June 23, 1936. C. J. CROWLEY ET AL 2,044,836

INFLATABLE BALL

Filed Dec. 23, 1932

Fig. 1.

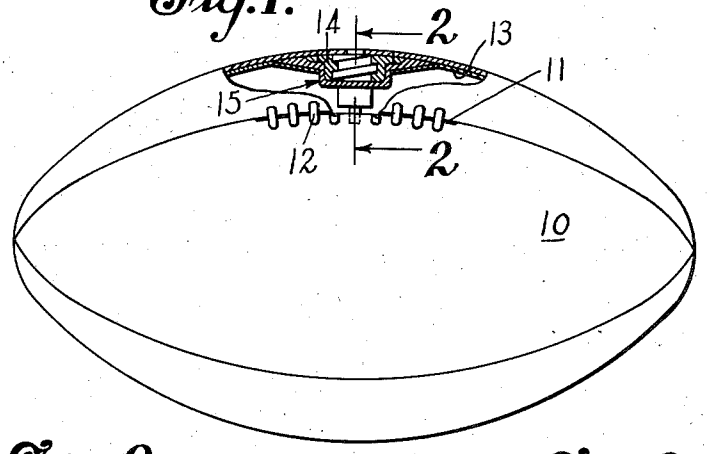


Fig. 2.

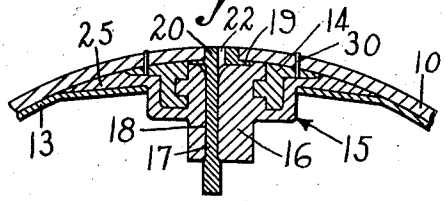


Fig. 3.

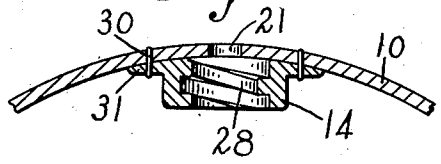


Fig. 4.

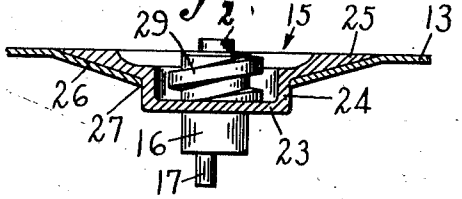


Fig. 5.

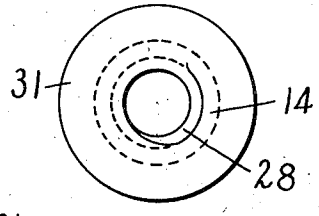


Fig. 6.

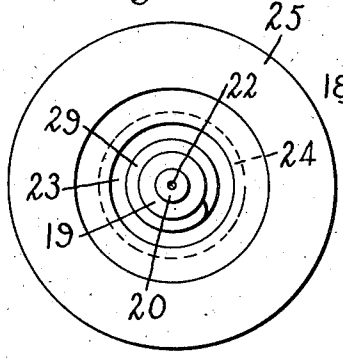
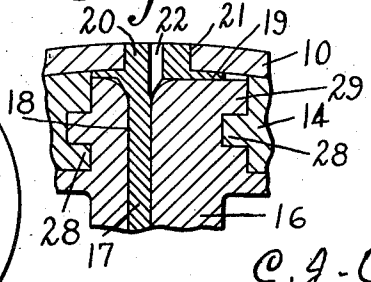


Fig. 7.



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UNITED STATES PATENT OFFICE

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INFLATABLE BALL

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6 Claims. (Cl. 273—65)

This invention relates to inflatable balls, and more especially to balls such as footballs in which a bladder is contained within a suitable case or cover.

Our improvements pertain especially to the provisions whereby air can be introduced into the bladder and the latter thereafter sealed, and to provisions whereby the bladder can be detached or released from the cover for removal when this is desired.

In the manufacture of footballs the use of metal inflating valves is undesirable as these provide hard inelastic parts in the surface of the ball which are quite objectionable.

One of the objects of our invention is to overcome the drawback just mentioned, and in particular to furnish a satisfactory form of all-rubber valve.

Another object is to provide a structure which can be very readily assembled and used, and the use whereof is very convenient.

To these and other ends the invention consists in the novel features to be hereinafter described and claimed.

In the accompanying drawing:

Fig. 1 is an elevation of a football equipped with our improvements, the ball being partially broken away to show the interior structure;

Fig. 2 is an enlarged section on line 2—2 of Fig. 1;

Fig. 3 is an enlarged section of a portion of the casing member;

Fig. 4 is an enlarged sectional view of a portion of the bladder showing the valve structure carried by the bladder;

Fig. 5 is a detail top plan view of the rubber socket member as it appears before it is applied to the casing or cover;

Fig. 6 is a top plan view showing the valve structure before it is applied to the bladder; and

Fig. 7 is a view on a considerably enlarged scale of a portion of Fig. 2.

