GAME BALL WITH NON-INTERSECTING CHANNELS OR RIBS

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ABSTRACT
A game ball, such as a basketball, having non-intersecting channels or ribs is disclosed in various embodiments. Each channel forms a closed loop extending across the surface of the ball between a right side and a left side. Exemplary embodiments of the game ball have four, two, and one channel(s) and five, three and two panels, respectively.
FIG. 3
(PRIOR ART)
GAME BALL WITH NON-INTERSECTING CHANNELS OR RIBS

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates, in various exemplary embodiments, to an improved game ball or sports ball. More particularly, the disclosure is directed to an inflatable sports ball or game ball, such as a basketball, which has non-intersecting channels or ribs.

BACKGROUND

[0002] Inflatable game balls can be produced by several different processes. In particular, a basketball comprises a multi-layer structure which includes a generally spherical interior air bladder which is wound with monofilament strands to create a winding layer overlaying the air bladder. A carcass is then formed, or molded, over the winding layer.

[0003] The carcass is of substantially uniform thickness defining a spherical outer surface with a carcass circumference. Ribs project outwardly from, and extend curvilinearly around, the carcass outer surface. Typically, each rib is raised about 0.75-1.50 mm above the surface of the carcass.

[0004] The ribs define a plurality of separated surface areas or panel areas. Generally, the carcass is divided into eight panel surface areas. Panels may be laminated onto the outer surface of the carcass in the separated surface areas. The thickness of the panels is typically greater than the thickness of the ribs, so that the ribs, while projecting above the carcass surface, are slightly recessed below the panel exterior surface. The edge portions of the panels may be beveled or “skived” so that the panel edge will be flush with the projecting carcass rib when laminated.

[0005] When finished, the laminated basketball has a spherical shape, with each carcass rib and opposing skived panel edge portions defining a channel or a seam. Typically, the channel or seam is 4.75-9.52 mm wide. The exact size or shape of this area can be varied, according to performance and aesthetic considerations.

[0006] The construction of a basketball as described above generally results in a ball exhibiting substantially uniform characteristics such as grip, feel, hardness, abrasion resistance, durability, resilience, compressibility, etc. In particular, the channel on a basketball generally enhances the player’s ability to grip the ball. Basketballs known in the art generally have three channels or ribs which intersect with each other and these channels are generally smooth compared to the panel surfaces. However, where channels intersect, there is a large smooth spot which reduces the player’s ability to grip the ball and also affects the rebound of the ball. Consequently, there is a need for a ball which improves the grip, feel, control, and performance of a game ball, such as a basketball.

BRIEF DESCRIPTION

[0007] Disclosed herein are game balls which have non-intersecting ribs or channels. The game ball comprises a spherical interior air bladder. A winding layer overlays the air bladder. A carcass is then formed over the winding layer. The outer surface of the carcass has one or more non-intersecting ribs which define a plurality of panel areas. The carcass thickness in the rib is greater than the carcass thickness in the panel areas. A plurality of panels is provided and each panel is placed in a panel area. In other embodiments, the game ball has one or more non-intersecting channels.

[0008] In an exemplary embodiment, the game ball comprises a plurality of channels. Each channel forms a closed loop which runs across the surface of the ball from a right side to a left side and back to the right side. The closed loop of each channel defines a panel area inside the loop. The remaining surface of the game ball outside the closed loops of the channels also defines a panel area. The channels do not intersect with each other.

[0009] In another exemplary embodiment, the game ball comprises four channels. Each channel forms a closed loop which runs from a right side of the game ball to a left side of the game ball and back again and defines a panel area inside the loop. The four panel areas inside the loop have substantially the same shape and dimensions. The channels do not intersect with each other. The area outside the four channels also defines a fifth panel area. Panels are provided for each panel area.

[0010] In a further exemplary embodiment, the game ball comprises two channels. Each channel forms a closed loop which extends across the surface of the ball between a right side and a left side of the game ball. The two channels define three panel areas. Panels are provided for each panel area.

