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Conroy

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[54] **ATHLETIC ARMOR AND INFLATABLE BAG ASSEMBLY**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 249,668, May 2, 1972, Pat. No. 3,784,985.

[52] **U.S. Cl.** **36/71**

[51] **Int. Cl.** **A43b 19/00**

[58] **Field of Search** ..... 36/71, 2.5 R, 2.5 AL; 2/22, 24, 300 R

[56] **References Cited**

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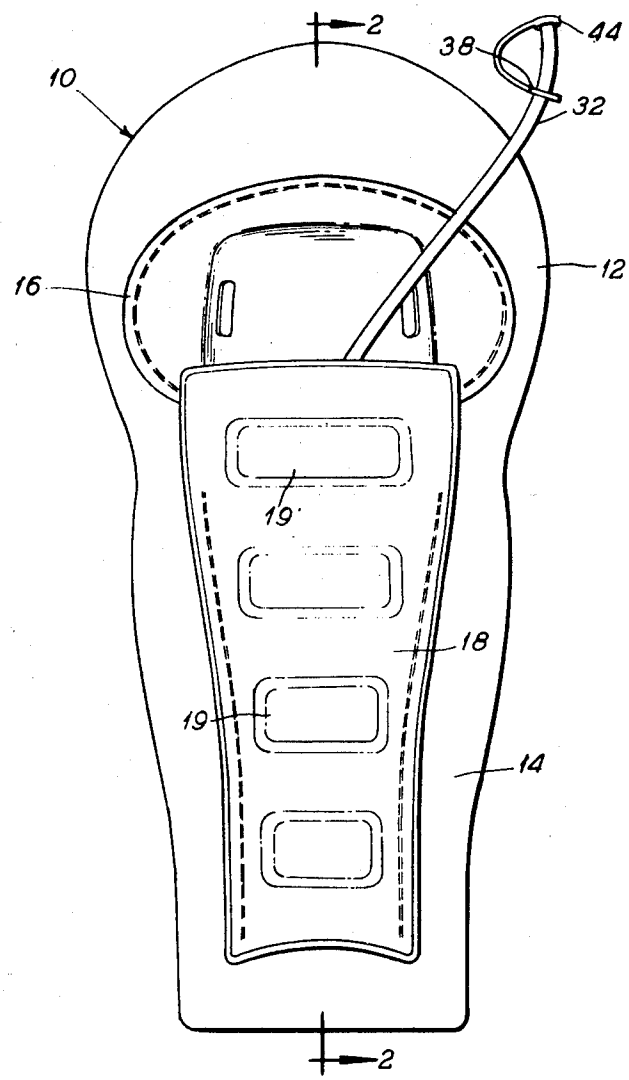
Primary Examiner—Patrick D. Lawson

[57] **ABSTRACT**

A heel and foot air-inflatable member for use with a foot gear such as a ski boot. The member is in the form of an arched configuration having an air-fill means sufficiently long to allow the member to be inflated after it is positioned within the foot gear. The arched configuration is maintained by a connecting link positioning spaced arms of the arched member.

