

June 11, 1957

F. ORMS

2,795,425

INFLATABLE OBJECTS WITH SELF-SEALING VALVES.

Filed Sept. 29, 1953

3 Sheets-Sheet 1

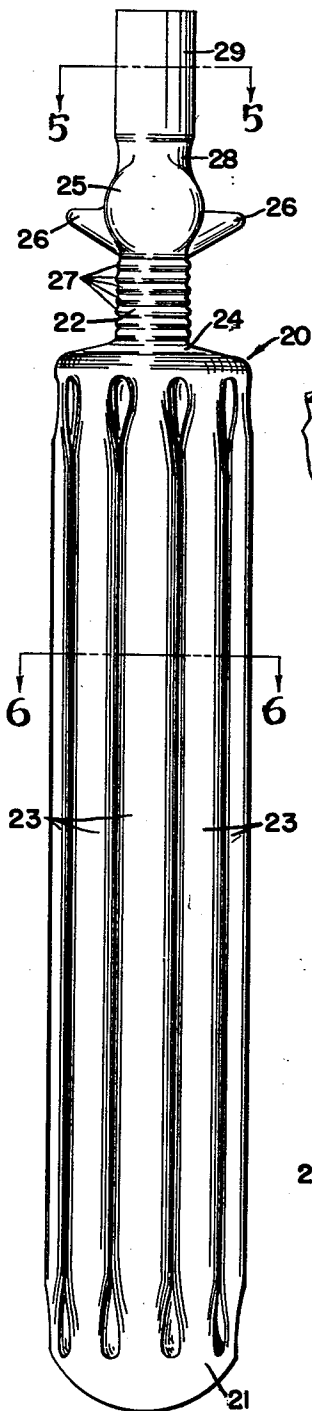


FIG. 1

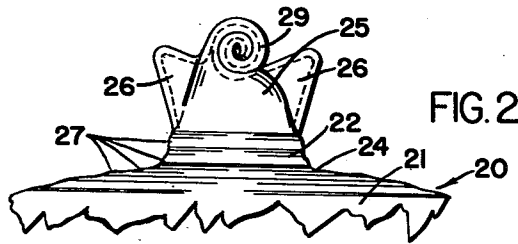


FIG. 2

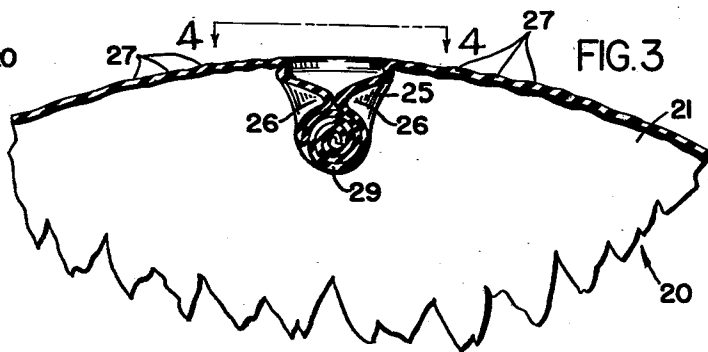


FIG. 3

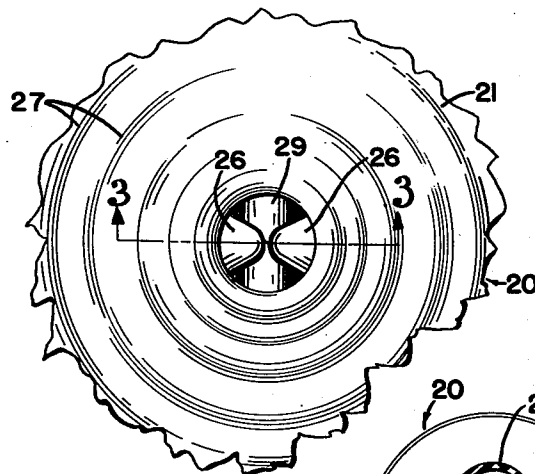


FIG. 4

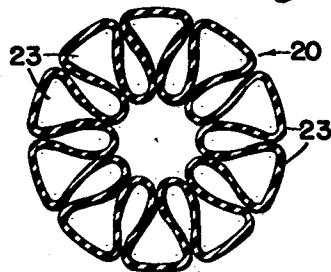


FIG. 6

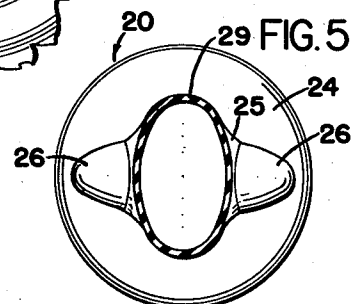


FIG. 5

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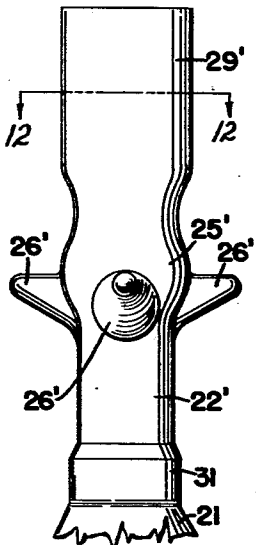


