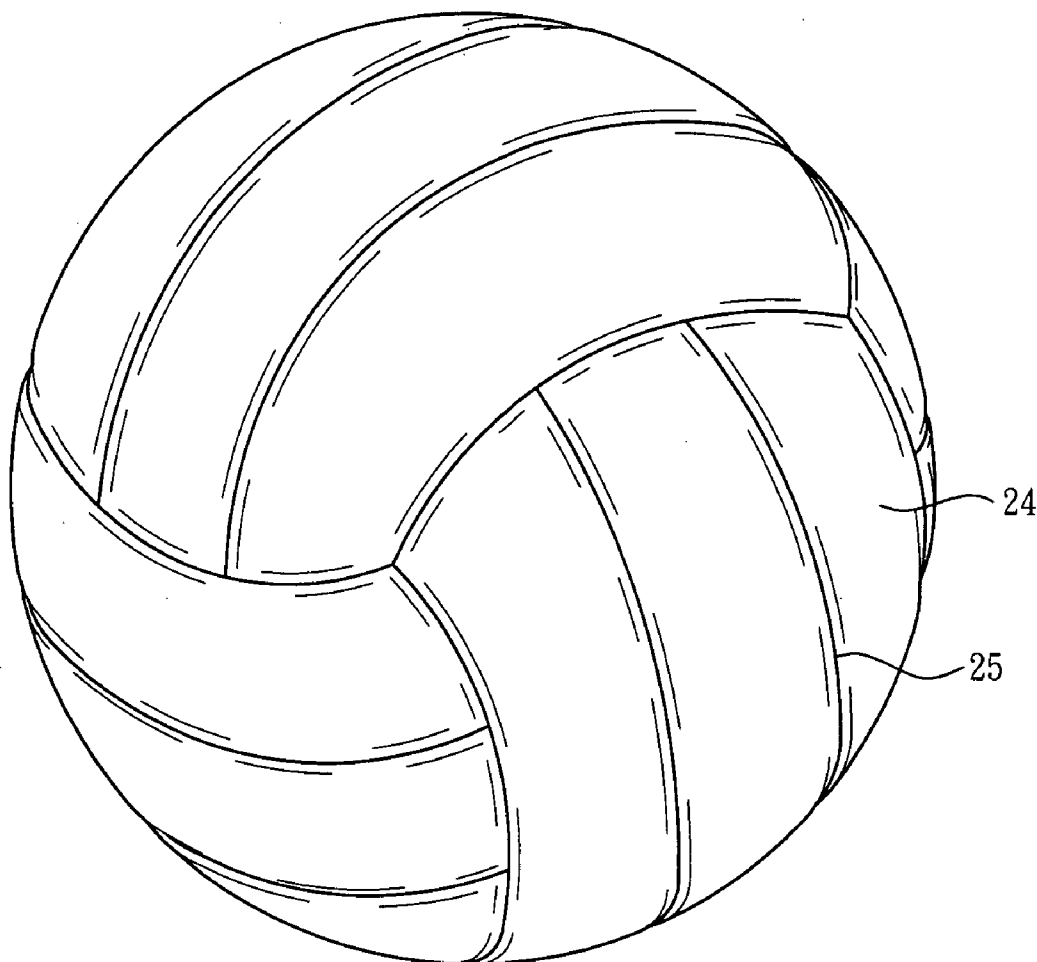




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(19) **United States**(12) **Patent Application Publication****Tu et al.**(10) **Pub. No.: US 2008/0287231 A1**(43) **Pub. Date: Nov. 20, 2008**(54) **BALL WITH IMPROVED STRUCTURE****Publication Classification**(75) Inventors: **Tsun-Ching Tu**, Taipei (TW);
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A63B 41/10 (2006.01)(52) **U.S. Cl.** **473/606**(57) **ABSTRACT**Correspondence Address:
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The disclosed ball with improved structure of the present invention comprises a hollow bladder that can be inflated in to a ball-like shape, a reinforcement layer that is a layer of cloth having intensive pores and fixedly covering up to the outer surface of the bladder, a buffer layer that is made from foam and fixedly attached to the outer surface of the reinforcement layer, a cover layer that is a layer of cloth having intensive pores and fixedly attached to the outer surface of the buffer layer, and an external layer that fixedly covers up the outer surface of the cover layer and forms the appearance of the ball.

