

UNITED STATES PATENT OFFICE.

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SPORT BALL.

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This invention relates to improvements in inflatable sport balls and more particularly to improvements in a valve for the bladder or inflatable element thereof.

5 The invention is directed to an improvement in the valve disclosed in U. S. Letters Patent No. 1,618,676, granted Feb. 22, 1927, on a joint invention of Milton B. Reach and myself. The filling tube and valve of that
10 patent extended inwardly into the bladder and the filling tube was long and the spring for pressing the tube together to secure the valve action was relatively large and bulky. As a consequence, the bladder, when unin-
15 flated, did not lie flat, as is ordinarily the case and as is desired, but was humped up in the middle by the large bulk of the filling tube and valve. The uninflated bladder, therefore, did not pack nicely in its box and
20 was unattractive in appearance. Aside from this, however, the arrangement was also open to objection because of the possibility of the bladder becoming injured or even punctured due to careless handling which might cause
25 the ends of the metal spring to strike against the bladder. Such an injury is especially likely to occur if something falls on the bladder or the carton in which it is packed. The blow, thereby delivered, might drive
30 the spring through the bladder at a point opposite to that at which the filling tube is attached. Another disadvantage of the construction referred to is that the filling tube is unduly long and thereby offers a great
35 deal of frictional resistance to the insertion and removal of the inflating pin. Besides making difficult the operation of inserting and removing the inflating pin, there is also the danger that in applying the relatively
40 great force necessary to insert the inflating pin in the filling tube, one might drive it through too far and cause an injury to or even a puncture of the bladder.

This invention has for its general object
45 the provision of a valve, which will function in the same general manner as the valve of the prior patent, referred to, and which possesses all of the advantages of that type of valve without the disadvantages and objectionable features above set forth as incident
50 to the prior construction.

Particular objects of the invention are to
locate the valve wholly on the outside of
the bladder; to reduce the length of the fill-
55 ing tube; to improve the spring by which the filling tube is closed and its disposition

with relation to the filling tube; to provide a simpler, cheaper and better construction of valve; and to provide a valve of such exceedingly compact form as to render it
60 possible to apply the valve to the outside of the bladder.

The valve construction of this invention has the advantages of the prior construction in that the bladder can be inflated or de-
65 flated without unlacing the outer casing of the ball and in that an effective and leak proof valve closure is afforded.

Other objects and advantages will appear in the following description and will be
70 pointed out in the appended claims.

The invention will be disclosed with reference to the one illustrative embodiment of it in the accompanying drawings, in
75 which:—

Fig. 1 is a sectional view showing a portion of sport ball provided with a valve embodying the invention;

Fig. 2 is a fragmentary plan view of the ball, illustrating how access may be had to
80 the valve without unlacing the ball;

Fig. 3 is a sectional view of the valve element before the closure spring is applied thereto;

Fig. 4 is a similar view showing the spring
85 in place;

Fig. 5 is a sectional plan view taken on the line 5—5 of Fig. 4; and

Fig. 6 is a sectional view of a pin which may be used to open the valve and permit
90 inflation and deflation of the ball.

Referring to these drawings, the bladder or inflatable inner casing is shown in part at 8. It is to be understood that the bladder is air tight and has but the single open-
95 ing 9, which is sealed by the valve of this invention. The cover, or outer casing, is designated 10 and it is provided on the inside with the usual flap 11 underlying the slit or opening 12 through which the bladder
100 is inserted into casing 10. The slit 12 is adapted to be substantially closed by lacings which are applied to the cover adjacent the slit in the usual manner as indicated conventionally at 13.

The valve of this invention consists essentially of a body of flexible material, usually also elastic, such as rubber or the like, made up originally in the form shown in
Fig. 3. The rubber body comprises a flange
105 15, usually circular and skived down toward the periphery as shown; an upstand-

ing neck 16 which forms the filling tube and is herein shown as of circular cross section; and a button 17 on top of the neck. This body has a central and axially disposed hole 18 therethrough which hole forms the filling opening for the bladder and is substantially commensurate in diameter with the inflating tube 19 shown in Fig. 6. The filling opening 18 has a flaring entrance 20 at its upper end, to facilitate insertion of tube 19 and, if desired, a flaring exit 20' at its lower end. The flange 15 is vulcanized to the outer wall of bladder 8 with the openings 18 and 9 in communication. The valve 15 also includes some suitable means for compressing the neck 16 and normally forcing the walls of opening 18 into intimate contact so as to prevent air from passing into or out of bladder 8.

