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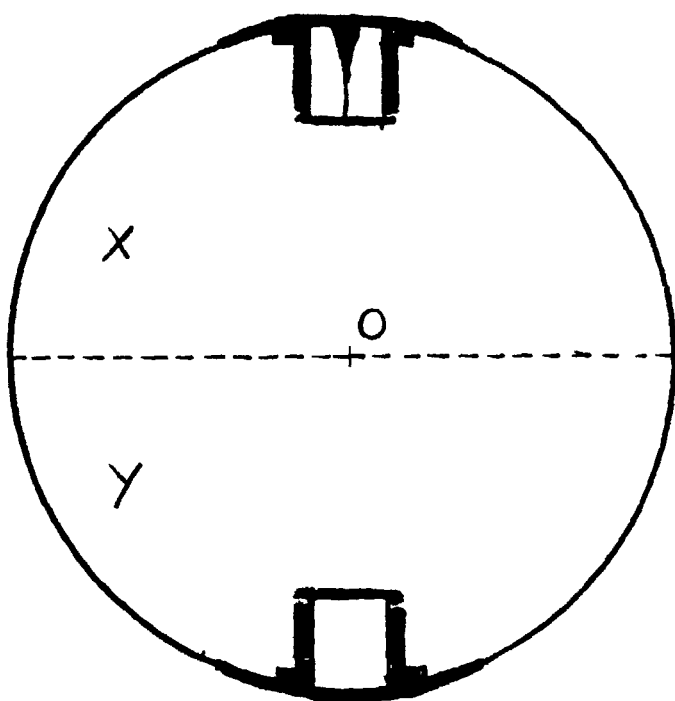
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(54) Title: BALANCED BLADDER FOR INFLATABLE BALLS



(57) Abstract: The present invention relates to a balanced inflatable bladder for soccer ball, football, rugby ball, volley ball, basket ball, net ball and the like. The balanced bladder is generally elliptical or circular in shape. The balanced bladder of the present invention is made of an elastomeric material or synthetic rubber or natural rubber and comprises at least two valves of similar configuration placed diametrically opposite preferably at an angle of 180°. Each valve comprises a male member and a female member where the male member of at least one valve is provided with provision for insertion of air in the form of a tapering central hole. Each valve conforms in weight shape and dimensions with each other.



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BALANCED BLADDER FOR INFLATABLE BALLS

The present invention relates to an inflatable single piece balanced bladder of balanced weight formed in an elliptical or circular shape. The main embodiment of the present invention resides in the inflatable balanced bladder having a counter balancing effect maintained within the said balanced bladder to eliminate the inherent wobbling effect.

The inflatable bladder of the present invention is used in football, volley ball, rugby ball, soccer ball, basket ball, net ball and the like. The inflatable bladder of the present invention is a single piece bladder elliptical or circular in shape which is made up of elastomeric material or synthetic rubber or natural rubber.

BACKGROUND OF THE INVENTION

An inflatable bladder is required for all types of inflatable balls like soccer ball, rugby ball, football, volleyball, basket ball, net ball and the like. The bladder has been conventionally known to be manufactured from natural rubbers like latex, butyl rubber, polyvinyl chloride and other forms of synthetic rubbers or elastomeric materials. The bladder is provided with an air inlet valve through which the air is pumped into the bladder. The air inlet valve of the bladder is not visible to the naked eye as the same is covered by the outer body.

The bladder is placed inside the ball and the outer body either consists of panels which are stitched together or it is a molded body.

The surface of the outer body is provided with an aperture or opening to enable inflating the bladder and as a consequence the ball.

When the bladder is inserted inside the outer body of the ball, though the valve is not visible but because of the weight of the valve being concentrated on one side of the ball it does not follow the desired path on being hit. This effect is especially visible when the ball on being hit is also spinning on its own axis. This results in a wobbling

effect thereby resulting in the ball not taking the desired path and not reaching the desired destination.

