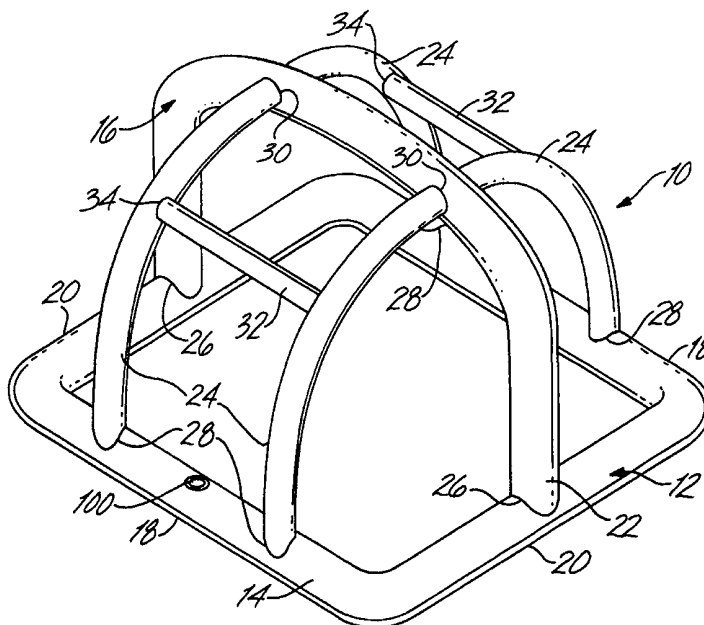




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(54) Title: INFLATABLE TENT



(57) Abstract

An inflatable tent comprises a frame and an optionally removable cover. The frame has a single inflatable continuous generally-tubular member. The generally-tubular member comprises a base section and an upright section. The base section is fixedly attached at one or more connection points to the upright section. The upright section comprises a rounded main arch having two ends, both of which are fixedly attached to the base section. The upright section further comprises at least one rounded supporting arch segment having one end attached to the main arch and the other end attached to the base section.

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INFLATABLE TENT

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FIELD OF THE INVENTION

The present invention relates to an inflatable tent, and more particularly to an inflatable tent having a continuous tubular frame.

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BACKGROUND OF THE INVENTION

Inflatable tents have been designed in the past. Some have inflatable walls and floors, resulting in a rather heavy tent that takes considerable time to inflate. Others have inflatable frames to support the tent walls and floor. It is this latter type of inflatable tent to which the present invention is directed.

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An important function of an inflatable tent is that it be quick and easy to erect and collapse. It is also important that an inflatable tent be lightweight and easy to store and carry. With these goals in mind, it is also important that the inflatable tent have structural integrity. Additionally, because it is almost inevitable that an inflatable tent frame will ultimately puncture or be damaged to the point where it can no longer be used, it is important to provide a means by which the tent cover can still be used, such as with poles. Finally, a tent should be easy and inexpensive to manufacture, thus keeping the cost down for the consumer. The present invention is directed to an inflatable tent designed to achieve each of these goals.

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SUMMARY OF THE INVENTION

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One aspect of the present invention is a tent comprising a frame and a removable cover. The frame consists essentially of a single inflatable continuous generally-tubular member, which comprises a base section and an upright section. The base section is fixedly attached at one or more connection points to the upright section. The removable cover has an inside and an outside and is capable of enclosing the frame and capable of having its inside temporarily attached to the frame.

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Another aspect of the invention is a tent comprising a frame and a cover capable of enclosing the frame. The frame comprises a single inflatable continuous generally-tubular member comprising a base section and an upright section. The upright section comprises a rounded main arch having two ends, both ends being fixedly attached to the base section, and at least one rounded supporting arch segment having two ends, wherein one end is fixedly attached to the main arch and the other end is fixedly attached to the base section.

DESCRIPTION OF THE DRAWINGS

5 These and other features, aspects, and advantages of the present invention will be more fully understood when considered with respect to the following detailed description, appended claims, and accompanying drawings, wherein:

 FIG. 1 illustrates an inflatable tent frame according to the present invention.

 FIG. 2 is a side view of the inflatable tent frame of FIG. 1.