(73) Assignee: **Continental Chemical Co., Ltd.**(21) Appl. No.: **11/804,262**(22) Filed: **May 17, 2007**

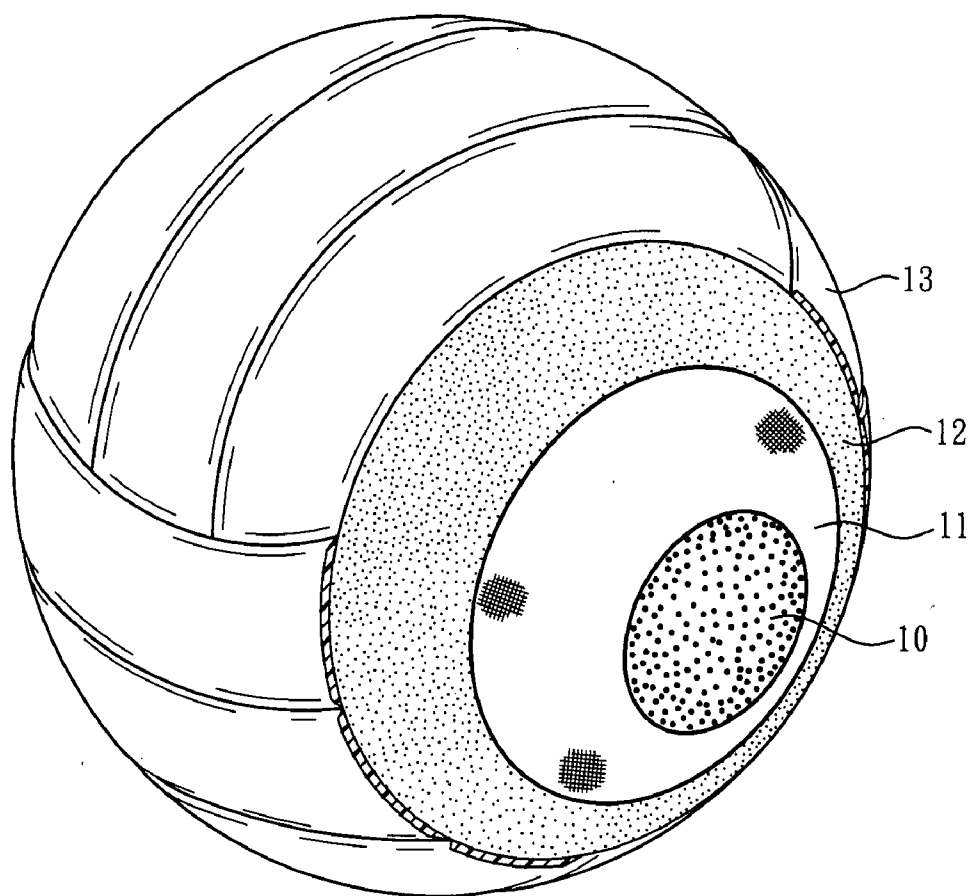


FIG. 1
PRIOR ART

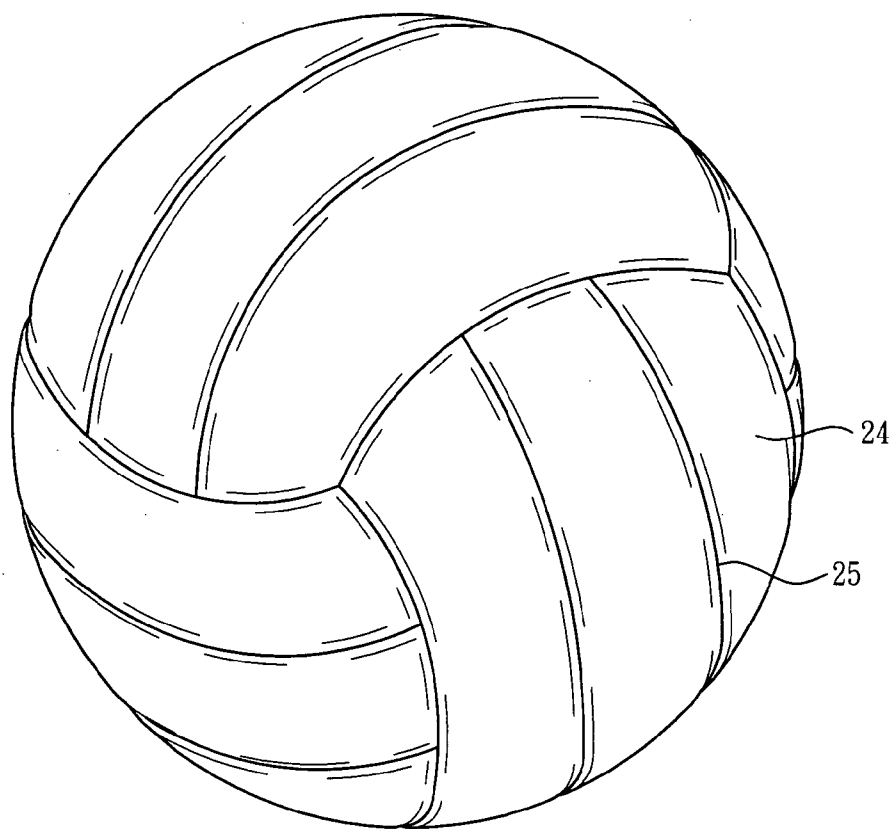


FIG. 2

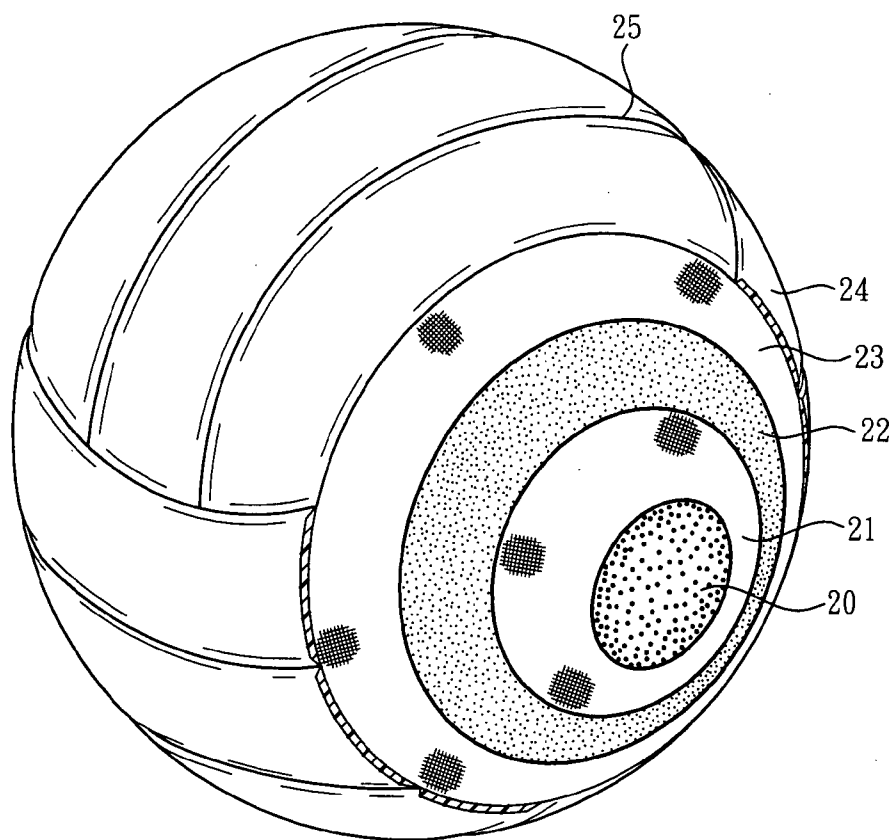


FIG. 3

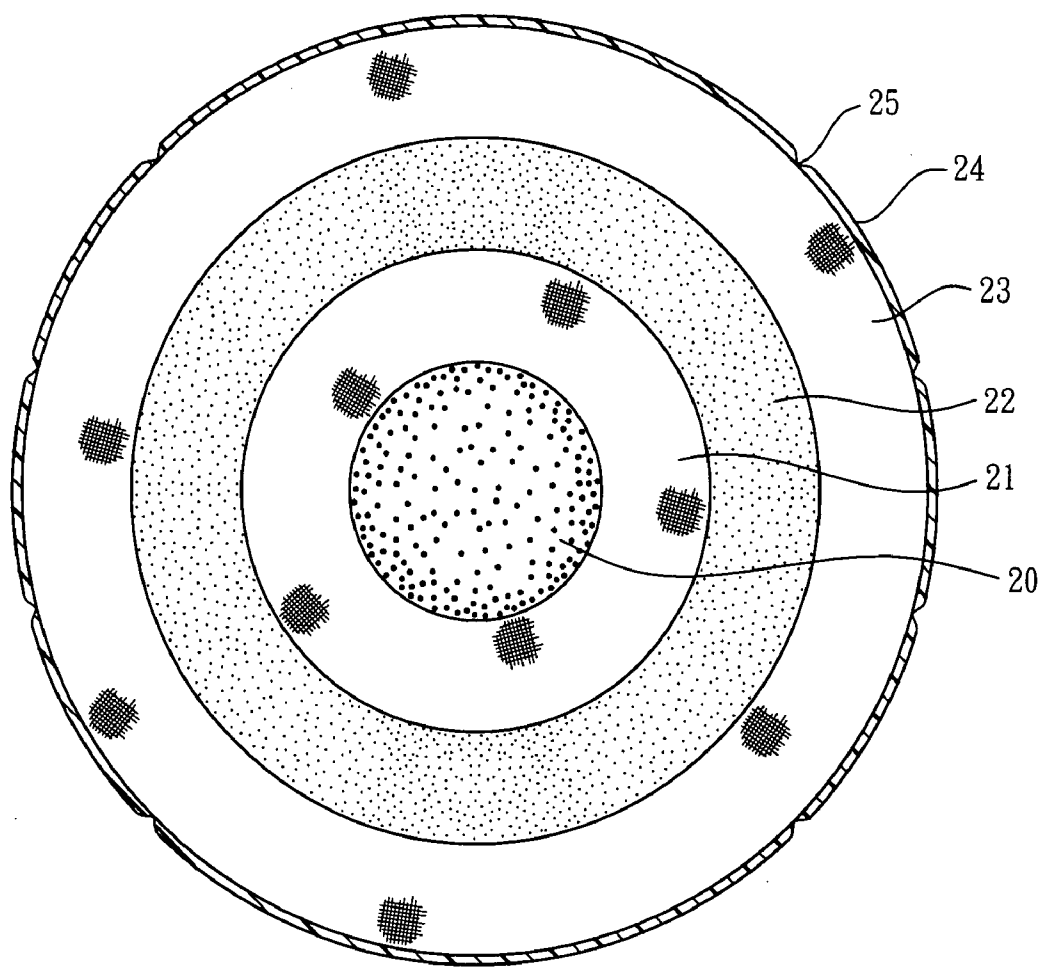


FIG. 4

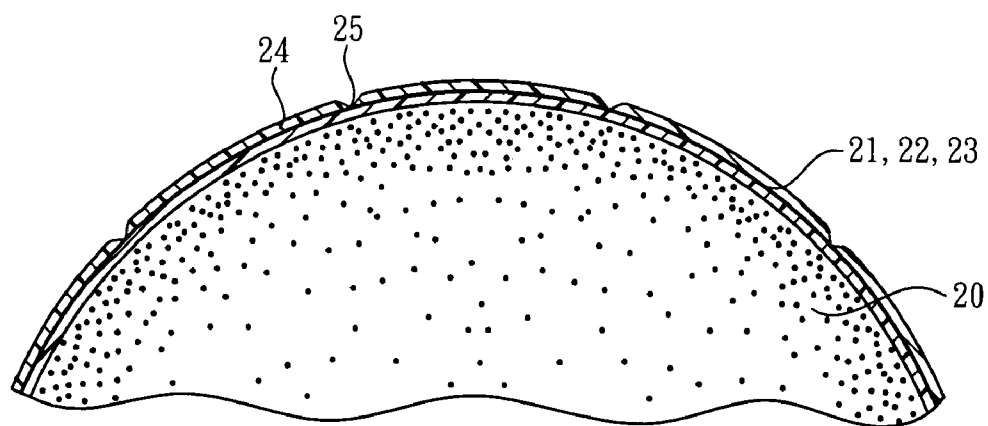


FIG. 5

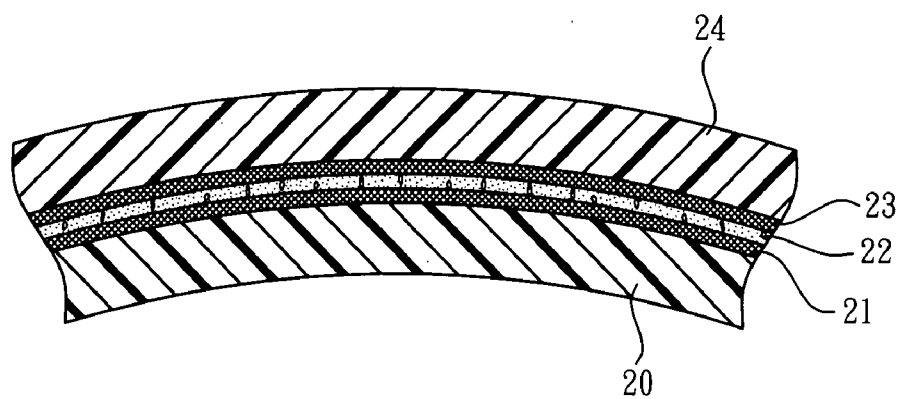


FIG. 6

BALL WITH IMPROVED STRUCTURE

BACKGROUND OF THE INVENTION

[0001] 1. Technical Field

[0002] The present invention relates to inflatable sport or game balls and, more particularly, to an inflatable sport or game ball with improved structure. The disclosed structure comprises sequentially from the inside thereof a bladder, a reinforcement layer covering up the outer surface of the