FIG. 7

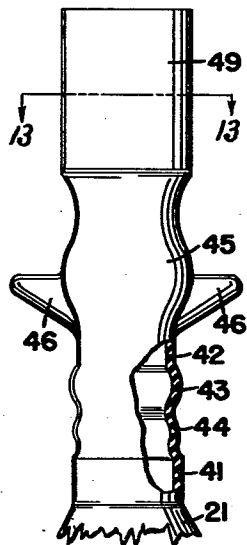


FIG. 8

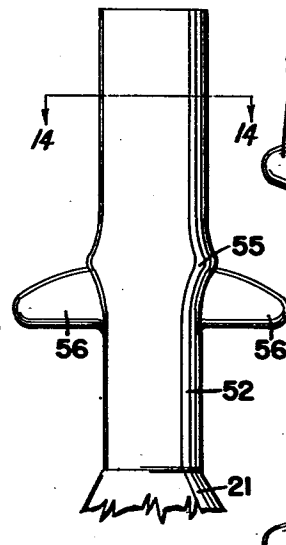


FIG. 9

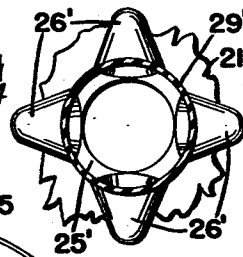


FIG. 12

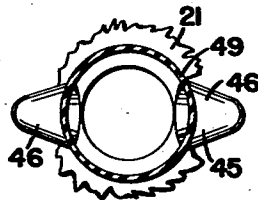


FIG. 13

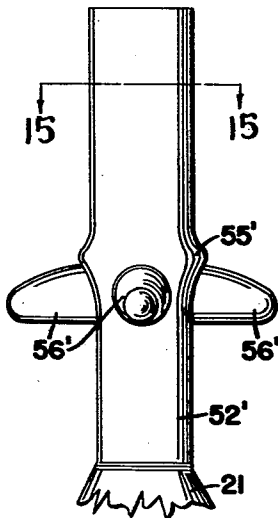


FIG. 10

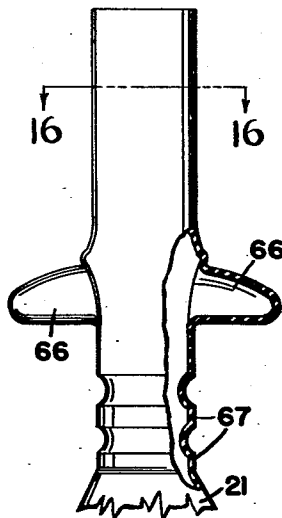


FIG. 11

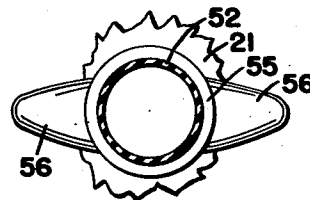


FIG. 14

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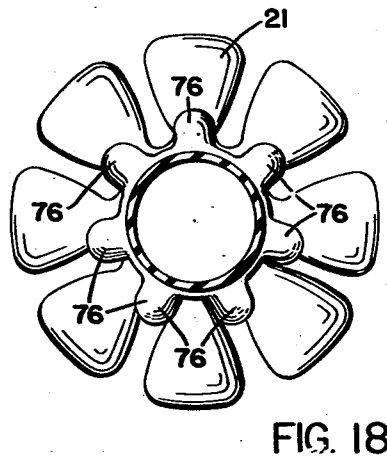
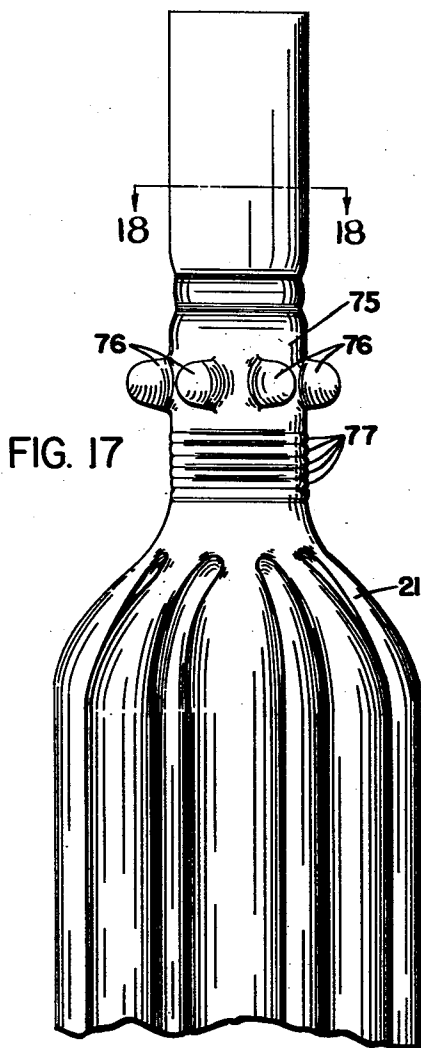
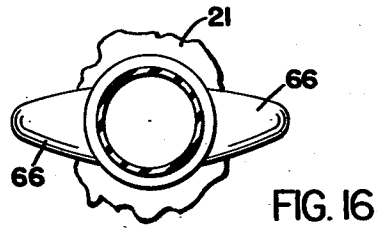
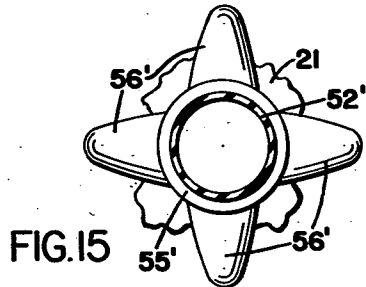
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INFLATABLE OBJECTS WITH SELF-SEALING VALVES

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3 Sheets-Sheet 3



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INFLATABLE OBJECTS WITH SELF-SEALING VALVES

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Application September 29, 1953, Serial No. 383,050

1 Claim. (Cl. 273—58)

This invention relates to the construction of inflatable items, such as beach balls, volley balls and other playballs, having neck portions which, after the items have been inflated, may be tucked or forced inwardly of the outer circumference of the items, such neck portions having valve means cooperating therewith to retain the inflating medium in the items and to confine the tucked-in neck portion within the outer circumference of the items.

One of the objects of the invention is to provide a self-sealing valve means in association with the neck portion of an inflatable play ball or the like, whereby after the ball has been inflated, the outer end of the neck portion may be rolled inwardly upon itself to temporarily prevent escape of the inflating medium, said neck portion thereafter being tucked or forced inwardly of the outer circumference of the ball, with the arrangement being such that the neck portion is automatically retained within the ball with its rolled end confined in rolled position so as to permanently prevent escape of the inflating medium.