10 FIGs. 3a and 3b illustrate how the cover is attached to the inflatable frame.

DETAILED DESCRIPTION OF THE INVENTION

 The present invention is directed to an inflatable tent comprising a frame and a cover. FIGs. 1, 2, 3a and 3b provide a preferred embodiment of an inflatable tent according to the present invention. With reference to FIG. 1, the frame **10** comprises a single inflatable continuous generally-tubular member **12**, which creates the shape of the tent and is used to support the cover. The cross-sectional area of the generally-tubular member **12** can be, for example, a circle, an oval or a rectangle with rounded corners, and is preferably a circle.

 The continuous tubular member **12** allows for injection of a fluid, preferably air, at a single location to inflate the entire tubular member by passage of the fluid throughout the entire member. When inflated, the tubular member **12** is rigid enough to support the cover without substantial sagging by the tubular member or the cover.

 The tubular member **12** comprises a base section **14**, which provides a foundation for the tent, and an upright section **16**, which gives shape to the tent. The base section **14** and upright section **16** are fixedly attached at one or more locations.

 The base section **14** is preferably rectangular in shape, but can also have other shapes, such as circular, oval, square and other polygonal shapes. When the tubular member **12** is rectangular in shape it comprises two parallel lengthwise edges **18**, which are the longer sides of the rectangular base, and two parallel widthwise edges **20**, which are the shorter sides of the rectangular base.

 The base section **14** can be of any reasonable size. It is preferred, however, that the base section be no bigger than that required to sleep three persons. Preferably the lengthwise edges **18** range in length from about 75 to 110 inches, and more preferably from about 85 to 95 inches. The widthwise edges **20** preferably range in length from about 65 to 100 inches, and more preferably from about 80 to 90 inches.

 It is also preferred that the base section **14** be of such a size to allow placement of an air mattress inside the base section. Preferably, when the air mattress is inflated it fills the entire area within the base section **14** such that all of the sides of the air mattress are snug against the inside

edges of the base section, and such that the air mattress is, in effect,
5 the floor of the tent. Suitable air mattresses are described in U.S. Patent Nos. 4,977,633,
5,267,363, and 5,367,726, the disclosures of which are incorporated herein by reference. A
preferred air mattress is the Aero TRAILBED.

Fixedly attached to the base section **14** at multiple locations is the upright section **16**. In
one embodiment, the upright section **16** comprises a main arch **22** and one or more supporting
10 arch segments **24**. The main arch **22** and supporting arch segments **24** each have two ends. The
main arch **22** and supporting arch segments **24** are preferably rounded, i.e., have no angled-
corners. One example of a rounded main arch **22** is shown in FIG. 1, where the main arch has
straight sides meeting a rounded top.

Alternatively, the main arch **22** and/or the supporting arch segments **24** can comprise two
15 or more straight segments connected at an angle rather than the rounded design. This angled
design is less desirable, however, because it provides less support than the rounded design and
is more difficult and expensive to manufacture than the rounded design.

When the base section **14** is rectangular, the main arch **22** is situated parallel to the
lengthwise edges **18** and is fixedly attached at both of its ends, preferably at an angle of about 90
20 degrees, to each of the widthwise edges **20** at connection points **26**. Connection points **26**
are preferably located at or near the midpoints of the widthwise edges **20**. When the base section **14**
is circular, the main arch **22** preferably spans the diameter of the circular base section and is
fixedly attached at both of its ends to the circular base at connection points **26** located at opposite
25 sides of the circular base. When the base section is a shape other than rectangular or circular, the
main arch **22** preferably spans the longest distance across the base section and is fixedly attached
at both of its ends at opposite sides of the base section.

When the base section **14** is rectangular, each supporting arch segment **24** is parallel to the
widthwise edges **20**. One end of each supporting arch segment **24** is fixedly attached, preferably
30 at an angle of about 90 degrees, to one of the lengthwise edges **18** at a connection point **28** and
the other end of each supporting arch segment **24** is fixedly attached to the main arch **22** at a
connection point **30**. Preferably the supporting arch segments **24** are fixedly attached to the main
arch **22** at an angle ranging from about 85 to about 95 degrees, more preferably ranging from
about 87 to about 93 degrees, and still more preferably at an angle of about 90 degrees.