5 There have been attempts to remove this wobbling effect by placing counterbalancing weight between the bladders and the panels to offset the weight of the lacing and the associated components thereon. However, the desired effect has still not been achieved.

10 To avoid wobbling effect created due to placement of the valve there have been various methods used and various modifications made in the manufacture of the bladder and the ball. The US Patent 5709622 and 5470060 define a football with odd number of panels. To avoid kicking the football at a diametrically opposite position to the location of laces of the football, the football in this invention is provided with an odd number of panels, thereby enabling the kicking of the football at a location
15 where no seam is located to enhance the effectiveness and accuracy of kicking. US Patent 5577724 defines use of an additional lacing in order to provide balance to the weight and structure of the football.

Further US Patent 5098097 relates to an American football comprising an inflatable,
20 one piece bladder formed in a generally elliptical shape and fabricated of an elastomeric material; four panels secured together over the bladder, each panel being of a similar, generally oval shape with inturned edges secured together by stitching to form four seams; an essentially inextensible liner formed of four liner components, each liner component being of a similar, generally oval shape with inturned edges
25 secured together and to an associated panel by stitching to form four seams, the liner components being located between the panels and the bladder; an opening formed centrally along a part of one seam at a location where the panel and the liner components are not stitched; lacing located along the opening to couple the inturned edges in place of the stitching; closure means comprising two patches and a tongue
30 located between the bladder and line components, the patches being stitched to the liner components and panel on opposite sides of the opening, the tongue being stitched to a liner component and panels and extending to a location between the

bladder and patches; and a counter weight of elastomeric material, and of a size and shape substantially equal to that of the lacing and closure means molded to the bladder external thereof along the seam of the panels opposite the lacing.

5 Another US patent 5,342,043 also defines an American football an inflatable, one piece bladder formed in a generally elliptical shape and fabricated of an elastomeric material; four panels secured together over the bladder, each panel being of a similar, generally oval shape with inturned edges secured together by stitching to form four seams; an essentially inextensible liner formed of four liner components, each liner
10 component being of a similar, generally oval shape with inturned edges secured together and to an associated panel by stitching to form four seams, the liner components being located between the panels and the bladder; an opening formed centrally along a part of one seam at a location where the panel and the liner components are not stitched; lacing located along the opening to couple the inturned
15 edges in place of the stitching; closure means comprising two patches and a tongue located between the bladder and line components, the patches being stitched to the liner components and panel on opposite sides of the opening, the tongue being stitched to a liner component and panels and extending to a location between the bladder and patches; and at least a pair of spaced apart counterweights of an
20 elastomeric material, each of a weight substantially equal to half that of the said lacing and closure means and molded to the bladder internally thereof and spaced from the seam of the panels opposite said lacing a predetermined distance so that there is no abatement of punting or kicking efficiency while still allowing a true spiral pass to be thrown. However, even this patent has not been able to claim complete elimination of
25 the wobbling effect.

The present invention aims to provide an inflatable balanced bladder made of a elastomeric material or synthetic rubber or natural rubber for use in football, soccer ball, rugby ball, volley ball, basket ball, net ball and the like, wherein wobbling effect
30 is eliminated due to the bladder being a fully balanced bladder.

The present invention relates to an inflatable balanced bladder for use in football, soccer ball, volley ball, rugby ball, basket ball, net ball and the like. The main embodiment of the present invention resides in counterbalancing of the weight of the air inlet valve by placement of a dummy valve conforming to the air inlet valve in weight, shape and dimensions at 180^0 axially opposite to the said air inlet valve. The dummy valve is placed diametrically opposite to the air inlet valve where both the valves, i.e., an inlet valve and the dummy valve, are equidistant from the center of the balanced bladder. This therefore results in the formation of a fully balanced bladder.

10 The balanced bladder of the instant invention comprises at least a pair of valves placed diametrically opposite to each other at 180^0 , equidistant from the center of the said bladder. Each valve comprises a male member and a female member. The male member has a circular disc made of natural rubber or synthetic rubber with tapered outer surface and a cylindrical protruding stem at the center of the said circular disc.