While various means may be employed for this purpose and it is even possible to so form the tube 16 that it will of itself close, I prefer to provide a means which will always insure a tight closure. Therefore, by preference, I use a metal spring, such for example as that shown at 21 in Fig. 5, because this will remain effective long after rubber or elastic bands have, by deterioration and aging, lost their elasticity. The spring, as herein shown, is made of thin flat metal and may be bent up into approximately U-shaped form, or as shown, more nearly in the form of a letter O, except that its ends do not quite meet. At any rate, the important thing is to provide two substantially parallel legs between which the walls of the filling tube are clamped and to have these legs long enough to cover the entire width of the filling tube when the latter is flattened down as shown in Fig. 5. This spring is characterized in that it occupies only a small amount of space lengthwise of the filling tube and it may, by variation of its cross sectional shape from that illustrated, be made even smaller in height if necessary or desired. The long dimension of the spring is crosswise of, or transverse to, the axis of the filling tube and by this disposition of parts I am enabled to make the valve of such small compass that it can be applied to the outside of the bladder.

The spring 21 may be covered by an elastic band or tube 22 to protect adjacent parts from possible injury by contact with the edges of the spring.

In use, the bladder, uninflated, is inserted through slit 12 into the casing 10 and the button 17 of the valve is passed through the usual hole in flap 11 so that the button at all times holds the mouth 20 of the filling tube in a definite and accessible position. The cover 10 is then laced up in the usual manner, leaving the mouth 20 accessible as shown in Fig. 2. To inflate

the bladder, a tube such as 19 may be used. This tube, which may be much shorter than what is required with the prior type of valve, has a hole 23 leading from one end toward, but terminating short of, the opposite end. The last named end is preferably nicely rounded, as at 24, so as to facilitate its insertion into the filling opening and avoid injury thereto or to the bladder. The lower end of hole 23 communicates with a radial hole 25 leading to the outer periphery of the tube. One inserts the rounded end 24 into the flaring entrance 20 and pushes it inwardly into and through the filling opening until the hole 25 is brought into communication with the interior of bladder 8. The bladder is then inflated in any suitable way, using the tube 19 as a conduit for the air. As the tube 19 is inserted in filling opening 18, the arms of spring 21 are forced apart and the valve opened. When tube 19 is withdrawn, the arms of the spring close off the opening 18 and the bladder is thereby sealed against escape of air.

It is to be noted that the valve is disposed in its entirety on the outside of the bladder,—a location which is not at all feasible with the prior construction heretofore alluded to. The valve has been made of small compass; the filling tube has been materially reduced in length and the axial dimensions made as small as feasible; and a different type of spring has been used which is characterized by having its long dimension transverse to, rather than parallel with, the axis of the filling tube. These various changes are each important factors, making possible, as they do, the location of the valve outside the bladder. At the same time, I get the advantage that the bladder, when deflated, lies flat, packs nicely and looks attractive to a customer. Also, I eliminate, or at least materially lessen, the danger of puncturing or injuring the bladder both during packing, shipment and handling of the bladder and during inflation of the same by the use of a tube, such as 19. The substantial decrease in length of the tube so lessens the frictional resistance to insertion of the inflating tube 19 that it can be inserted much more easily. Since less force is required to insert it, there is less likelihood that it will be jammed in so violently as to enter too far and puncture the bladder at a point opposite that at which the valve is attached.

The valve of this invention is of the same general class as that of the valve of said patent and functions similarly and has all the advantages incident to the use of the special type of valve shown in the patent. At the same time, the valve construction has been materially improved and simplified and made in such a manner that it may be lo-

cated outside rather than inside the bladder, thus overcoming the objections to and disadvantages of the prior construction.

The invention has been disclosed herein, in an embodiment at present preferred, for illustrative purposes but the scope of the invention is defined by the appended claims rather than by the foregoing description.

What I claim is:

10 1. A valve for inflatable sport balls comprising, a filling tube extending outwardly a relatively short distance from the bladder of the ball, and a substantially U-shaped spring, the legs of which are disposed transversely to the axis of the filling tube and
15 act to press the walls of the latter together to close the filling opening.

2. The combination with the cover, flap and bladder of a sport ball, of a body of rubber or the like having a flange attached to the bladder, a neck upstanding from the

flange and terminating with a button adapted to fasten to said flap, said body having a normally closed filling opening therein leading from the outer face of the button 25 through said neck and flange into the bladder, the entrance to said opening being accessible through the laced opening of said cover without unlacing the same.

3. A valve for an inflatable sport ball, 30 comprising, a body of rubber or the like having a base flange for attachment to the outer wall of the bladder and a short straight upstanding tubular neck terminating in a button, and a spring having legs extending 35 transversely to the axis of the neck and pressing against the latter at oppositely disposed points to normally close the filling opening therethrough.

In testimony whereof I have affixed my 40 signature.

WILLIAM W. MacDONALD.