As illustrated in FIG. 2, the upright section preferably comprises supporting arches **24** in
35 pairs, such that each left side supporting arch segment **24a** has a mirror image right side
supporting arch segment **24b**. The left side supporting arch segment **24a** and the right side
supporting arch segment **24b** are connected to opposite sides of the main arch **22** at connection
points **30** and are connected to opposite lengthwise edges **18** at connection points **28** such that,

5 but for the presence of the main arch **22**, the pair of supporting arch segments would form a single arch parallel to the widthwise edges **20**. In a preferred embodiment, the upright section **16** comprises two pairs of supporting arch segments **24**.

10 Preferably the upright section further comprises one or more cross beams **32** having two ends. Each cross beam **32** is fixedly attached to two supporting arch segments **24**, such that the two ends of each cross beam **32** are fixedly attached to two different supporting arch segments **24** at connection points **34**. The cross beams **32** are preferably parallel to the lengthwise edges **20** and connect, preferably at an angle of about 90 degrees, to the supporting arch segments **24**. The cross beams **32** provide additional support and greater rigidity to the upright section **16**. In a preferred embodiment, the upright section **16** comprises two cross beams **32**, each connecting one of the two pairs of supporting arch segments **24**.

15 Other alternative designs for the upright section **16** are possible and are considered to be within the scope of the present invention. For example, the upright section **16** could comprise a plurality of main arches **22**, where supporting arch segments **24** may or may not be necessary and cross beams **32** can be used to connect the main arches **22**. Alternatively, the upright section **16** could comprise two main arches **22**, each spanning diagonally across the base section **14** from opposite corners, thus forming an "X" shape. In another alternative embodiment, cross beams **32** can be used where one end is connected to a supporting arch segment **24** and the other end is connected to the main arch **22**.

20 The main arch **22**, supporting arch segments **24**, cross beams **32**, and base section **14** can be fixedly attached to one another by any suitable means. Preferably they are heat-welded, but can also be sewn, for example. Preferably each section of the frame **10**, i.e., the main arch **22**, each supporting arch segment **24**, each cross beam **32**, and the base section **14**, has a consistent circumference from end to end, although each different segment need not have the same circumference as the other segments. Alternatively, a segment can taper from one end to the other. For example, the main arch **22** can taper from bottom to top, such that it is more lightweight at the top.

25 In a preferred embodiment, all of the connection points **26**, **28**, **30** and **34** contain air passage openings. In an alternative embodiment, connection points **30**, connecting the supporting arch segments **24** to the main arch **22**, do not contain air passage openings. Other combinations of connection points that contain air passage openings and connection points that do not contain air passage openings can exist, so long as the entire tubular member **12** can be inflated by injection of a fluid at a single location, as described above.

30 The air passage openings should be large enough to permit the fluid to move quickly from one section into another. Preferably the air passage openings for the main arch **22**, supporting

5 arch segments **24**, and cross beams **32** are as large as the inner diameters of the main arch, supporting arch segments, and cross beams respectively.

10 A cover capable of enclosing the frame **10** is also provided. The cover comprises a single flexible fabric that forms an enclosed region in which the frame **10** can be located and that has an inside and an outside. By single flexible fabric it is not meant that the cover cannot be made of more than one material, but rather only that the entire cover is a single continuous cover enclosing the entire frame **10**. To erect the tent of the present invention, the frame **10** is situated within the enclosed region of the cover and inflated, thus giving shape to the cover.

15 The cover can be formed of any appropriate material. Preferably the material is durable, lightweight, tear-resistant, puncture-resistant, fire-retardant, and/or waterproof. In a preferred embodiment, the cover is formed of two different materials. The bottom portion of the cover, i.e., the portion that would contact the base section **14** of the tent and the ground on which the tent sits, is preferably formed of a durable waterproof plastic, such as polyethylene. The upper portion of the cover, i.e., the portion that would cover the upright section **16** of the tent, is preferably made of a durable, lightweight waterproof material such as nylon. More preferably, the nylon is flame-retardant. When these two different portions are used, they can be sewn or otherwise fixedly attached to each other, and preferably have polyvinylchloride piping at the seam. The portion of the cover that contacts the base section **14** is preferably of a size such that it covers the side edges of the base section **14**.

20 The cover contains at least one opening for users to enter and exit the tent. The opening can be of any shape, and preferably is rectangular with rounded top corners. In a preferred embodiment, the opening can be closed by a flap fixedly attached to the cover. Preferably the flap is the same shape as the opening. Preferably the flap is fixedly attached to the cover at the flap's bottom edge, and preferably the flap's bottom edge attaches to the cover at the seam where the bottom and top portions of the cover meet.