15 The tip of the said protruding stem is having a protruding collar. The female member of the valve is in the form of a cylindrical sleeve having at its upper end a circular gasket and at its bottom end a circular collar with a central hole provided within the said cylindrical sleeve where the diameter of the said central hole at the center of the said circular disc conforms to the diameter of said protruding stem of male member,

20 the said collared base of the female member being resiliently secured to the said circular disc of the said male member to provide the desired tensile strength to the said protruding stem.

In an another embodiment the balanced bladder of the instant invention is provided with three valves each being placed at an angle of 120^0 . The valves placed at such an angle are similar in weight, shape and configuration and at least one of the male member of one of the valves is provided with a tapering hole in the circular disc terminating at the cross section of the protruding collar and a horizontal pinhole in the said protruding collar of the male member allowing the air to pass through the

30 said pinhole provided in the center of the said protruding collar. The female member of all the three valves are similar in weight, shape and configuration.

Accordingly the present invention relates to a balanced inflatable bladder made of elastomeric material or synthetic rubber or natural rubber for use in football, soccer ball, rugby ball and the like, comprising:

an air inlet valve provided at the top end of the said bladder for insertion of air
5 comprising a male member in the form of a circular disc provided with a cylindrical protruding stem at the center of the said circular disc and a tapered outer surface having a central hole to allow pumping of air through the said hole provided in the said circular disc; a female member in the form of a cylindrical sleeve having at its upper end a circular gasket and at its bottom end a circular collar with a central hole
10 provided within the said cylindrical sleeve where the diameter of the said central hole conforms to the diameter of said protruding stem of male member, the said collared base of the female member being fixed to the said circular disc of the said male member; and

a dummy valve provided at the bottom end of the said bladder having a male
15 member without any central hole conforming to the said male member of the air inlet valve in weight, shape and configuration; a female member conforming in weight, shape and configuration to the said female member of the air inlet valve;

wherein the said dummy valve provided at 180^0 axially opposite to the said air inlet valve is placed equidistant from the center point of the two axis of the said
20 bladder thereby eliminating the wobbling effect of the football, soccer ball or rugby ball, when provided with the said bladder in inflated form.

The present invention also relates to a inflatable bladder made of elastomeric material or synthetic rubber or natural rubber for use in football, volley ball, rugby ball, soccer
25 ball and the like, comprising:

at least a pair of similar valves rigidly fixed or glued to the said bladder placed diametrically opposite to each other at 180^0 , equidistant from the center of the said bladder; each said valve consisting of a male member and a female member;

wherein the said male member is a circular disc made of natural rubber or synthetic
30 rubber with tapered outer surface having a cylindrical protruding stem at the center of the said circular disc, a circular protruding collar provided at the other end of the said stem, one of the said male member provided with a horizontal pinhole in the center of

the said collar and a tapering hole in the circular disc terminating at the cross section of the protruding collar allowing the air to pass through the said horizontal pin hole provided in the center of the said protruding collar; and the said female member is in the form of a cylindrical sleeve having at its upper end a circular gasket and at its
5 bottom end a circular collar with a central hole provided within the said cylindrical sleeve where the diameter of the said central hole at the center of the said circular disc conforms to the diameter of said protruding stem of male member, the said collared base of the female member being resiliently secured to the said circular disc of the said male member to provide the desired tensile strength to the said protruding stem.