bladder, a buffer layer combined with the outer surface of the reinforcement layer, a cover layer combined with the outer surface of the buffer layer and an external layer that is bound with the outer surface of the cover layer and forms the appearance of the ball. The ball with the disclosed structure is characterized by the improved softness and bounce.

[0003] 2. Description of Related Art

[0004] The conventional structure of a ball, as shown in FIG. 1, typically comprises four layers sequentially combined. From the inside to the outside of the ball, the innermost layer is a hollow bladder 10 that can be inflated in to a ball-like shape. The bladder 10 is covered up by a reinforcement layer 11. The reinforcement layer 11 is further wrapt by a buffer layer 12. The buffer layer 12 is externally attached with an external layer 13. The bladder is the main component that bears the air pressure inside the ball and also contributes the shape of the ball. The bladder 10 is made with synthetic butyl rubber and natural rubber, which are mixed in a predetermined proportion. The reinforcement layer 11 is made by winding thread around the outer surface of the bladder 10 with a winding machine, wherein the thread can be nylon filament, polyester thread or monofilament polymeric strand. The reinforcement layer 11 functions for restricting the bladder 10 from excessively inflated so as to ensure the stability of the shape of the bladder 10 and the ball. Also, the reinforcement layer 11 contributes to mitigate the pressure effecting on the buffer layer 12 and the external layer 13 during air inflation. Adhesive is typically implemented inside the reinforcement layer 11 in order to reinforce the combination of the reinforcement layer 11 and the bladder 10. The buffer layer 12 is materially a layer of sponge-formed foam or raw rubber having minute air cells, so as to provide enhanced bounce, softness, buffer capacity and shock absorption. The external layer 13 is a layer of textured leather, which may be synthetic leather or genuine leather. To attach the external layer 13 onto the buffer layer 12, the outer surface of the latter is firstly harshened and coated with glue, and the external layer 13, which has been cut into a plurality of thinned-flange portions in advance, is adhered to the buffer layer 12. The resultant ball product is finalized after being finally shaped by an external mold.