25 When closed, the edges of the flap that are not fixedly attached to the cover can be temporarily attached to the cover by any suitable temporary closing means. One preferred closing means is a double-sided zipper, allowing the user to open and close the flap from both inside and outside the tent.

30 Additionally, the opening can also be covered with a screen, which allows air into the tent, but keeps insects out of the tent. The screen, which is preferably the same shape as the opening, can also be fixedly attached to the cover. The screen is preferably fixedly attached to the cover at the screen's bottom edge, and can similarly be opened and closed by any suitable temporary closing means, such as a double-sided zipper.

35 The cover can optionally contain one or more vents and/or windows. For example, the

5 vents can be similar to the opening described above, having a screen with a double zipper and a flap with a double zipper. Alternatively the vents can comprise a non-removable and non-openable screen with a flap cover that can be propped open by tying the ends of the flap cover to the ground. Other types of vents and windows would be known to one skilled in the art and are all considered within the scope of the present invention. The vents and/or windows can be placed at any suitable location on the cover, such as on top, on the sides, or on the back opposite the opening.

10 In a preferred embodiment, the cover is a removable cover **50**. The removable cover **50** is designed to be temporarily attached to the frame **10**, but also to be easily removed from the frame. This design allows the user to use the removable cover **50** with traditional tent poles in the event that the inflatable frame **10** becomes damaged and unusable. The user simply unattaches the inside of the removable cover **50** from the frame **10**, deflates the frame, and pulls the frame out the opening.

15 The removable cover **50** can be temporarily attached to the frame **10** in any manner that allows easy removal from the frame. In a preferred embodiment, as illustrated in FIGs. 3a and 3b, straps **55** having two ends are sewn or otherwise fixedly attached to the inside of the removable cover **50**. Each strap **55** preferably comprises a single rectangular strip of fabric fixedly attached at or near its midpoint **58** to the inside of the removable cover **50**. The two ends of each strap are provided with temporary attaching means **62** that can adhere to each other when repeatedly pressed together and opened. The preferred temporary attaching means **62** are VELCRO brand patches. Alternatively, the ends of the straps **55** can be tied together. The straps **55** can be wrapped around any portion of the tubular member **12**, including the main arch **22**, supporting arch segments **24**, cross beams **32**, and/or base section **14**.

20 The straps **55** can be situated in any suitable manner. In a preferred embodiment, eleven straps **55** are attached to the inside cover so as to wrap around the four corners of the base section **14**, around the top of the main arch **22**, approximately halfway up the two sides of the main arch **22**, and approximately halfway up each of the supporting arch segments **24**.

25 To keep the straps **55** from sliding along the tubular member **12**, resulting in an undesirable shifting of the removable cover **50** on the frame **10**, tabs **64** can be located at various locations on the tubular member **12**. The tabs **64** contain slits **66** through which the straps **55** can fit. The tabs **64** are provided at locations on the tubular member **12** corresponding to the locations of the straps **55** attached to the inside of the removable cover. Thus, when the removable cover **50** is correctly positioned on the frame, each strap **55**, when wrapped around the tubular member **12**, can be placed through a tab **64**.

30 When the cover is not removable, it can be fixedly attached to the frame **10** by any suitable

5 means. For example, the means described above for attaching the removable cover can be used, except the straps **55**, instead of comprising temporary attaching means **62**, are permanently closed around the tubular member **12**. Other means for fixedly attaching the cover to the frame **10** would be known to those skilled in the art and are considered to be within the scope of the present invention.

10 In one embodiment, the tent further comprises a second frame, preferably located outside the cover, to provide backup support for the cover. The second frame can also be used instead of the inflatable frame if the inflatable frame should become damaged and unusable. The second frame comprises preferably one or more lightweight flexible poles capable of being temporarily attached to the cover.

15 The poles are preferably made of fiberglass, but can also be made of any lightweight flexible material such as graphite or titanium. In one embodiment, each pole is hollow and comprises multiple pole sections permanently joined by an elastic cord running through the hollow centers of the pole sections. Each pole section has a pole section connecting means at each end to temporarily connect the pole sections when in use. One preferred pole section connecting means is use of a male pole connector and/or a female pole connector at each end of each pole section for connection to the other pole sections. When not in use, the pole sections can be
20 unconnected and the pole can be folded for convenient carrying and storage.