10

The inflatable balanced bladder of the present invention comprises an air inlet valve at the top end of the said bladder and dummy valve placed at the bottom end thereof. The air inlet valve provided at the top end of the said bladder comprises a male member and a female member. The male member of the air inlet valve is in the form
15 of a circular disc provided with a cylindrical protruding stem at the center of the said circular disc. The cylindrical protruding stem and the circular disc have a central hole extending along the length of the said stem. The central hole enables inlet of air while inflating the said bladder. The female member of the air inlet valve is in the form of a cylindrical sleeve having at its upper end a circular gasket and its bottom end a
20 circular collar with a central hole provided within the said cylindrical sleeve. The diameter of the said central hole conforms to the diameter of the cylindrical protruding stem of the air inlet valve and the collar provided at the base is fixed to the said circular disc of the said male member. The diameter of the central hole conforms to the diameter of the said circular protruding stem of the said male member as when
25 the male member and the female member are joined to form the valve, the cylindrical protruding stem passed from within the said central hole provided in the said female member. The circular gasket of the said female member ensures that the desired gripping tension is maintained around the said protruding stem thereby ensuring that no leakage of air occurs from the air inlet valve. Prevention of leakage is essential to
30 maintain the shape and pressure of air within the football, volleyball, soccer ball, rugby ball and the like incorporating the bladder of the instant invention.

The air inlet valve is attached to the top end of the said bladder while at the bottom end of the bladder a dummy valve is attached. The dummy valve as provided conforms in shape, weight and configuration to the air inlet valve. The dummy valve is also provided with a male member and a female member. The male member of the dummy valve differs from the male member of the air inlet valve in that the said male member of the dummy valve does not have a central hole while the female member of the said dummy valve conforms in weight, shape and configuration to the female member of the air inlet valve.

10 The dummy valve is rigidly attached/glued to the said bladder through a hole provided in the said bladder such that the male member of the said dummy valve sticks rigidly to the outer surface of the said bladder.

The shore hardness of the female member of the valve of the instant invention is 60-70 while that of male member is 50-60. The gripping tension exhibited by the female member of the instant invention is sufficient enough to avoid any air leakage.

The main embodiment of the present invention therefore resides in providing a dummy valve of configuration, shape and weight conforming to the configuration, shape and weight of the air inlet valve.

25 The air inlet valve and the dummy valve are placed equidistant from the center point of the two axis of the said bladder. The placement of the dummy valve at diametrically opposed position to the air inlet valve leads to balancing the weight of the bladder. The counterbalanced bladder results in eliminating the wobbling effect of the football, soccer ball, volley ball, rugby ball and the like, having the inflatable bladder of the instant invention.

30 The instant invention therefore provides a balanced inflatable bladder where the main embodiment resides in providing valves of similar configuration, weight and shape placed diametrically opposite to each other. The placement of such similar valves at the opposite ends of the inflatable bladder leads to equal distribution of pressure

inside the bladder when such bladder is inflated. As a result of presence of two valves of similar configuration and identical weight placed at the diametrically opposite positions of the bladder, on inflation, the pressure as well as weight and gravitational forces are concentricity balanced thus eliminating the wobbling effect.

5

The counter balancing of weight occurs not only because of placement of valves of similar configuration, shape and weight, at diametrically opposite ends of the bladder but also because of the equal distance of the farthest end of the protruding stem and circular gasket of the dummy valve and the air inlet valve of the said bladder from the center of the bladder. Due to placement of similar weights at the two ends of the bladder and due to ends of the two valves being equidistant from the center of the bladder, the bladder of the instant invention is a balanced bladder.

The placement of farthest ends of the two valves being in manner that they are equidistant from the center of the bladder provides a concentrically balanced pressure within the bladder when the bladder is inflated with air. This equal distribution of weight, pressure and consequentially gravitational forces within the football, volley ball, basket ball, net ball, soccer ball, rugby ball and the like comprising the bladder of the instant invention eliminates the wobbling effect.

20

The present invention can be understood more explicitly and in a better manner with reference to the accompanying drawings wherein Figure 1 shows the bladder of the present invention where both the valves present in the bladder are shown.

Figure 2 shows the top view of the bladder highlighting the air inlet valve (C) affixed on the bladder (B) along with the dummy valve (A).

30

Figure 3 shows the view of the bladder of the instant invention when the bladder is dissected into two halves. The two halves when viewed are identical to each other.

Figure 4 is the outer view of the dummy valve whose dimensions, shape and weight conforms to the dimensions, shape and weight of the air inlet valve.

Figure 5 is the inner view of the dummy valve with both the male and female components fixed to each other.