[0011] In an additional exemplary embodiment, the game ball has only one channel. The channel extends across the surface between a right side and a left side of the ball at least six times and defines two panel areas. In a still further embodiment, the channel extends between a right side and a left side of the ball eight times. Each panel area has substantially the same shape and the same dimensions. Two panels are provided and each panel is placed in a different panel area.

[0012] In other embodiments, the panels are skived and/or follow the tapered surface of the channel, so that the skived panel edge is substantially flush with the exterior face of the rib.

[0013] In still another embodiment, the panels comprise a material selected from the group consisting of polyvinyl chloride, polyurethane, rubber, and a composite material. In other embodiments, each panel has a pebbled texture which increases grip.

[0014] Additional non-limiting features of the disclosure will be described hereinafter and will form the subject matter of the claims appended hereto.

DESCRIPTION OF THE DRAWINGS

[0015] The following is a brief description of the drawings, which are presented for the purposes of illustrating the exemplary embodiments disclosed herein and not for the purposes of limiting the same.

[0016] FIG. 1 is a left side view of a prior art basketball.

[0017] FIG. 2 is a front view of a prior art basketball.

[0018] FIG. 3 is a right side view of a prior art basketball.

[0019] FIG. 4 is a left side view of a first exemplary embodiment of a game ball according to the present disclosure.
FIG. 5 is a front view of a first exemplary embodiment of a game ball according to the present disclosure.

FIG. 6 is a right side view of a first exemplary embodiment of a game ball according to the present disclosure.

FIG. 7 is a perspective view of a first exemplary embodiment of a game ball according to the present disclosure.

FIG. 8 is a left side view of a second exemplary embodiment of a game ball according to the present disclosure.

FIG. 9 is a front view of a second exemplary embodiment of a game ball according to the present disclosure.

FIG. 10 is a right side view of a second exemplary embodiment of a game ball according to the present disclosure.

FIG. 11 is a rear view of a second exemplary embodiment of a game ball according to the present disclosure.

FIG. 12 is a left side view of a third exemplary embodiment of a game ball according to the present disclosure.

FIG. 13 is a front view of a third exemplary embodiment of a game ball according to the present disclosure.

FIG. 14 is a right side view of a third exemplary embodiment of a game ball according to the present disclosure.

FIG. 15 is a left perspective view of a third exemplary embodiment of a game ball according to the present disclosure.

FIG. 16 is a right perspective view of a third exemplary embodiment of a game ball according to the present disclosure.

DETAILED DESCRIPTION

A game ball, such as a basketball, having non-intersecting channels or ribs is disclosed in various embodiments. Each channel forms a closed loop extending across the surface of the ball between a right side and a left side. Exemplary embodiments of the game ball have four, two, and one channel(s) and five, three, and two panels, respectively.

The exemplary embodiments of this disclosure are more particularly described below with reference to the drawings. Although specific terms are used in the following description for clarity, these terms are intended to refer only to the particular structure of the various embodiments selected for illustration in the drawings and not to define or limit the scope of the disclosure. The same reference numerals are used to identify the same structure in different Figures unless otherwise specified. The structures in the Figures are not drawn according to their relative proportions and the drawings should not be interpreted as limiting the disclosure in size or location.

FIG. 1 is a left side view of a typical prior art basketball. The basketball 10 is generally spherical and has three ribs or channels 12, 14, and 16. Channel 12 extends longitudinally around an equator of the basketball, channel 16 extends laterally around a second equator of the basketball, and channel 14 is a serpentine channel which has a shape like that of a baseball seam. Channel 14 intersects channel 12 at intersections 20 and 24, while channels 12 and 16 intersect at intersection 22. Eight panel areas 30, 32, 34, 36, 38, 40, 42, and 44 are defined by the three channels. Other game balls known in the art have more channels and/or panels; e.g., U.S. Pat. No. 6,752,732 discloses a basketball having nine to twelve panel areas and/or five channels. Generally speaking, when two channels intersect, they intersect at an angle that is not substantially 180°. For example, line segments 50 and 52 meet at intersection 22, but do so at an angle that is substantially 180°; therefore, they are considered the same channel, not two different channels. In contrast, channels 12 and 16 meet at a 90° angle at intersection 22; they are considered two different channels. Channels may also be considered as intersecting when they touch each other at some point along their path. In particular, channels do not need to cross each other in order to be considered as intersecting.