25 When in use, the pole sections are connected and the poles are preferably bended to form rounded arches. In one embodiment, three poles are used, a main arch pole and two supporting arch poles. The main arch pole is similar in shape to, but slightly larger than, the rounded main arch **22**. The main arch pole is situated outside the cover, preferably directly above the main arch **22**.

30 The supporting arch poles are preferably approximately semicircular in shape. The supporting arch poles are situated outside the cover and perpendicular to the main arch pole. Preferably the supporting arch poles are situated over the pairs of supporting arch segments **24**. Depending on which poles are positioned first when the tent is erected, the tops of the supporting arch poles will be situated either directly under or directly over the main arch pole. Alternatively, the main arch pole can be used without the supporting arch poles, particularly when the second frame is being used as back-up support rather than in place of the inflatable frame.

35 In another alternative embodiment, two rounded poles of approximately equal size can be situated in an "X" formation, such that the ends of the poles are located near the corners of the base frame. Other configurations of poles can also be used and are considered to be within the scope of the present invention.

The pole sections located at the ends of the poles are connected to the base of the cover

5 by a pole connecting means. A preferred pole connecting means comprises a female pole connector at each end of the pole and a male pole connector attached to the base of the cover. In one embodiment, each male pole connector is fixedly attached to a rigid ring, such as a metal or plastic ring. The ring is fixedly attached to a loop fixedly attached near the base of the cover. The loop can be made of any suitable flexible material, and is preferably the same material as the cover.

10 The outside of the cover contains one or more pole securing means for temporarily securing the poles to the cover. In a preferred embodiment, each pole securing means comprises one or more sleeves fixedly attached to the outside of the cover. The sleeves can be made of any suitable material, and preferably are the same material as the cover, which in a preferred embodiment is nylon. The sleeves are situated along the cover to correspond to the positions
15 where the poles are to be placed and are designed to allow a pole to be slid through their center.

Each pole can be slid through a single continuous sleeve. Preferably, however, each pole securing means comprises multiple sleeves with spaces in between the sleeves to make it easier for the user to feed the pole through the sleeves. Preferably the sleeves are situated approximately a foot above the base of the cover on each side.

20 The tent preferably comprises a securing means for securing the tent to the ground. In a preferred embodiment, the securing means comprises one or more stake loops fixedly attached to the outside of the removable cover and positioned such that, when the frame is inflated, the stake loops are near the ground. The stake loops can be made of any suitable flexible material, and are preferably made of nylon webbing. A stake can then be driven into the ground through
25 each stake loop to secure the tent to the ground. Any suitable stake can be used, as would be recognized to one skilled in the art.

Coupled to the tubular member **12** is a valve **100** through which the fluid can be introduced into the tubular member for inflation. Preferably the valve **100** is located at a position that is on the inside of the frame **10**, i.e., on the side away from the cover **50**, so that a user can reinflate a partially deflated frame without removing the cover. It is also preferred that the valve **100** is located on the base section **14**, allowing the inflation mechanism, described below, to be situated on the ground and yet still near the valve during inflation. Particularly preferred valves are described in U.S. Patent Nos. 4,977,633, 5,267,363, and 5,367,726. The frame **10** can then be inflated using any inflation mechanism. A preferred inflation mechanism is a pump, such as those
30 described in U.S. Patent Nos. 4,977,633, 5,267,363, and 5,367,726. A particularly preferred value and pump combination is that used with the Aero TRAILBED.

35 When the tent is deflated, it can be stored and carried in a carrying bag. Preferably the carrying bag is lightweight, but still large and strong enough to carry the tent as well as the poles

5 and inflation mechanism. In one embodiment, the carrying bag is a tube-like bag, preferably having a mesh window to allow moisture out of the bag. The top can be covered with a flap. Preferably the carrying bag has a single strap and a cinch cord for easily closing the bag.

10 The above description of preferred embodiments of the inflatable tent of the present invention are for illustrative purposes. Because of variations that will be apparent to those skilled in the art, the present invention is not intended to be limited to the particular embodiments described above. The scope of the invention is defined in the following claims.