- 5 Figure 6 is the inflated bladder of the instant invention which highlights the placement of the two valves. The dummy valve and the air inlet valve of the instant invention are placed at the diametrically opposite ends of the said bladder.

- Figure 7 in contrast shows the inflated bladder as known conventionally which is an
10 imbalanced bladder because of the presence of valve on only one side of the bladder. The inflated bladder of the conventional type therefore produces a wobbling effect when in flight. This bladder when cut into half, produces two halves of different dimensions. One end of the conventional bladder is therefore heavier than the other.

- 15 Figure 8 is a side view of the well balanced deflated bladder showing the air inlet valve and the dummy valve on either sides.

Figure 9 highlights the outer side of the air inlet valve and figure 10 shows the inner view of the air inlet valve with male and female components shown together.

20

- Figure 1 shows the bladder (B) of the instant invention with dummy valve and the air inlet valve shown in the bladder. The dimensions of the dummy valve (A) conforms with the dimensions of the air inlet valve (C) and both the valves are fixed on to the body of the bladder (B). Figure 2 clearly shows the air inlet valve (C) placed at the top
25 end of the bladder (B) and the central hole in the circular disc which extends along the length of the cylindrical protruding stem () is also shown.

- Due to placement of two valves conforming in all respects to each other, the bladder having such valves at its diametrically opposite ends, when cut into half results in
30 formation of two halves of identical weights and dimensions, as shown in figure 3.

The valves can be studied in more detail from the accompanying figures 4, 5, 9 and 10. Figures 4 and 5 shows the outer and the inner view of the dummy valve (A) where the circular disc with a tapering outer surface is shown in figure 4. Figure 5 shows the male member of the dummy valve, i.e., the circular disc 1(A) having a cylindrical protruding stem (not shown). The female member of the dummy valve (A) in the form of a cylindrical sleeve 3 (A) having at its upper end a circular jacket 4(A) and at its bottom end a circular base collar 2(A) with a central hole provided therein. The diameter of the said central hole conforms to the diameter of the said cylindrical protruding stem as evident from 5(A).

10

The air inlet valve as shown in figure 9 and 10 conforms in configurations, weight and shape with the dummy valve. The air inlet valve, however, is provided with a central tapering hole at the circular disc extending along the length of the said cylindrical protruding stem. The circular disc 1(C) having a cylindrical protruding stem with a horizontal pin hole and a central tapering hole is shown in figure 9. The female member of the air inlet valve (C) in the form of a cylindrical sleeve 3 (C) having at its upper end a circular jacket 4(C) and at its bottom end a circular base collar 2(C) with a central hole provided therein. The diameter of the said central hole conforms to the diameter of the said cylindrical protruding stem as evident from 5(C). The circular jacket 4(C) at the upper end of the said cylindrical sleeve 3(C) provide the desired gripping tension to the said cylindrical protruding stem.

The bladder of the instant invention when inflated provides a balanced bladder having two valves placed at opposite ends of the bladder and the tip of the valves being equidistant from the center of the bladder. Figure 6 highlights the placement of the two valves. The dummy valve (A) and the air inlet valve (C) of the bladder (B) of the instant invention are placed at the diametrically opposite ends of the said bladder and are of similar configurations and identical weight. This figure clearly depicts that the two valves (A & C) are equidistant from the center (O) of the said bladder. It is evident from the said figure that the two halves (X & Y) of the inflated bladder are of identical configurations. In comparison, the conventional bladder (B') if cut into half, provides two halves (X' & Y') of different dimensions. The inflated bladder (B') of

the conventional type is an imbalanced bladder because of the presence of valve on only one side of the bladder. One end of the conventional bladder is therefore heavier than the other. The inflated bladder of the conventional type therefore produces a wobbling effect when in flight.