In the drawing we have shown our improvements applied to a football of oval shape, but our invention is applicable to balls of other shapes.

In the particular form illustrated by way of example, the football is provided in the cover with the usual slit through which the bladder is introduced, and this slit is held closed by a lacing, and at a point offset from the lacing the bladder is equipped with an all-rubber inflation valve, which valve cooperates with a rubber socket on the interior of the cover to hold the bladder removably in place in the cover so that it will not be dislocated laterally relatively thereto.

In the drawing the cover is shown at 10, the slit through which the bladder is introduced at 11, the lacing at 12, the bladder at 13, the rubber socket member carried by the cover at 14, and the all-rubber valve structure carried by the bladder at 15.

The valve structure 15 comprises a solid rubber body 16, which is of generally cylindrical shape and has disposed therein an elongated plug member 17 also made of rubber. The plug member 17 is of cylindrical shape and considerably elongated relatively to its cross-section and extends through a narrow cylindrical passage 18 which is longitudinally disposed with reference to valve body 16 and is preferably offset somewhat from the center of said valve body, as shown more particularly in Fig. 2. On top of the valve body, the plug member 17 is provided with an integral rubber flange 19 preferably of about the same diameter as the valve body, and extending upward from flange 19 is an integral rubber sleeve or projection 20. The sleeve 20 fits an opening 21 in cover 10 at a point offset from laced opening 11, and a small hole or bore 22 in sleeve 20 leads from the upper face thereof to a point adjacent the periphery of the body of plug 17 so that an inflating needle, not shown, can be guided to a point on the periphery of the plug and thereafter caused to project down through the valve body alongside the plug so that the inner end of the needle will enter the space in the interior of the bladder and assume a position for inflating the bladder.

It will be observed that in the particular form shown the sleeve 20 is arranged concentrically with respect to valve body 16. This sleeve when the parts are assembled in the manner shown in Fig. 2 extends to the outer face of cover 10 so as to be substantially flush therewith.

The lower end of plug member 17 extends downwardly beyond the valve body 16. In Fig. 2 this lower end portion of the plug member appears as being of greater diameter than the body portion of said member, but in practice we prefer to make the body of the plug member of the same diameter throughout its length, and the fact that the drawing shows portions of different diameters is due to the compressive effect of the elastic body 16 and to the elongation of the plug member in its bore or passage, it being held under tension therein.

The valve body 16 is preferably secured to the bladder 13 by a flange structure such as that now to be described. About midway of its ends the valve body has an integral rubber flange 23 projecting laterally therefrom, this flange con-

stituting the bottom of a cup member, a portion of the side wall of which is constituted by a substantially upright wall 24 integral with flange 23. From the upper edge of wall 24 the rubber structure is continued upwardly and outwardly to form an attaching flange 25, the lower surface of which is preferably beveled, as shown at 26. The bladder 13 is provided with an aperture 27 through which the cup-shaped part 24, 23 is introduced, and the under surface of flange 25 is cemented or otherwise suitably secured to the bladder in a region around the aperture 27.

For attaching the valve structure and bladder removably to the cover 10, the rubber socket member 14, hereinbefore mentioned, is provided with means whereby it may be detachably secured to the valve body 16. For this purpose we prefer to provide rubber connecting means constituted by coarse interior rubber threads 28 formed within and as an integral part of socket member 14. These threads 28 are adapted to be engaged with corresponding exterior rubber threads 29 formed on the valve body 16 as an integral part thereof. The socket member 14 can be conveniently attached to cover 10 by suitable means such as stitching 30, passing upwardly through an integral rubber flange 31 with which the socket member is provided and through the wall of the cover, as shown in Fig. 3.

The assembled position of the parts is shown in Fig. 2.

The upper end or mouth of the passage 18 is preferably made of a flaring shape, as shown more particularly in Fig. 7. This facilitates the introduction of the inflating needle into the passage.

It will be understood that the sleeve 20 fitting within inflating aperture 21 of the cover locates the valve structure with regard to the cover and serves to guide the inflating needle to a position in which it can be caused to pass through the valve body in the manner hereinbefore described. When the parts are in the position shown in Fig. 2, plug element 17 is under tension and is also under considerable compression, owing to the fact that the body 16 is distended by the act of inserting the plug into position within the same. In other words, the wall of the tubular enclosing member is expanded laterally and presses inwardly and laterally on the plug. The plug, on the other hand, exerts a strong outwardly and laterally acting force to hold the valve structure closed. Thus, when the needle shank is withdrawn from the inflating position, the relatively long passage through which it has been introduced is immediately closed and the bladder is sealed in a most effective manner against leakage of air.

When it is desired to remove the bladder from the football, this can be done very readily. The ball being deflated, the laced slit is opened and the valve structure 15 and attached bladder can be detached from the cover by unscrewing the valve structure from the socket member 14. After the bladder has been removed, a new bladder can be placed in the cover if that is desired.