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CLAIMS

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1. A tent comprising:

a frame consisting essentially of a single inflatable continuous generally-tubular member, the generally-tubular member comprising a base section and an upright section, wherein the base section is fixedly attached at one or more connection points to the upright section; and

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a removable cover having an inside and an outside, the cover being capable of enclosing the frame and being capable of having its inside temporarily attached to the frame.

15

2. A tent according to claim 1, wherein the upright section comprises a main arch having two ends, the two ends being fixedly attached to the base section, and at least one supporting arch segment having two ends, wherein one end is fixedly attached to the main arch and the other end is fixedly attached to the base section.

20

3. A tent according to claim 2, wherein the main arch and supporting arch segment are rounded.

4. A tent according to claim 2, comprising at least two pairs of supporting arch segments.

25

5. A tent according to claim 4, further comprising at least one cross beam having two ends, the two ends being each fixedly attached to a different supporting arch segment.

6. A tent according to claim 1, wherein the upright section comprises at least one rounded main arch.

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7. A tent according to claim 1, wherein the base section is rectangular.

8. A tent according to claim 1, wherein the removable cover comprises a single flexible fabric.

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9. A tent according to claim 1, further comprising both a second frame, the second frame comprising at least one pole having two ends, both ends being capable of being temporarily connected to the base of the cover, and a pole securing means fixedly attached to the outside of the cover.

5 10. A tent comprising a frame and a cover capable of enclosing the frame, wherein the frame comprises a single inflatable continuous generally-tubular member comprising:
a base section; and

10 an upright section comprising a rounded main arch having two ends, both ends being fixedly attached to the base section, and at least one rounded supporting arch segment having two ends, wherein one end is fixedly attached to the main arch and the other end is fixedly attached to the base section.

11. A tent according to claim 10, wherein the cover is a removable cover capable of being temporarily attached to the frame.

15 12. A tent according to claim 10, comprising two pairs of supporting arch segments.

13. A tent according to claim 12, further comprising at least one cross beam having two ends, wherein the two ends are each fixedly attached to a different supporting arch segment.

20 14. A tent according to claim 10, wherein the supporting arch segment is fixedly attached to the main arch at an angle ranging from about 85 to about 95 degrees.

25 15. A tent according to claim 14, wherein the supporting arch segment is fixedly attached to the main arch at an angle ranging from about 87 to about 93 degrees.

30 16. A tent according to claim 15, wherein the supporting arch segment is fixedly attached to the main arch at an angle of about 90 degrees.

35 17. A tent according to claim 10, wherein the base section is rectangular.