5

WE CLAIM:

1. A balanced inflatable bladder made of elastomeric material or synthetic rubber or natural rubber for use in football, soccer ball, rugby ball and the like,
5 comprising:

an air inlet valve provided at the top end of the said bladder for insertion of air comprising a male member in the form of a circular disc provided with a cylindrical protruding stem at the center of the said circular disc and a tapered outer surface having a central hole to allow pumping of air through the said hole provided in the
10 said circular disc; a female member in the form of a cylindrical sleeve having at its upper end a circular gasket and at its bottom end a circular collar with a central hole provided within the said cylindrical sleeve where the diameter of the said central hole conforms to the diameter of said protruding stem of male member, the said collared base of the female member being fixed to the said circular disc of the said male
15 member; and

a dummy valve provided at the bottom end of the said bladder having a male member without any central hole conforming to the said male member of the air inlet valve in weight, shape and configuration; a female member conforming in weight, shape and configuration to the said female member of the air inlet valve;

20 wherein the said dummy valve provided at 180⁰ axially opposite to the said air inlet valve is placed equidistant from the center point of the two axis of the said bladder thereby eliminating the wobbling effect of the football, soccer ball or rugby ball, when provided with the said bladder in inflated form.

25 2 A balanced inflatable bladder as claimed in claim 1, wherein the said gasket and the cylindrical sleeve of the said female member provides desired gripping tension to the said cylindrical protruding stem of the said male member, thus allowing the horizontal pinhole to open up for inflow of air through a pin inserted through the said hole in the circular disc of said male member.

30

3. A balanced inflatable bladder as claimed in claim 1, wherein the said female member of the said valve has a shore hardness of 60-70.

4. A balanced inflatable bladder as claimed in claim 1, wherein the said male member has a shore hardness of 50-60.
- 5 5. A balanced inflatable bladder as claimed in claim 1, wherein the said dummy valve is rigidly attached/glued to the said bladder through a hole provided in the said bladder such that the male member of the said dummy valve sticks rigidly to the outer surface of the said bladder.
- 10 6. A balanced inflatable bladder made of elastomeric material or synthetic rubber or natural rubber for use in football, volley ball, rugby ball, soccer ball and the like, comprising:
at least a pair of similar valves rigidly fixed or glued to the said bladder placed diametrically opposite to each other at 180^0 , equidistant from the center of the said
15 bladder; each said valve consisting of a male member and a female member;
wherein the said male member is a circular disc made of natural rubber or synthetic rubber with tapered outer surface having a cylindrical protruding stem at the center of the said circular disc, a circular protruding collar provided at the other end of the said stem, one of the said male member provided with a horizontal pinhole in the center of
20 the said collar and a tapering hole in the circular disc terminating at the cross section of the protruding collar allowing the air to pass through the said horizontal pin hole provided in the center of the said protruding collar; and the said female member is in the form of a cylindrical sleeve having at its upper end a circular gasket and at its bottom end a circular collar with a central hole provided within the said cylindrical
25 sleeve where the diameter of the said central hole at the center of the said circular disc conforms to the diameter of said protruding stem of male member, the said collared base of the female member being resiliently secured to the said circular disc of the said male member to provide the desired tensile strength to the said protruding stem.
- 30 7. A balanced inflatable bladder as claimed in claim 6, wherein the said valves are similar valves conforming in weight, shape and configuration to each other.

8. A balanced inflatable bladder as claimed in claim 6, wherein the wall thickness of the said gasket is 0.3 to 0.6 cm to provide the desired gripping tension to the said cylindrical protruding stem of the said male member.
- 5 9. A balanced inflatable bladder as claimed in claim 6, wherein the said valves are rigidly attached/glued to the said bladder through a hole provided in the said bladder such that the male member of the said dummy valve sticks rigidly to the outer surface of the said bladder.
- 10 10. A football or soccer ball having an inflatable bladder as claimed in any of the preceding claims.
11. A volleyball having an inflatable bladder as claimed in any of the preceding claims.
12. A basket ball having an inflatable bladder as claimed in any of the preceding
15 claims.
13. A net ball having an inflatable bladder as claimed in any of the preceding claims.
14. A rugby ball having an inflatable bladder as claimed in any of the preceding claims.