FIG. 2 is a front view of the prior art basketball. In this view, panel areas 40, 42, 44, and 30 are not visible; neither is channel 16. Here, channel 14 extends longitudinally across the surface of the basketball from a left side to a right side and back again, or in other words, it extends across the surface of the basketball between the left side and the right side. Channel 14 extends across the surface of the basketball a total of four times. Channel 12 also extends across the surface of the basketball between the left side and the right side; it does so a total of two times.

FIG. 3 is a right side view of the prior art basketball. Here, channel 14 intersects channel 16 at intersections 60 and 64, while channels 12 and 16 intersect at intersection 62.

FIGS. 4-7 are four different views of a first exemplary embodiment of a game ball according to the present disclosure. This embodiment of a game ball has four non-intersecting channels. In specific embodiments, the game ball is a basketball.

FIG. 4 is a left side view of the first exemplary embodiment of a game ball according to the present disclosure. The game ball 80 has four channels 82, 84, 86, and 88. Each channel is a closed loop extending across the surface of the ball from a left side to a right side and back, or i.e., between a left side and a right side. Each channel defines a panel area inside the loop; for example, channel 82 defines panel area 90. In FIGS. 4-7, the four panel areas have been shaded differently in order to distinguish them: panel area 90 is stippled; panel area 92 is crosshatched; panel area 94 has vertical lines; and panel area 98 has horizontal lines. The area outside the channels also defines a panel area; here, panel area 98 is defined as the surface area not enclosed by the four channels and is white in FIGS. 4-7. The channels do not intersect; i.e., no channel intersects any other channel.

FIG. 5 is a front view of the first exemplary embodiment. There is no channel running along an equator of the game ball. In this view, the entire closed loop of channels 82 and 84 can be seen. In this embodiment, the rear
view (not shown) is substantially the same as the front view, except of course that different channels and panel areas are seen. However, the front and rear views do not need to be substantially the same; for example, if there is an odd number of channels or the panels are not symmetrically placed, the views may differ.

[0040] FIG. 6 is a side view of the first exemplary embodiment. Again, none of the channels intersect in this view. The left side view and the right side view are essentially the same. This occurs because in this embodiment, the channels are symmetrically placed around the longitudinal axis of the ball and each panel area has a substantially the same shape and dimensions. Again, the present disclosure also contemplates embodiments where the channels are not symmetrically placed. However, in specific embodiments, the channels are symmetrically placed around the surface of the ball.

[0041] FIG. 7 is a perspective view showing the front and the right side of the first exemplary embodiment. The four channels do not intersect. Panel areas 90, 92, 94, and 96 have substantially the same shape and dimensions. In specific embodiments, a plurality of panel areas will have substantially the same shape and dimensions. However, this does not mean all panel areas will; e.g., in this embodiment, panel area 98 differs in shape and dimension from the other four panel areas. As another example, a game ball may have four non-intersecting channels, but two channels define panel areas of one shape and dimension and the other two channels define panel areas of another shape or dimension. In other specific embodiments, all panel areas defined by the inside of the closed loop of a channel will differ in shape and dimension.

[0042] FIGS. 8-11 are four different views of a second exemplary embodiment of a game ball according to the present disclosure. This embodiment of a game ball has two non-intersecting channels. In specific embodiments, the game ball is a basketball. In these Figures, panel area 90 is stippled, panel area 92 is crosshatched, and panel area 94 is white.

[0043] FIG. 8 is a side view of the second exemplary embodiment of a game ball according to the present disclosure. The game ball 80 has two channels 82 and 84. Each channel is a closed loop extending across the surface of the ball between a left side and a right side of the ball. The shape of each channel is similar to that of a baseball seam. Each channel defines a panel area inside the loop; for example, channel 82 defines panel area 90. The area outside the channels also defines a panel area; here, panel area 94 is defined as the surface area not enclosed by the two channels. The two channels do not intersect.

[0044] FIG. 9 is a front view of the second exemplary embodiment. From this view, panel areas 90 and 92 do not appear the same, even though they have substantially the same shape and dimensions.

