

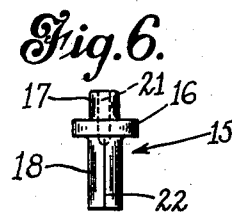
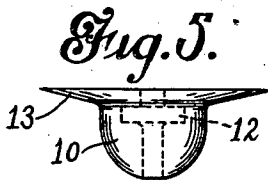
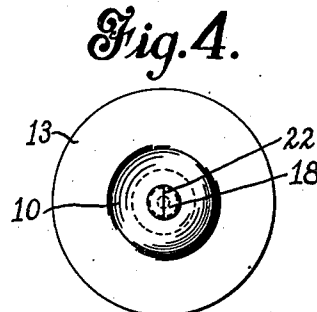
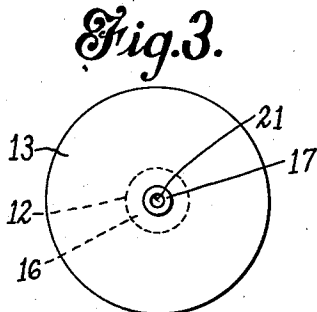
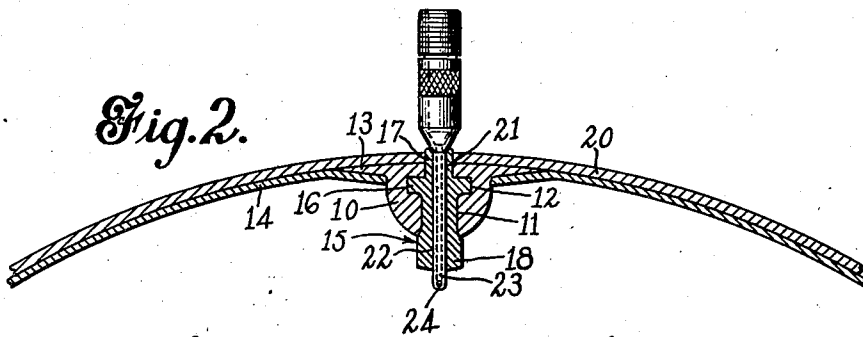
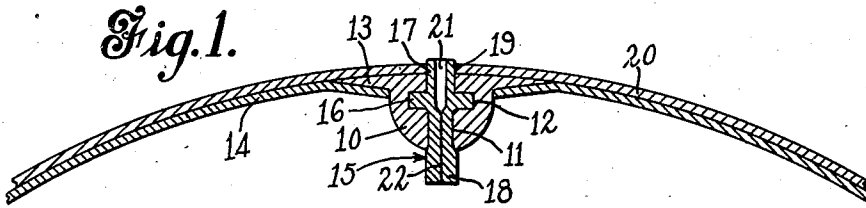
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VALVE FOR INFLATABLE BALLS

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VALVE FOR INFLATABLE BALLS

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6 Claims. (Cl. 273-65)

This invention relates to inflating valves for such articles as football bladders, play balls, and the like, and has particular reference to a self-closing valve of this type, the parts of which may preferably all be constructed of rubber, although this is not requisite in all aspects of the invention.

In the production of football bladders and similar articles, difficulty has at times been encountered in providing bladders with valves which will hold the air for a sufficient length of time, and at the present time bladders are often provided with self-closing valves, in connection with which is usually employed a hollow inflating needle inserted through the valve into the bladder in order to inflate the latter. In valves of this character the inflating aperture is often of relatively small size in order that the surrounding walls may be pressed firmly together in air-tight relation when the needle is withdrawn, and in inserting the needle into a small opening of this kind, particularly if the opening is not concentric with the nipple itself, the needle sometimes does not readily follow the opening.

It is contemplated in the present invention to provide a valve which will be self-closing and through which the needle may be easily and readily inserted in the proper course so that there will be no danger of its being forced through the side wall of the valve member, thus puncturing this wall and causing the valve to leak.

One object of the invention is the provision of a self-closing valve for football bladders, play balls, and similar inflatable articles, with which an inflating needle is designed to be employed, of such construction that the needle will be guided accurately and easily through the passage in the valve member, and at the same time the passage will be tightly closed when the needle is withdrawn to prevent any likelihood of air leakage therefrom.

Another object of the invention is the provision of an all-rubber valve member for use with inflatable articles, which will be particularly efficient in operation and at the same time be relatively cheaply manufactured.

A still further object of the invention is the provision of a valve member having a passage through which an inflating needle may be readily inserted and which at the same time will be provided with means to exert a lateral constrictive force upon the walls of the passage so that the latter will be tightly closed against the leakage of air.