FIG.1

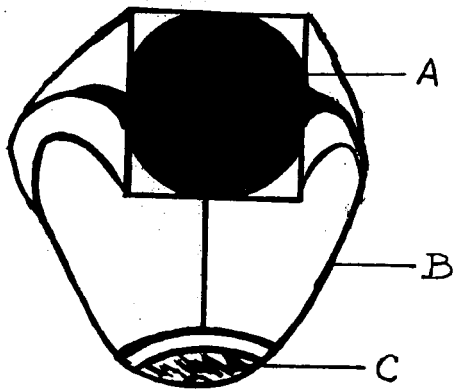


FIG.2

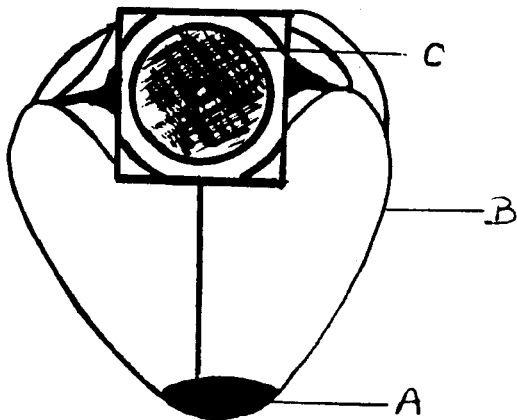
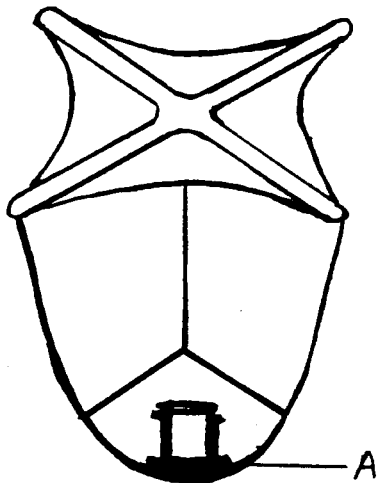