[0045] FIG. 10 is a right side view of the second exemplary embodiment. Again, the two channels do not intersect. Note that in this view and in the left view, panel area 94 may appear to be two different panel areas, even though it is not.

[0046] FIG. 11 is a rear view of the second exemplary embodiment. It is not the same as the front view.

[0047] FIGS. 12-16 are five different views of a third exemplary embodiment of a game ball according to the present disclosure. This embodiment of a game ball has only one channel and therefore cannot intersect another channel. In specific embodiments, the game ball is a basketball. In these Figures, panel area 90 is stippled and panel area 92 is white.

[0048] FIG. 12 is a left side view of the third exemplary embodiment. The game ball 80 has one serpentine channel 82 which defines two panel areas 90 and 92. The two panel areas are offset from each other by approximately 45° and interlock. They also have substantially the same shape and dimensions; however, in other embodiments, the two panel areas have different shapes and dimensions.

[0049] FIG. 13 is a front view of the third exemplary embodiment. This view is very similar to the front view of FIG. 5; however, note that here the channel continues down the left side, whereas in FIG. 5 the two channels 82 and 84 are each seen to form a closed loop.

[0050] FIG. 14 is a right side view of the third exemplary embodiment. This view is rotated approximately 45° compared to the left side view of FIG. 12 and shows that there is only one channel 82.

[0051] FIG. 15 is a left perspective view showing the front and the left side of the third exemplary embodiment. FIG. 16 is a right perspective view showing the front and the right side of the third exemplary embodiment. Even though FIG. 16 appears the same as FIG. 7, the number and pattern of the channel(s) is different. The channel 82 extends across the surface between a right side and a left side of the ball eight times. Overall, the game ball appears to have eight panels. In specific embodiment where the game ball has only one channel, the channel must extend between a right and left side at least six times.

[0052] FIGS. 1-16 referred to panel areas defined by channels when discussing the game ball of the present disclosure. It should be remembered that for each game ball, a plurality of panels is provided. Each panel area will have at least one panel placed inside it.

[0053] In exemplary embodiments of the present disclosure, each channel is a closed loop running from a left side of the ball to a right side of the ball. In other words, each channel extends across the surface of the ball between a right side and a left side of the ball. The game ball has at least one right side and at least one left side. A right side and left side of the ball can be determined by intersecting a plane with the ball; the plane will separate the ball into a left side and a right side. In specific embodiments, the plane intersects the ball along an equator of the ball. A channel will intersect the plane as many times as it extends between the right and left sides defined by that plane. For example, in the prior art basketball, with reference to FIG. 1, say that the plane in which channel 12 lies defines a right and left side of the ball. Channel 14 extends across the ball four times; it intersects channel 12 at intersections 20, 24, 60, and 64. Similarly, channel 16 extends across the ball only twice; it intersects channel 12 at intersections 22 and 62. In the first exemplary embodiment, with reference to FIG. 4, each channel extends across the surface of the ball twice. In the second exemplary embodiment, with reference to FIG. 8, each channel extends across the surface of the ball four times.
exemplary embodiment, with reference to FIG. 12, the channel extends across the surface of the ball eight times. In specific embodiments, the ball has one left side and one right side.

In specific embodiments where the ball has one left side and one right side, the right side of the ball is located substantially near an end of the ball and the left side of the ball is located substantially near the opposite end of the ball. Therefore, each channel extends substantially from one end to the opposite end of the ball. For example, in the first exemplary embodiment, as seen in FIG. 5, the right side and the left side are located substantially near opposite ends of the ball.

In the three exemplary embodiments shown, each channel is non-planar. In specific embodiments of the present disclosure, each channel is non-planar. However, in other embodiments, a channel may be planar, i.e. it may be defined by the intersection of a plane with the game ball.

As previously discussed, a game ball, such as a basketball, is made from a carcass which has outwardly projecting ribs. Generally speaking, a channel on a basketball corresponds to the exterior surface of a rib. Any discussion of a channel on the surface of a game ball is directly applicable to a rib on the outer surface of a carcass and should be construed as such. For example, the discussion of the first exemplary embodiment, which has four channels on the surface of a game ball, should be construed as applying equally to a carcass having four ribs on its surface. Similarly, the carcass will have at least one right side and at least one left side.