Another object is to provide lateral wings, ears or other protuberances intermediate the ends of the neck portion of a playball or the like, whereby after the ball is inflated, the outer end of the neck portion may be initially rolled inwardly upon itself to a location adjacent said protuberances, said neck portion and said protuberances thereafter being tucked or forced inwardly of the ball, with said protuberances constituting means retaining the rolled end of the neck in rolled position within the ball so as to permanently prevent escape of the inflating medium through the neck, while at the same time said protuberances prevent the accidental return of said neck portion to its initial position outside the ball.

A further object is to provide protuberances of various sides or shapes intermediate the ends of the neck portion of a playball or the like.

A further object is to provide a bulbous or enlarged area on the neck portion from which the wings or ears protrude, whereby when the rolled up portion of the neck and the protuberances are tucked inwardly of the ball, the bulbous area will also move into the ball and form a sack or bag in which the rolled up portion of the neck will rest, said sack or bag assisting the protuberances somewhat in preventing unrolling of the neck portion.

A further object is to provide a plurality of relatively small spaced ribs on the neck portion of the ball between the protuberances and the body portion of the ball, some or all of which ribs upon inflation of the ball become part of the body portion of the ball, depending upon the amount of inflation desired. Such ribs assist in holding the rolled-up portion of the neck in air-sealing position within the circumference of the ball, particularly when the ball is only partially inflated.

Other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawings.

In the drawings:

Fig. 1 is a front view of an uninflated playball having

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my self-sealing valve parts incorporated in the neck portion of the ball;

Fig. 2 is a fragmentary view of the ball after being inflated, with the outer end of the neck portion rolled inwardly upon itself to a position adjacent the lateral wings or ears on the neck to temporarily prevent escape of air or other gas used as the inflating medium;

Fig. 3 is a fragmentary section taken substantially on line 3—3 of Fig. 4, with the neck portion manually forced within the outer circumference of the ball, in which position the lateral wings or ears reverse their direction and engage the rolled-up portion of the neck to permanently prevent escape of the inflating medium, and the bulbous portion forms a sack or bag in which the rolled up portion of the neck rests;

Fig. 4 is a fragmentary plan view taken substantially in the direction indicated by line 4—4 of Fig. 3;

Fig. 5 is a section taken substantially on line 5—5 of Fig. 1;

Fig. 6 is a section taken substantially on line 6—6 of Fig. 1;

Figs. 7 to 11 inclusive are front views of neck portions of balls, each embodying a modified form of self-sealing valve;

Figs. 12 to 16 inclusive are sections taken substantially as indicated on Figs. 7 to 11, respectively;

Fig. 17 is a front view of the neck portion of a ball showing a further modification, and

Fig. 18 is a section taken substantially on line 18—18 of Fig. 17.

Referring to Figs. 1 to 6 of the drawings, one form of the invention is shown, wherein Fig. 1 illustrates a one-piece, inflatable playball in uninflated condition, indicated in its entirety by the numeral 20, having an elongated body portion 21 and a reduced neck portion 22. The ball 20 may be formed of conventionally compounded liquid latex or other liquid dispersions of natural or synthetic rubbers, preferably by using a conventional dipping form of the shape required to produce the ball.

The body 21 of the ball is molded on the dipping form for the greater portion of its length with a plurality of substantially symmetrical pleats or overlaps 23, which arrangement permits additional expansion of the body portion when it is inflated into substantially spherical shape. For example, a ball having a body portion 21 about eleven inches long with its greatest outside diameter about three and one-half inches, as viewed in Fig. 1, can be expanded merely by a person blowing it up, to a size about twenty-four inches in diameter.