Various changes can be made in the details of the structure without departing from the scope of our invention as defined in the claims. We have not attempted to illustrate or describe the many modifications which may be made without departure from the principles of the invention.

Where we refer to material as being rubber or all-rubber, it is intended that the material have rubber characteristics, and it is intended that a combination of rubber and cloth-inserted material may be used if desired.

What we claim is:

1. In an inflatable ball, a cover having an inflating perforation, a bladder, an elastic tubular member attached to the bladder and presenting an elongated longitudinal passageway from the exterior of the bladder to the interior, a narrow elongated elastic closing plug under compression in said passageway so as to close and seal the same, said plug extending out of said passageway at the outer end of the latter and into the inflating perforation of the cover, means associated with the outer end portion of the plug adjacent the outer surface of the cover for guiding an inflating needle to a position alongside the plug in the passageway so that the needle can be extended completely through the passageway and into the interior of the bladder for inflating the latter, and cooperating means of engagement carried by the outer lateral portion of the tubular member and by the inner face of the cover around the inflating perforation whereby the bladder is held to and against the cover, said last-named means being manually manipulable when the bladder is in deflated condition to detach the bladder from the cover when desired.

2. In an inflatable ball or similar article, a cover having an inflating aperture, a bladder, an elastic outer valve member having a flange by which it is attached to said bladder, said valve member having a narrow longitudinal passageway, the wall of said passageway being elastic and relatively thick, a narrow solid elastic plug or inner member having a body normally greater in diameter than said passageway arranged longitudinally in said passageway and under lateral compression therein over a considerable area for sealing the passageway, the outer end portion of said plug extending into said inflating aperture, coarse elastic screw threads formed integrally with said outer valve member at the side thereof, and a fastening member of elastic material secured to the inner surface of the cover around said inflating aperture and presenting a socket having interior screw threads engaging the threads of said outer valve member so as to hold the outer valve member and bladder detachably to the cover.

3. In an inflatable ball or similar article, a cover having an inflating aperture, a bladder, an elastic outer valve member having a body provided with a flange by which it is secured to said bladder, said outer valve member having a narrow longitudinal passageway, an elastic inner member or plug having the portion intermediate its ends normally of greater diameter than said passageway and longitudinally arranged therein under compression by the wall of said passageway so as to form a seal extending over the lateral exterior area of said intermediate portion, said inner member having both ends extending longitudinally beyond said outer member, the outer end of said inner member being disposed in and fitting said inflating aperture and provided with a hole for an inflating needle, the outer surface of said outer valve member being provided with integral elastic screw threads, and an elastic fastening member applied to the cover and having a socket with interior elastic threads engaging the threads of said outer valve member to hold the valve structure and bladder in place relatively to the cover.

4. In an inflatable ball or similar article, a cover having an inflating aperture, a bladder,

an elastic outer valve member of approximately cylindrical form, an approximately cup-shaped elastic member having the bottom portion of the cup integral with said outer valve member intermediate of the ends of the latter, said cup-shaped member having a flange at its rim portion whereby it is secured to the wall of the bladder, said outer valve member having a narrow passageway longitudinally arranged therein, an inner elastic valve member in the form of a narrow plug longitudinally arranged in said passageway and under compression therein for sealing the passageway, the valve structure having at its outer part a member disposed in and fitting the inflating aperture of the cover so as to locate the valve and bladder relatively to the cover, elastic screw threads formed integrally with said outer valve member at the side thereof in the space between said cup-shaped member and the cover, and a fastening member applied to the inner face of the cover and having a socket with interior elastic threads engaging those on the outer valve member.

5. In an inflatable ball or similar article, the combination of a cover having an inflating aperture, a bladder, an elastic outer valve member, an elastic inner valve member longitudinally arranged in the outer valve member, said valve structure having at its outer end portion a projection fitting within the inflating aperture of the cover, a cup-shaped elastic member integral with the outer valve member, the bottom portion of the cup being located intermediate of the ends of the outer valve member, said cup-shaped member being located in an opening of the bladder and secured to the bladder, said outer valve member being provided within the cup-shaped member with exterior elastic threads, and a member applied to the inner surface of the cover and fitting within said cup-shaped member and having elastic threads engaging those of the outer valve member to hold the valve structure and bladder in place relatively to the cover.

6. In an inflatable ball, a cover having an opening, a bladder having a valve attached thereto, said valve comprising a member projecting outwardly from the bladder, means for attaching the bladder to the cover comprising screw threads on the outer wall of said projecting member and an internally screw-threaded element secured to the cover with which said first-named threads may be engaged to draw said member against the inner surface of the ball, and means projecting outwardly from said valve member and disposed in the opening in the cover through which an inflating needle may be inserted.

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