When describing the ball, channels, panel areas, or panels as symmetrical, the term “symmetrical” should be understood as meaning mirror-image symmetry. In other words, the ball is symmetrical if a plane divides the ball in half and the halves are mirror images of each other. FIGS. 4 and 13, for example, show a mirror-image half of the ball.

It should be noted that in the manufacture of a game ball such as a basketball, what appears to be one panel may actually be several smaller panels. The above discussion of panels and channels is intended to apply to the appearance of the final product and should not be construed as a discussion of how the game ball must be manufactured. For example, in the third exemplary embodiment shown in FIGS. 12-15, panels 90 and 92 are more cost-effectively produced as four or five separate pieces. Each of the panels may be manufactured instead by joining appropriate edges of separate pieces together to form the four-leaved panel of the final product. Those joined edges are not visible in the final product and should not be considered a channel. Alternatively, one may realize that those joined edges do not correspond to a rib on the exterior surface of a carcass and thus should not be considered a channel either.

A game ball, such as a basketball, is made up generally of four major components: an interior air bladder, a layer of monofilament strands wound over the bladder, a carcass formed over the wound layer defining panel areas, and panels secured in the panel areas.

The bladder is formed spherically and adapted to be inflated with air. The bladder, when properly inflated, provides the primary resilience for the finished ball. Such air bladders are usually formed of butyl rubber or butyl and natural rubber compounds and are fitted with a valve for introducing air into the ball to inflate and pressurize the structure. The bladder is usually made from rubber.

Outwardly disposed of the interior air bladder is a layer comprising monofilament polymeric strands, usually of nylon or polyester. The strands are coated with an adhesive, such as a rubber cement, to ensure retention of the strands on the bladder. The winding layer adds dimensional stability to the bladder and ball, restrains outward expansion when inflated, and also reduces outward pressure on the carcass.

The next layer of the basketball is an elastomer carcass. The carcass is usually fabricated from a polymer composition molded over the wound bladder. Rubber (natural and/or synthetic) is also used for improved rebound and durability. The carcass has a substantially spherical outer surface defining a carcass circumference. One or more ribs extend above the carcass circumference.

The exterior face of the extending rib is above the substantially spherical outer surface. The outwardly extending rib also has lateral sides. It should be noted that while the carcass and ribs are described separately for clarity, in practice the carcass will be formed as an integral portion, including panel areas and ribs, around the wound layer. The carcass surface between the ribs defines the plurality of panel areas.

The carcass has a thickness in the range of about 0.5 to 1.5 millimeters (mm) and usually a range of about 0.8 to 1.2 mm over the majority of the panel areas. Each rib has a thickness in the range of about 0.75 to 1.50 mm. The carcass may comprise an integral cellular portion adjacent the winding layer.

The carcass is usually formed of two hemispheres separated at an equator line, which are then molded over the winding layer. The carcass is molded by placing rubber panels into a carcass mold. The molding of the carcass hemispheres onto the winding layer forms a unitary, seamless carcass comprising rib(s) and panel areas; it also causes the carcass material to flow into and around the strands of the winding layer for a secure mechanical bond.

The outermost surface of the ball is formed from discrete panels. The panels are shaped to fit within the panel areas between the rib(s). A panel is placed on the outer surface of the carcass in a panel area and attached, usually with adhesive. The edges of the panels may be skived and are generally adjacent to a rib side and flush with the exterior face of the rib. The panels may be made from any combination of materials and may also have a pebbled texture to improve grip and handling of the ball. In specific embodiments of the present disclosure, each panel or a plurality of panels comprises a material selected from polyvinyl chloride, polyurethane, rubber, or a composite material. In further embodiments, each panel or a plurality of panels have a pebbled texture.