As shown in Fig. 1, the upper end of the body portion 21 terminates in a shoulder 24, where it is joined to the reduced neck portion 22. Intermediate the ends of the neck portion 22, a bulbous portion 25 is formed, in which latter portion a pair of integral, oppositely disposed protuberances in the form of generally pointed ears or wings 26 is provided. The protuberances 26 in Fig. 1 have their upper surfaces substantially at right angles to the center line of neck 22, while their lower surfaces taper downwardly, providing in effect, generally rounded wings or ears which decrease gradually in diameter toward their outer ends (see Fig. 5).

Between the bulbous portion 25 and the shoulder 24, the neck is preferably provided with a plurality of small spaced ribs 27, while outwardly of the bulbous portion, the neck is curved gradually, as at 28, to join with the outer end portion or mouth-piece 29, which may be, but is not necessarily, slightly ovate in cross section as indicated in Fig. 5.

In actual manufacture of the ball 20, as depicted in Fig. 1, it has been found that the complete one-piece structure may be readily removed from its dipping or molding form (not shown) simply by peeling the entire

structure downwardly off the form, without unduly stretching the neck portion as it passes over that portion of the form which would be of largest diameter. With a construction wherein the largest diameter of the body portion 21 is about three and one-half inches, the smallest diameter of the neck portion can be about seven-eighths of an inch, with the distance between the tips of the wings being about two and one-quarter inches, and the construction can be readily removed from the form without any damage to the rubber. In many prior ball constructions it has been necessary to cut out a piece at the bottom of the body portion and to pull the material upwardly off the form, an arrangement which required subsequent patching of the hole left by the cut out portion in order to inflate the ball. My construction obviates any patching of the ball.

After the material of the ball has been cured, painted if desired, and otherwise conventionally treated, it is ready to be inflated. By using his mouth a person can easily inflate the ball in the usual manner, and by reason of the extra rubber in the body portion, it can be inflated to any desired size short of its bursting point.

After inflation to the desired extent, the mouth-piece is carefully removed from the mouth with a person's fingers being used to initially squeeze the mouth-piece to prevent escape of air. Then the outer end of the neck portion including the mouth-piece is rolled inwardly, as indicated in Fig. 2, until the rolled up portion is adjacent the wings or ears 26. If the mouth-piece is ovate in cross section, the rolling takes place on the major axis of the oval, but in any event, the rolled up portion preferably lies about midway between wings 26 when a pair of the latter are used, as indicated in Fig. 2.

It will be further noted from Fig. 2 and from Fig. 4 that during inflation some of the ribs 27 move from the neck portion into the body portion 21. When complete inflation takes place, all of the ribs 27 move into the body portion, and the lower ends of the wings 26 will be adjacent the inflated body portion 21.

After the neck portion has been properly rolled up, a person's thumb, and an additional finger if desired, is utilized to push or tuck the rolled up portion together with the remaining portion of the bulbous area 25 and the wings 26, inwardly of the outer circumference of the body portion 21. This pushing or tucking in of the roll, bulbous portion and wings is readily accomplished with a sort of snap-in action after the parts have passed the plane of the circumference of the ball, with relatively little force being required, and upon reaching their inward position, the wings 26 become inverted, with their points extending toward and adjacent each other so that the wings form obstructions above the rolled up neck portion which act as stops preventing the voluntary or accidental return of the rolled up neck portion to a position outwardly of the body portion 21, as indicated in Fig. 3. Also in the tucked in position the bulbous portion 25 becomes, in effect, a sack or bag in which the rolled up neck portion rests, and this bulbous portion also helps to prevent unrolling of the neck portion. While there may be a tendency for the rolled up neck portion to unroll itself or to return to its outward position while inwardly of the body portion, such tendency has never exhibited itself in actual practice, since play-balls made in accordance with this invention have remained inflated for several months without any appreciable loss of air.

Apparently the rolled up neck portion does not unroll itself because of its frictional engagement with the wings 26, assisted possibly by engagement with the sides of the bulbous portion 25, which engagements are assisted by the air pressure in the body portion and the natural resilience and elasticity of the rubber, and as long as the wings 26 obstruct the outward return of the rolled up neck portion there can be no escape of air through the neck portion. Also the ribs 27 assist in preventing the

voluntary or accidental outward return of either the wings or the rolled up portion, particularly when the ball is only partially inflated, since these ribs act as reinforcements around the opening formed at the tuck-in area.