A still further object of the invention is the

provision of a valve for football and basketball bladders and the like which shall comprise an outer body member and an inner plug, the inner plug being provided with a passage communicating with the interior of the bladder, and the outer body member exerting a constrictive force upon the inner member to render this passage self-closing against the leakage of air when the inflating needle has been withdrawn.

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

In the drawing:

Fig. 1 is a sectional view of a portion of a football having therein a bladder provided with our new valve structure showing the position of the parts when the article is in use;

Fig. 2 is a similar view illustrating the manner of inflating the article by the use of an inflating needle;

Fig. 3 is a top plan view of the valve structure removed from the body;

Fig. 4 is a bottom plan view of the parts shown in Fig. 3;

Fig. 5 is a side elevational view of the body member of the valve; and

Fig. 6 is a side elevational view of the plug removed from the body member.

In the practice of our invention, we prefer to make all parts of the valve of rubber, although this is not essential in all cases, and preferably the valve comprises an outer body member or tubular part of rubber having a flange by means of which it is attached to the bladder and an inner rubber part or plug disposed within and embraced by the body member, the plug having an opening therein to communicate with the interior of the ball.

We find it convenient to make use of an inflating needle in passing air into the bladder or other hollow article for inflation, and the structure is such that the needle can be passed readily from the exterior through the wall of the hollow article, such that the inner end of the needle containing the air hole will be inside the article to conduct air into its interior. The structure is also such that after the withdrawal of the inflating needle, the passage through which it has been introduced will be closed very tightly against the leakage of air.

As shown more particularly in Fig. 1 of the drawing, the outer or body member of the valve structure is constituted by a tubular member provided with a through passage 11, there being adjacent the upper end of this passage an annu-

lar recess 12 in the body member which communicates with the passage. It will be noted that the body member has a relatively thick side wall and adjacent its upper end is provided with a laterally extending flange 13, this flange being adapted to be adhesively applied to the bladder wall 14, preferably at the outer surface thereof. This flange may be, and preferably is, formed integrally with the wall of the body member 10.

Within the passage 11 of the body member is disposed a plug, shown in side elevational view in Fig. 6, and designated generally by the numeral 15. This plug is provided with a laterally extending annular flange 16, and the upper end 17 of the plug above the flange may, if desired, be slightly smaller in diameter or cross-sectional size than the lower portion 18 below the flange.

By reference to Figs. 1 and 2, it will be noted that the plug 15 is disposed within the through passage 11 in the body member in such a position that the flange 16 lies in the annular recess 12, and the outer or upper end 17 of the plug projects slightly from the outer surface of the body member above the flange 13. Likewise, at its inner end the portion 18 of the plug projects from the inner end of the body member into the interior of the bladder. It will of course be understood that the body member 10 is secured to the bladder, so that it also projects into the interior thereof.

The outer projecting end 17 of the plug is designed to be received, when the bladder is inserted in the usual cover, in an opening 19 of the cover 20, so that the valve and bladder are located relatively to the cover and so that access is permitted to insert the needle through the plug from the exterior of the cover without unlacing the same.

As shown more especially in Figs. 1 and 6, the plug is provided with a passage 21 extending inwardly from the outer end thereof. This opening extends only part way through the plug, however, and terminates at a position slightly below the flange 16, although the length of this passage may be varied if desired. The lower portion of the plug 15 is split transversely from its lower end upwardly, so that its lower portion is in two distinct parts. This split 22 extends upwardly to the lower end of the passage 21, so that the space between the two parts of the lower portion 18 of the valve member communicates with this passage at a point within the passage 11 of the body member 10.

When it is desired to inflate a bladder provided with our improved valve, a hollow inflating needle 23 having an outlet opening 24 in its lower end is inserted into the passage 21. At the bottom of this passage the needle with slight pressure will be caused to enter the slit or split 22 between the two parts of the lower portion 18 of the plug 15. The needle may then be pushed downwardly until its lower end emerges from the lower end of the plug, as shown in Fig. 2, in which position the outlet opening has free communication with the interior of the bladder. The latter may then be freely inflated.

It will be noted that the inner portion 18 of the plug 15 is preferably slightly larger than the passage 11 through the body member 10. As the body member 10 is made of rubber and is therefore elastic, it will exert a compressive force upon the inner portion 18 of the plug, as shown in Figs. 1 and 2, so as to urge the two halves of this member in tight contact with each other and effect an air-tight seal between them. This will, of course, effectively shut off communication be-

tween the passage 21 and the interior of the bladder to prevent the leakage of air therefrom when the needle is withdrawn. Moreover, it will be seen that the inner projecting end portion 18 of the split plug expands or mushrooms outwardly, assuming its normal cross-sectional size, so that this portion of the plug being larger than the opening in the body member 10 spreads out over this opening and seals the space around the plug against the leakage of air. In addition, this enlarged end of the plug acts as a stop and will prevent any tendency of the plug to be withdrawn from the body with the needle when the latter is withdrawn after the inflation process has been completed.