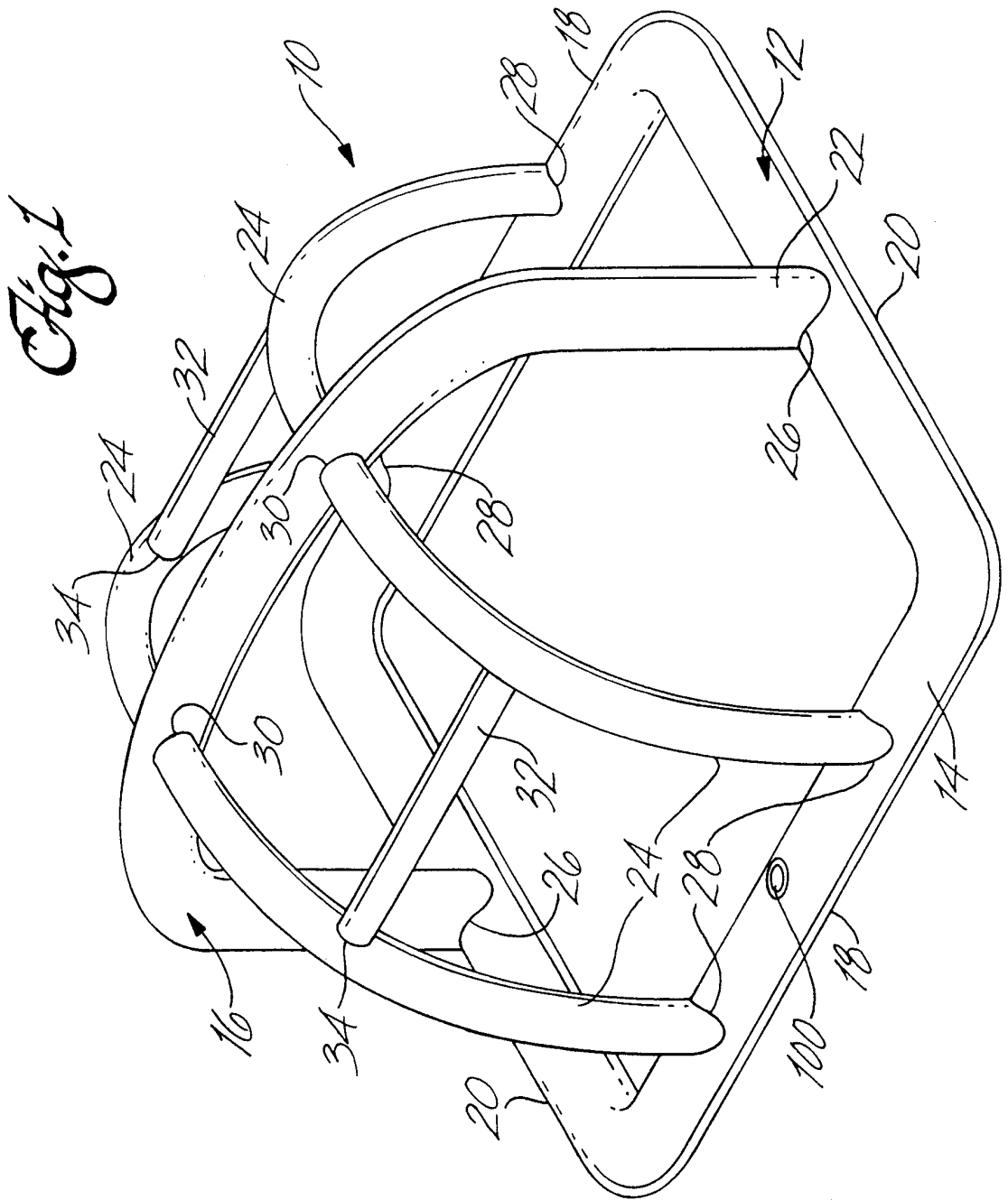
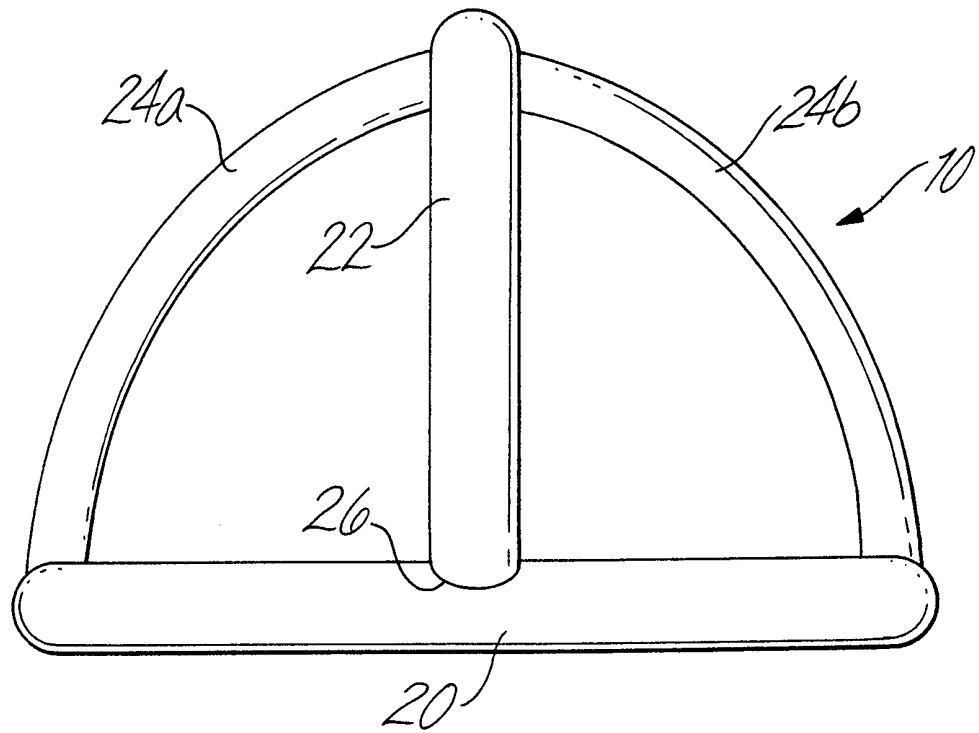