[0005] The structure constructed from the aforementioned layers of the ball is therefore quite compact and renders the inflated ball excessively hard. With excessive hardness, the ball may present excessive bounce that causes the bounce direction uncontrollable. Besides, the ball with insufficient softness can give users poor touch feeling and may even hurt users when it impacts the users.

SUMMARY OF THE INVENTION

[0006] It is one objective of the present invention to provide a ball with improved structure that provides enhanced softness, bounce and buffering capacity. The derivative efficacy of the present invention includes that the air pressure charged

into the ball can be appropriately controlled while the ball presents sufficient, desirable and expected bounce and the controllable bounce. The present invention also contributes the improved touch feeling. Meantime, the disclosed ball is efficient in absorbing impact force so as to mitigate the impact force effecting on the users.

[0007] To achieve these and other objectives of the present invention, the disclosed ball with improved structure comprises a hollow bladder that can be inflated in to a ball-like shape, a reinforcement layer that is a layer of cloth having intensive pores and fixedly covering up the outer surface of the bladder, a buffer layer that is made from foam and fixedly attached to the outer surface of the reinforcement layer, a cover layer that is a layer of cloth having intensive pores and combined with the outer surface of the buffer layer, and an external layer that is fixed onto the outer surface of the cover layer and forms the appearance of the ball.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The invention as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

[0009] FIG. 1 is a perspective view of a conventional ball wherein the ball is partially sectioned for showing the internal structure thereof;

[0010] FIG. 2 is a perspective view of a ball according to the present invention;

[0011] FIG. 3 is a perspective view of the disclosed ball according to the present invention wherein the ball is partially sectioned for showing the bladder, the reinforcement layer, the buffer layer, the cover layer and the external layer;

[0012] FIG. 4 is a transverse view of the disclosed ball according to the present invention showing the bladder, the reinforcement layer, the buffer layer, the cover layer and the external layer;

[0013] FIG. 5 is a sectional transverse view of the disclosed ball; and

[0014] FIG. 6 is a partially enlarged drawing of the disclosed ball according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] As shown in FIG. 2 through FIG. 5, the disclosed ball of the present invention comprise five layers, which are sequentially from the inside to the outside a bladder 20, a reinforcement layer 21 bound to the outer surface of the bladder 20, a buffer layer 22 bound to the outer surface of the reinforcement layer 21, a cover layer 23 bound to the outer surface of the buffer layer 22 and an external layer 24 that is adhered to the outer surface of the cover layer 23 and forms the appearance of the ball.

[0016] As an example, a volleyball is described below for illustrating the structure of the present invention. However, it is to be understood that the disclosed structure may be applied to various balls without going outside the spirit and scope of the invention.

[0017] The bladder 20 is the main component that bears the air pressure inside the ball and also contributes the shape of the ball. The bladder 20 is made with synthetic butyl rubber and natural rubber mixed in a predetermined proportion. The reinforcement layer 21 is substantially a thin layer of cloth

having intensive pores such as cotton or synthetic fiber and fixedly covering up the outer surface of the bladder **20** by means of adhesive. The reinforcement layer **21** functions for restricting the bladder **20** from excessively inflated so as to ensure the stability of the shape of the bladder **20** and the ball. Also, the reinforcement layer **21** contributes to mitigate the pressure effecting on the buffer layer **22** during air inflation. The buffer layer **22** is materially a layer of sponge-formed foam or raw rubber having minute air cells, so as to provide enhanced bounce, softness, buffer capacity and shock absorption to the ball. The cover layer **23** is substantially a thin layer of cloth having intensive pores such as cotton or synthetic fiber and adhered to the outer surface of the buffer layer **22** by means of adhesive. The external layer **24** is a layer of textured leather, which may be synthetic leather or genuine leather and composed of a plurality of thinned-flange portions adhered to the cover layer **23** in the manner that a seam **25** is formed between each pair of the adjacent portions.