Upon the withdrawal of the needle, the valve will be self-closing, and due to the constrictive action of the relatively thick wall of the body member 10, a particularly tight air seal will be effected. Moreover, it will be apparent that the plug 15 and particularly its projecting outer end 17 will be concentric with the body member or valve structure as a whole, and the passage through the plug is such that the needle may be inserted concentrically with the body member and pushed straight through the plug into the interior of the ball. Moreover, the passage of the needle through the plug may be readily effected so that there will be no likelihood of the needle being caused to puncture the side wall of the body member, as the force required to insert the needle in its proper course will be much less than that required to pierce this wall.

It will also be apparent that the constrictive force of the body member is exerted over a considerable length of the plug so as to provide a sealing area of considerable size and thus insure against the likelihood of any leakage.

While we have shown and described a preferred embodiment of our invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the appended claims.

What we claim is:

1. A valve device for inflatable balls comprising a body member having a thick walled inner portion and a laterally projecting flange adjacent its outer end to be secured to the ball whereby the inner portion of the member projects within the ball, said member being of elastic material and having an opening therethrough, a compressible plug disposed within said opening and projecting from the body member at both its outer and inner ends, said plug having a passage extending inwardly from the outer end thereof but terminating short of its inner end and being split transversely from its inner end to the end of said passage, the inner portion of said body member compressing the split portions of said plug together, and the inner projecting end of the plug extending outwardly over the space between the plug and body member.

2. A valve device for inflatable balls comprising a body member having a laterally projecting flange adjacent its outer end to be secured to the ball whereby the inner portion of the member projects within the ball, said member having thick walls and being of elastic material and having an opening therethrough, a compressible plug disposed within said opening and projecting from the body member at both its outer and inner ends, said plug having a passage extending inwardly from the outer end thereof but

terminating short of its inner end and being split transversely from its inner end to the end of said passage, the inner portion of said body member compressing the split portions of said plug together, said plug being provided with an annular flange, said body member having an annular recess surrounding the opening therethrough to receive said flange, and the inner projecting end of the plug expanding outwardly over the space between the plug and body member.

3. A valve device for inflatable balls comprising a thick walled body member having a laterally projecting flange adjacent its outer end to be secured to the ball whereby the inner portion of the member projects within the ball, said member being of elastic material and having an opening therethrough, a compressible plug disposed within said opening and projecting from the body member at both its outer and inner ends, said plug having a passage extending inwardly from the outer end thereof but terminating short of its inner end and being split transversely from its inner end to the end of said passage, and the split portion of said plug being of constant cross-sectional size and normally larger in cross-sectional size than the opening in said body whereby the wall of the latter exerts a constricting force on the split portion of the plug, and the extending end of the latter expands over the opening in the body member.

4. A bladder having an inwardly extending tubular valve body of elastic material, a plug of elastic material disposed within said tubular valve body and projecting therefrom at its inner end within the bladder, said plug having a passage extending part way through the same from its outer end and having its body split transversely from the end of said passage to its inner end, the wall of said body being thick and surrounding and compressing the split portion of the

plug, and the projecting end of the plug expanding over the opening in the valve member.

5. A bladder having an inwardly extending tubular valve member of elastic material, a plug of elastic material disposed within said tubular valve member and projecting therefrom at its inner end within the bladder, said plug having a passage extending part way through the same from its outer end and having its body split transversely from the end of said passage to its inner end, the wall of said body surrounding and compressing the split portion of the plug, and the projecting end of the plug expanding outwardly over the opening in the valve member, said plug being provided with a laterally extending anchoring flange, said valve member having a recess surrounding the opening therein to receive said flange and said plug being of constant cross-sectional size below the flange.

6. A bladder having an inwardly extending tubular valve member of elastic material, a plug of elastic material disposed within said tubular valve member and projecting therefrom at its inner end within the bladder, said plug having a passage extending part way through the same from its outer end and having its body split transversely from the end of said passage to its inner end, the wall of said body surrounding and compressing the split portion of the plug, and the projecting end of the plug expanding outwardly over the opening in the valve member, said plug being provided with a laterally extending anchoring flange and being of constant cross-sectional size below said flange, said valve member having a recess surrounding the opening therein to receive said flange, and said tubular valve member having a laterally extending flange adapted to be secured to the bladder.

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