The game ball of the present disclosure may be produced largely in a conventional manner. Accordingly, the air bladder of the ball would be inflated to an appropriate size and preferably cooled to cause the material of the bladder to become somewhat rigid. In this rigid condition, the air bladder is wound with adhesive coated polymer threads. The air bladder with the overlying layer of windings
is then placed in a mold in which the carcass hemispheres are arrayed. Rubber panels are placed within the mold in order to mold the carcass. The mold is closed and sealed and optionally the air bladder is inflated to help the bladder make full contact with the carcass materials within the mold, and heat and pressure are applied to cause the rubber of the carcass to cure and vulcanize and become securely attached to the air bladder and winding layer. The molding process further forms the structure of the carcass, including rib(s) and panel areas.

[0068] Individual panels are formed to fit over the surface of the carcass within the panel areas defined by the formed rib(s). Decals, paint or other decorative or informative markings are usually applied to the panels at this manufacturing stage. Each panel is then applied to a panel area on the ball. The edge portion of each panel is skived or tapered. When a skived panel edge is correctly positioned abutting a rib, the panel edge will be adjacent a rib side and substantially flush with the outwardly projecting rib face.

[0069] Subsequently, the completed ball is taken from the mold and flash from the molding process is trimmed from the ball.

[0070] It is to be understood that the game ball of the present disclosure is not limited in its application to the details of construction and to the arrangements of the components set forth in the description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed within are for the purpose of description and should not be regarded as limiting.

[0071] As such, those skilled in the art will appreciate that the conception, upon which this disclosure is based, may readily be utilized as a basis for the designing of other structures, methods and systems for carrying out the several purposes of the present invention. It is important, therefore, that the claims be regarded as including such equivalent constructions insofar as they do not depart from the spirit and scope of the present invention.

1. An inflatable game ball, comprising a surface, at least one right side, at least one left side, and either two or four channels;

wherein each channel forms a closed loop extending across the surface of the ball between a right side and a left side;

wherein each channel defines a panel area inside the closed loop of the channel; and

the channels do not intersect.

2. (canceled)

3. The game ball of claim 1, wherein the right side is located substantially near an end of the ball and the left side is located substantially near the opposite end of the ball;

wherein the channels are symmetrically placed around the surface of the ball; and

wherein a plurality of panel areas has substantially the same shape and dimensions.

4. (canceled)

5. The game ball of claim 1, wherein the channels are symmetrically placed around the surface of the ball.

6. The game ball of claim 1, wherein a plurality of panel areas has substantially the same shape and dimensions.

7. The game ball of claim 1, wherein each channel is non-planar.

8. The game ball of claim 1, wherein the ball has one left side and one right side.

9. The game ball of claim 8, wherein the right side is located substantially near an end of the ball and the left side is located substantially near the opposite end of the ball.

10. An inflatable game ball, comprising a surface, a right side, a left side, and a channel; wherein the channel forms a closed loop extending across the surface of the ball between the right side and the left side at least six times.

11. The game ball of claim 10, wherein the channel extends across the surface of the ball between the right side and the left side eight times.

12. The game ball of claim 10, wherein the channel defines two panel areas and the two panel areas have substantially the same shape and dimensions.

13. An inflatable game ball, comprising:

a carcass comprising an outer surface, at least one right side, at least one left side, and either two or four ribs on the outer surface;

wherein each rib forms a closed loop extending across the outer surface of the carcass between a right side and a left side; and

each rib defines a panel area inside the closed loop of the rib; and

a plurality of panels, wherein each panel is placed on the outer surface of the carcass in a panel area.

14. The game ball of claim 13, wherein each panel comprises a material selected from the group consisting of polyvinyl chloride, polyurethane, rubber, and a composite material.

15. The game ball of claim 13, wherein each panel has a pebbled texture.

16. The game ball of claim 13, wherein each panel has substantially the same shape and the same dimensions.

17. An inflatable game ball, comprising:

a carcass comprising an outer surface, a right side, a left side, and a rib on the outer surface;

wherein the rib forms a closed loop extending across the outer surface of the carcass between the right side and the left side at least six times and defines two panel areas; and

a plurality of panels, wherein each panel is placed on the outer surface of the carcass in a panel area.

18. The game ball of claim 17, wherein the game ball has two panels and each panel is placed in a different panel area.

19. The game ball of claim 17, wherein the rib extends across the carcass between the right side and left side eight times.

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