[0018] As compared with the prior-art balls, the present invention uniquely comprises the reinforcement layer **21** as a layer of thin cloth having intensive pores such as cotton or synthetic fiber and fixedly covering up to the outer surface of the bladder **20** by means of adhesive. The present invention further comprises a cover layer **23** as a thin layer of cloth having intensive pores such as cotton or synthetic fiber arranged between the buffer layer **22** and outer cover layer **24**.

[0019] According to the present invention, the reinforcement layer **21** is adhered to the outer surface of the bladder **20** with adhesive after the latter has been inflated. As previously discussed, the reinforcement layer **11** of a conventional ball is made through winding thread on the outer surface of the inflated bladder **10** with a winding machine. Thus, it is obvious that the reinforcement layer **21** of the present invention is relatively easier and faster to be constructed.

[0020] The buffer layer **12** of the prior art made from foam is fixedly attached to the reinforcement layer **11** while it gets vulcanized. However, since the constitution of the reinforcement layer **11** is substantially wound thread, the foam can only combine with the reinforcement layer **11** at the intervals among the overlapped thread fractions. Such weak combination consequently weakens the adhesion of the buffer layer **12** and in turn depresses the adhesion of the external layer **13** to the buffer layer **12** because the external layer **13** is directly fixed onto the buffer layer **12**. As a remedy, the present invention implements a layer of cloth having intensive pores such as cotton and synthetic fiber as the reinforcement layer **21** instead of the thread wound reinforcement layer of the prior art so as to provide more and denser pores for the foam of the buffer layer **22** to be combined therewith. Resultantly, the relatively larger bonded area facilitates enhancing the adhesion of the buffer layer **22** and in turn enhancing the adhesion of the cover layer **23** and external layer **24**. Thereupon, the layers of the ball can be combined with enhanced firmness.

[0021] The main objective of the cover layer **23** is to provide an intermedium between the external layer **24** and the buffer layer **22**. As the intermedium, namely the cover layer

23, is a flexible and tender substance, it ensures the firm combination of the layers of the ball and enhances the buffer capacity and bounce of the buffer layer **22** so that the bounce, softness and buffer capacity of the entire ball can be improved. The derivative efficacy of the present invention includes that the air pressure charged into the ball can be appropriately controlled while the ball presents sufficient, desirable and expected bounce and controllable bounce. The present invention also contributes the improved touch feeling. Meantime, the disclosed ball is efficient in absorbing impact force so as to mitigate the impact force effecting on the users.

[0022] Although a particular embodiment of the invention has been described in detail for purposes of illustration, it will be understood by one of ordinary skill in the art that numerous variations will be possible to the disclosed embodiments without going outside the scope of the invention as disclosed in the claims.

What is claimed is:

1. A ball with improve structure comprising:

a hollow bladder that can be inflated in to a ball-like shape, a reinforcement layer that is a layer of cloth having intensive pores and fixedly covering up the outer surface of the bladder,

a buffer layer that is made from foam and fixedly attached to the outer surface of the reinforcement layer,

a cover layer that is a layer of cloth having intensive pores and fixedly attached to the outer surface of the buffer layer, and

an external layer that covers up the outer surface of the cover layer and forms the appearance of the ball.

2. The ball of claim 1, wherein the buffer layer permeates into the intensive pores of the reinforcement layer.

3. The ball of claim 1, wherein the cover layer is adhered to the outer surface of the buffer layer with adhesive.

4. The ball of claim 1, wherein the external layer is adhered to the outer surface of the cover layer with adhesive.

5. A ball with improved structure comprising a hollow bladder that can be inflated in to a ball-like shape and a reinforcement layer made through winding thread around the outer surface of the bladder with a winding machine, wherein the ball further comprises:

a buffer layer that is made from foam and fixedly attached to the outer surface of the reinforcement layer,

a cover layer that is a layer of cloth having intensive pores and fixedly covering up the outer surface of the buffer layer, and

an external layer that fixedly covers up the outer surface of the cover layer and appears as the appearance of the ball.

6. The ball of claim 5, wherein the cover layer is adhered to the outer surface of the buffer layer with adhesive.

7. The ball of claim 5, wherein the external layer is adhered to the outer surface of the cover layer with adhesive.

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