of the invention.

In the drawing:

Fig. 1 shows somewhat in perspective an inflated ring-shaped article having incorporated a valve structure made in accordance with the invention.

Fig. 2 is a fragmentary view of the article of Fig. 1 drawn on an enlarged scale.

Fig. 3 shows an enlarged section of the valve structure taken along line 3—3 of Fig. 2.

Fig. 4 shows the valve structure of Fig. 3 in collapsed or telescoped condition.

Fig. 5 is a top plan view of the valve of the Fig. 4 as applied to an inflated article, partly shown.

Fig. 6 is an elevational view of the valve structure of Fig. 3 drawn on a reduced scale, with the valve plug in inoperative position.

Fig. 7 shows a modified valve structure in elevation and in operative position.

Fig. 8 is an elevational view of the valve structure of Fig. 6 in operative position but with the plug turned about its longitudinal axis to twist the connecting arms thereabout.

Fig. 9 is a top plan view of the valve structure of Fig. 8 applied to an inflated article, the latter only being partly shown.

Fig. 10 is a fragmentary sectional view of a further modified valve structure seen in operative position, but not as yet collapsed.

Referring now more particularly to the drawing, there is shown, for instance, in Fig. 1 an inflatable ring-shaped body 10 to which a valve structure 11 is applied, which is made in accordance with the invention.

As more clearly seen in Fig. 2, the lower flange 12 of the valve structure 11 is heat-sealed to the body 10 of thermoplastic material, such heat-seal being designated by numerals 13, 13a. The valve body 11 has further the tubular base portion 14 of relatively large diameter to which is connected an upper tubular member 15 having an undercut portion 16 for a purpose later described. The tubular member 15 may be closed at the open end 17 by means of a plug 18 having the handle grip 19 and a plate-shaped member 20.

From the top surface of the plate-shaped member 20 extend downwardly directed arms 21, 22 which, in this instance, are anchored at 23, 24 respectively, to the tubular shaped portion 14. In the positions shown in Figs. 1 and 2, stopper or plug 18 has been inserted in opening 25 of tubular member 15 to close the valve.

Upon exerting pressure against the handle grip 19 in the direction of arrow A, the valve body 11 will be pushed inwardly through opening 10b of inflated article or body 10 of plastic material and telescopically collapses therein (Fig. 4), whereby parts 14, 15 and arms 21, 22 of valve body 11 will assume a retracted position within the interior of the tubular base part 14 as is more clearly seen in Fig. 4.

Thus, the valve structure 11 is substantially completely located below and with end plate 20 substantially flush with the outer surface of the inflatable body 10. The arm ends 21a, 22a also become flush with the outer surface 10a of said article as shown. If now a pulling action is exerted in the direction of arrow B on handle piece or grip 19 to such an extent that stopper 18 is completely withdrawn from the interior of tubular part 15, as seen in Fig. 6, air contained in inflated body 10 may completely escape from said body and valve 11 is again returned to its starting or erected position by means of arms 21, 22.

Fig. 4 shows the position of plug 18, plate 20 and grip 19 in such a manner, whereby the strap-shaped arms 21, 22 will contact the inner surface of base portion 14 rather linearly and slightly and come to lie between the latter and the pushed-in tubular portion 15, to facilitate easy and gradual return of valve 11 to its position as seen in Fig. 6.

In accordance with Figs. 6 and 8, it is assumed that body 10 has been inflated by any suitable hand operated pump (not shown) which engages tubular-shaped member 15 at its undercut 16 (while arms 21 and 22 together with plug 18, grip 19 and plate 20 are swung in sideward direction about and away from anchoring points 23, 24).

Upon completion of the inflation of the article or body 10, larger tubular valve part 14 will then first be com-

pressed by the fingers of the hand of an operator to prevent air escape and thereafter the hand pump is removed from its engagement position at the undercut 16 by pulling the pump lengthwise of tubular valve part 15, whereafter plug 18 may be brought into the position as shown in Fig. 3, closing opening 25 at the end 17 of sleeve-shaped portion 14.

By now turning plug 18 with plate 20 and grip 19 to assume a position as shown in Fig. 8, it will be apparent that the arms 21, 22 will assume a spiral-shaped configuration whereby the upper ends 21b, 22b of said arms will lock plug 18 in a positive tight position. The arms 21, 22 will assume positions as shown in Fig. 9 at 21b, 22b, so that substantially no protrusions whatsoever will be perceivable on the top surface 10a of the inflated body 10, as soon as the valve structure 11 is pushed in from its projected position of Fig. 8 to its retracted position seen in Figs. 4 and 9.