FIG.3



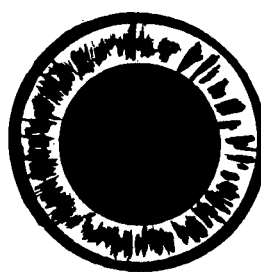


FIG. 4

A

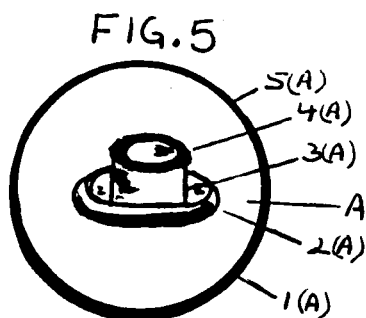


FIG. 5

FIG. 6

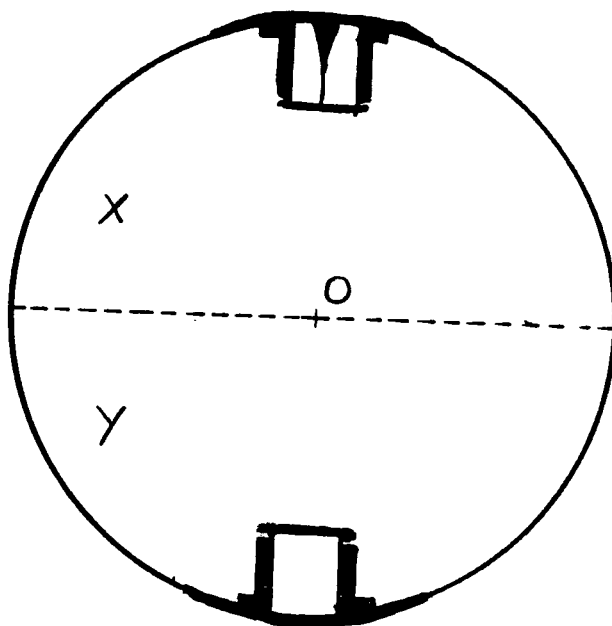


FIG. 7

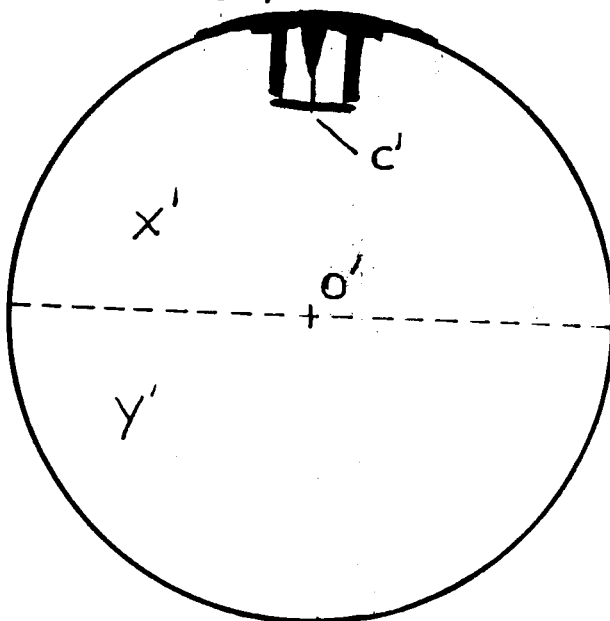


FIG.8

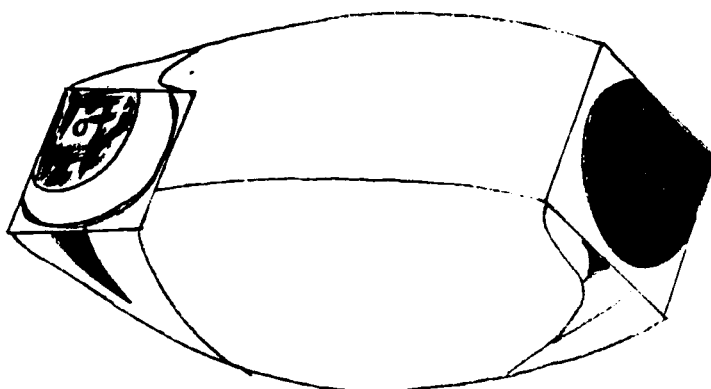


FIG.9

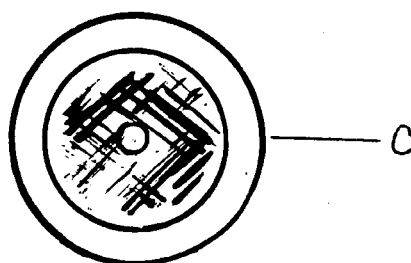
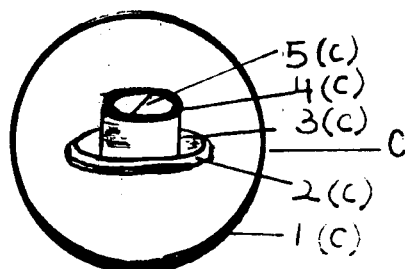


FIG.10



INTERNATIONAL SEARCH REPORT

International Application No
PCT/IN 99/00039

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A63B41/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category ^o	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 340 222 A (KERKENBUSH DARLE L ET AL) 20 July 1982 (1982-07-20) column 3, line 39 - line 63; figures column 5, line 58 - line 68 ----	1, 2, 5-7, 9, 13
A	WO 97 26950 A (UMBRO EUROP LIMITED ;MILLS CHRISTOPHER IAN (GB); SONNTAG JEAN MARI) 31 July 1997 (1997-07-31) page 2, paragraph 3 -page 4, paragraph 5; figures ----	1, 3-7, 9-14
A	US 1 559 364 A (PEARCE, D.O.) 27 October 1925 (1925-10-27) page 1, line 59 - line 65; figures page 2, line 26 - line 32 -----	1, 6, 10-14

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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3 April 2000

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INTERNATIONAL SEARCH REPORT

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