The valve action which takes place as soon as the roll, bulbous portion and wings are tucked in is entirely automatic and self-sealing and requires no additional effort from a user after the tuck-in is completed. The wings will automatically assume their inverted position within the ball where they prevent unrolling of the neck portion, prevent outward return of the neck portion, and consequently prevent escape of air through the neck portion.

Figs. 7 and 12 show a modified form of self-sealing valve wherein four equally spaced wings or ears 26' are formed integral with the bulbous portion 25' of the neck 22', and the mouth-piece 29' is annular. In this form of the invention, the ribs 27 are omitted but they could be utilized if desired, and in lieu of these ribs a relatively large reinforcing shoulder 31 is formed at the junction of body portion 21 and neck 22'. The wings 26' and bulbous portion 25' are identical with wings 26 and portion 25, and act in substantially the same manner as the latter when the rolled up neck portion and wings are tucked inwardly of the circumference of the inflated ball, the additional pair of wings providing supplemental obstructions or stops to prevent the escape of air through the neck portion.

In Figs. 8 and 13, another modification is shown wherein a relatively large reinforcing shoulder 41 is formed at the junction of body portion 21 and the neck portion 42, and instead of the small ribs 27, one large rib 43 and one small rib 44 are formed on the neck below the bulbous portion 45. In this embodiment the mouth-piece 49 is also annular, the bulbous portion 45 is identical with the portion 25, and the wings 46 are identical with the wings 26 and act in the same manner as the latter to prevent escape of air through the neck portion.

Figs. 9 and 14 show a further embodiment wherein the neck portion 52 is of substantially equal diameter throughout its length, except that it is enlarged slightly at 55 where the two wings 56 are formed integral therewith. In this embodiment the lower surfaces of the wings 56 are substantially at right angles to the center line of neck 52, while their upper surfaces taper downwardly. When the rolled up neck portion and the wings 56 are tucked into an inflated ball as previously described, these wings act in the same manner as the wings 26 in preventing escape of air through the neck portion.

Figs. 10 and 15 show a further modification which is identical with that shown in Figs. 9 and 14, except that four equally spaced wings 56' identical with wings 56 are utilized.

In Figs. 11 and 16, a further modification is shown wherein the two wings 66 are identical with wings 56, but the portion of the neck between body portion 21 and wings 66 is provided with two spaced ribs 67.

Figs. 17 and 18 show a further modification wherein more than four wings or ears are shown. In this instance seven relatively small substantially semi-spherical wings 76 are formed on the enlarged or bulbous area 75 of the neck portion of the ball, and ribs 77, corresponding to ribs 27, are formed between the body portion 21 and the wings 76. The action of area 75 and wings 76 after being tucked into the inflated ball with the rolled up neck is substantially the same as with area 25 and wings 26, except that the tips of the wings 76 will be farther apart than the tips of wings 26, but additional obstructions or stops are provided to prevent escape of air through the neck portion.

While I have illustrated and described preferred embodiments of my invention, it will be apparent that the invention is not limited thereto, and that modifications and changes may be made therein without departing from the spirit of the invention or the scope of the subjoined claim.

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What is claimed is:

An inflated member formed of a liquid dispersion of rubber, having a body portion, a neck portion through which said body portion is inflated, at least a pair of integral, oppositely disposed, generally pointed, lateral protuberances formed on said neck portion intermediate the ends of the latter, the outer end of said neck portion being rolled inwardly upon itself and together with said protuberances being located within the outer circumference of said body portion, in which latter location said protuberances have their points extending toward each other to provide means to prevent unrolling of said neck portion and retain said member in inflated condition, and

spaced ribs formed on said neck portion between said protuberances and said body portion to assist said protuberances in preventing unrolling of said neck portion when said member is only partially inflated.

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