Fig. 2



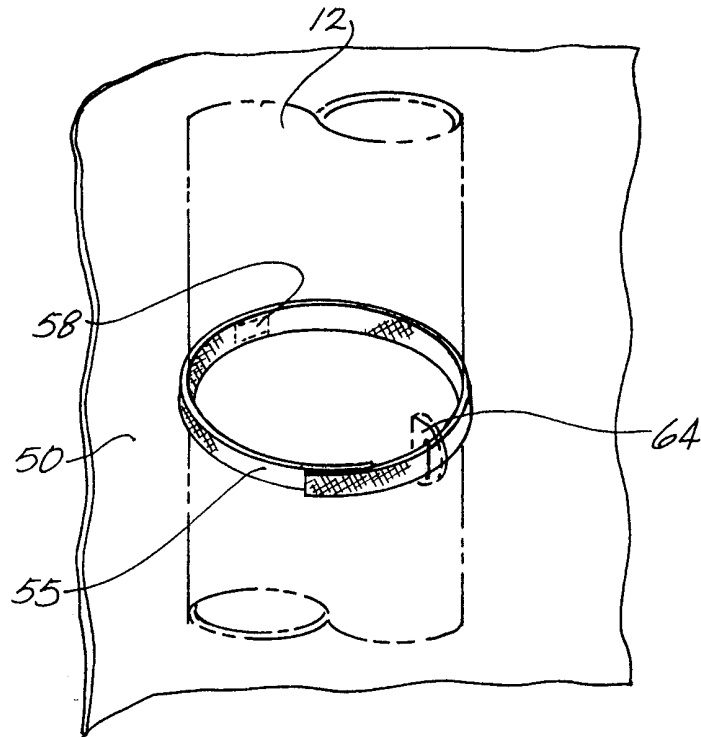


Fig. 3a

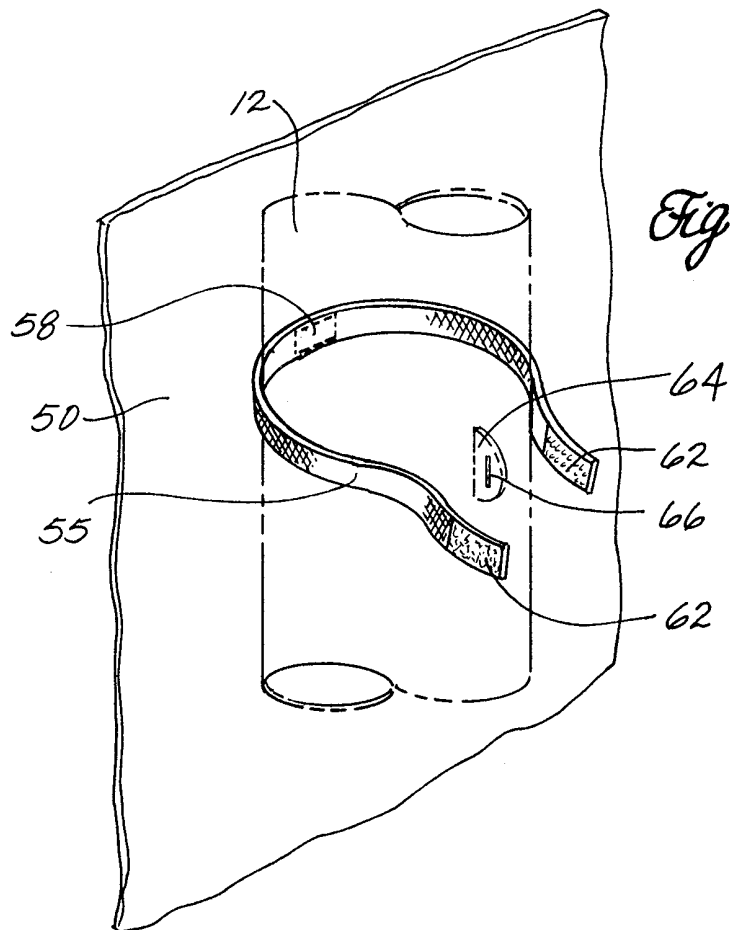


Fig. 3b