Fig. 7 shows a collapsible one-piece valve body 30 having a flange-shaped base part 14a and a substantially cylindrical-shaped top part 15a connected to said base part 14 and provided with a circular-shaped bead 16a, which serves the same purpose as described in respect of the undercut portion 16 of Figs. 2 and 3.

As can be further seen from Fig. 7 arms 21 and 22 extend from the top surface 20a of end plate 20 and are further anchored at approximately midway of the height of the collapsible valve body 30 to the latter. As shown, plug 18 has a springy end caused by central recess 18a and is inserted into opening 25a of the valve body to close the same. Function and result of collapsible valve body 30 made from rubber or any other suitable plastic or thermoplastic material is the same as that disclosed and illustrated in connection with Fig. 4.

It is of course understood that upon turning end plate 20 with plug 18 in engagement position the band-shaped arms 21, 22 may thus be twisted in a manner similar to those shown in Fig. 8 so that end plate 20 is substantially flush with the outer surface 10a of the article as seen in Fig. 9.

Fig. 10 shows a further modified valve body 40 pursuant to the invention, somewhat similar to that of Fig. 7, but with a tapered upper end for fitting therein a conically-shaped plug 18b having a recess 18c and laterally extending end projection or projections 41 for the engagement with depressions or groove 42 provided in the inner surface of valve body 40. In this case valve body 40 may be caused to completely withdraw from opening 10b of article 10 to erected position, whereupon plug 18b may be disengaged from its seat at 41, 42 for the release of the fluid from within the article to deflate same.

It can thus be seen that there has been provided in accordance with the present invention an inflatable article having a one-piece collapsible valve body made of rubber or other plastic material, which is characterized by a flange-shaped base part of relatively large diameter, a tubular top part of relatively reduced diameter connected to said base part, a plug insertable into said tubular top part and provided with an end plate from which said plug depends, and strap-shaped arm means extending exteriorly of said valve body from said end plate to a predetermined location of the outer surface of said valve body and spaced from said base part, said base part being affixed to said article and communicating with an opening provided in said article, whereby a fluid may first be introduced through said valve body into said article for inflating same and may be prevented by said plug from escape from within said article, said top part together with said plug and said arm means being telescopically collapsible through said tubular base part into the interior of said inflated article, so that said end plate of said valve body comes to lie substantially flush with the outer surface of said article.

It is well understood, that the features disclosed in Fig. 10, such as interengageable formations 41, 42 as well

as at least one recess 18c to attain springy stopper or plug end may also be incorporated in the embodiments of Figs. 3 and 7.

Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. A valve comprising a one-piece elongated flexible, plastic valve body having a tubular base and an upper tubular member extending from said base and terminating in an open end, said tubular base being of larger diameter than said upper tubular member, so that said upper tubular member may be telescopically received within said base, an end plate provided with a depending plug, said depending plug being of a size such that when inserted into the open end of said upper tubular member it completely seals said open end, arm means integral with said end plate and extending therefrom to said tubular base, said end plate being of larger diameter than said upper tubular member and being of substantially the same diameter as said base, said end plate lying substantially flush with said end of said tubular base remote from the connection of said tubular base and said upper tubular member and said plug being received in said open end in closed condition of said valve.

2. A valve comprising a one-piece elongated flexible plastic valve body having a tubular base and an upper tubular member extending from said base and having an open end, said base being of larger diameter than said upper tubular member, said upper tubular member being received within said base, an end plate provided with a depending plug, said depending plug being of a size such that when inserted into the open end of said upper tubular member it completely seals said open end, said plug being received in said open end, arm means integral with said end plate and said tubular base, said end plate being of larger diameter than said upper tubular member and being of substantially the same diameter as said base, said end plate lying substantially flush with said end of said tubular base remote from the connection of said tubular base and said upper tubular member, said upper tubular member together with said plug and said arm means being telescopically collapsible between said base and said upper tubular member when said end plate is substantially flush with said base.

3. In a valve according to claim 1, said arm means including two band-shaped elements extending at opposite sides from the top of said end plate to said base.

4. In a valve according to claim 1, said arm means being shaped in the form of a pair of opposed bands adapted to be folded between said upper tubular member and said base upon engagement of said plug within said open end of said upper tubular member.

5. A valve according to claim 1, said plug being provided with a central recess at its lower end, thereby to provide a springy and compressible portion thereon facilitating easy insertion of said plug in said open end.

6. A valve according to claim 1, said plug being conically-shaped and provided with a recessed lower end, respective interengageable means provided at said lower plug end and at said open end of said upper tubular member for tight engagement of said plug in said open end.

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