7 Claims, 9 Drawing Figures



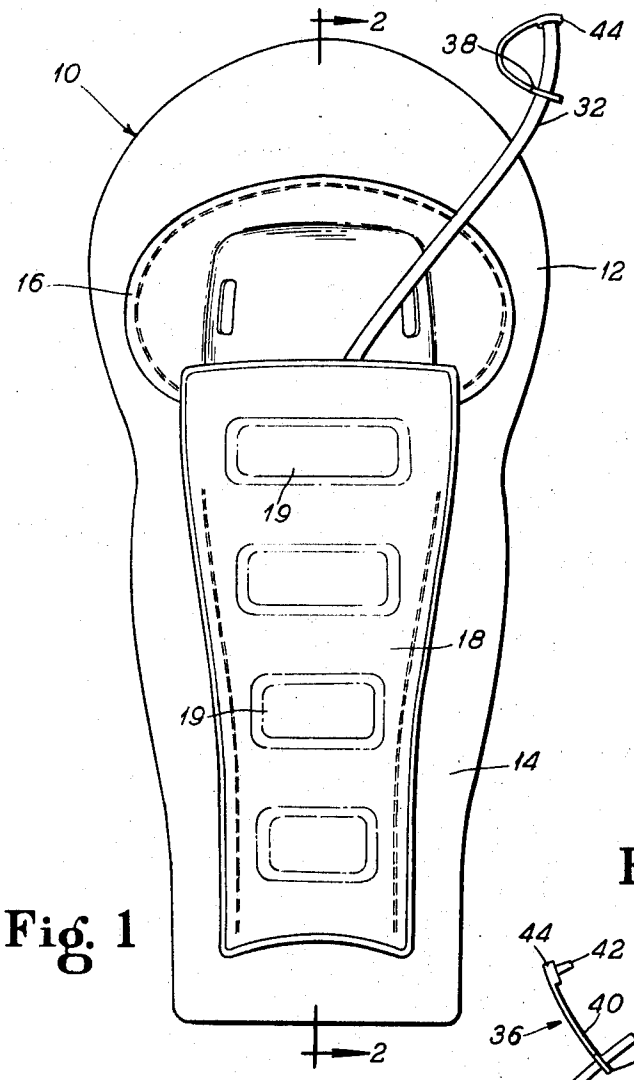


Fig. 1

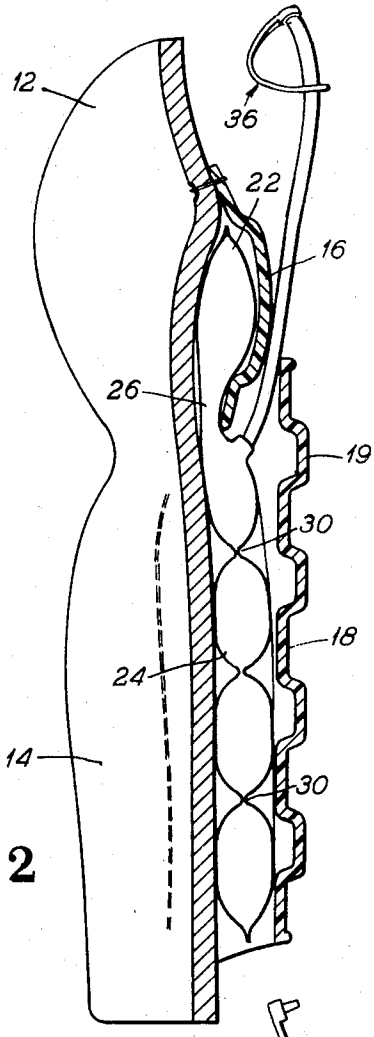


Fig. 2

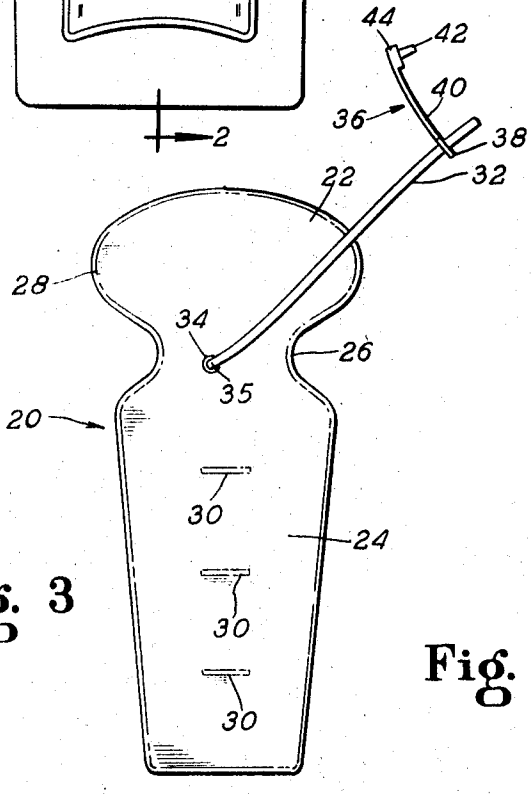


Fig. 3

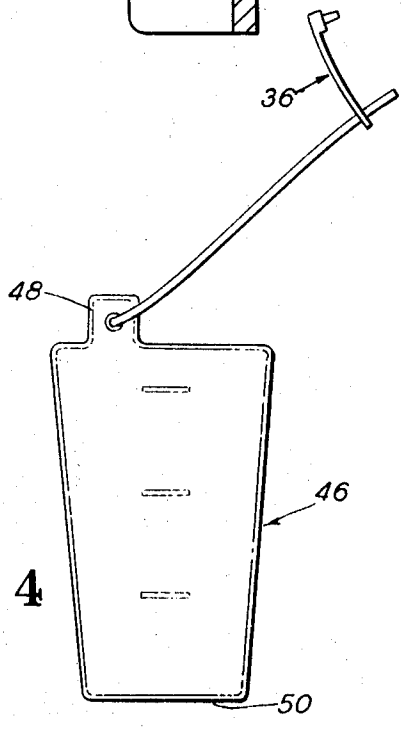


Fig. 4

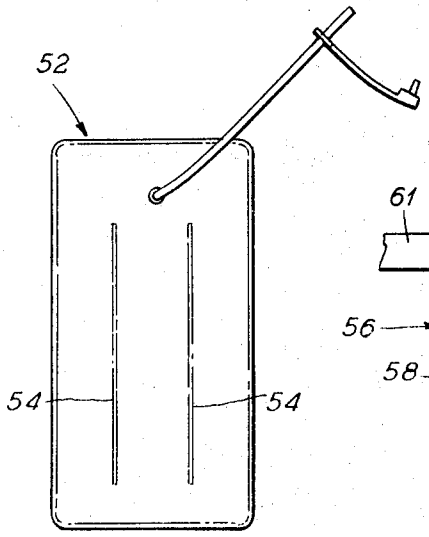


Fig. 5

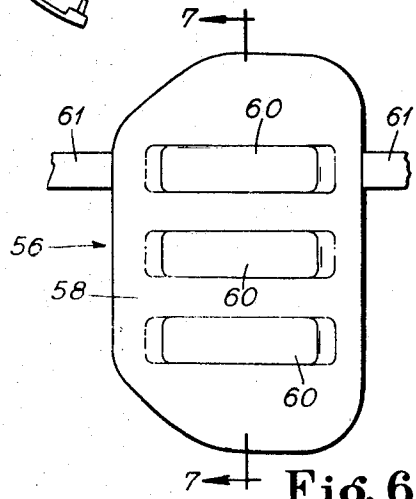


Fig. 6

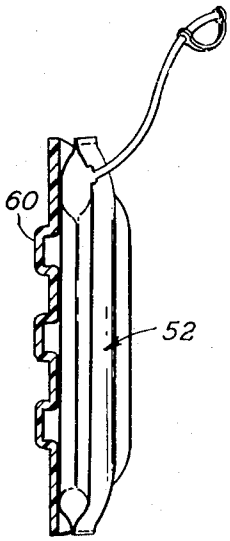


Fig. 7

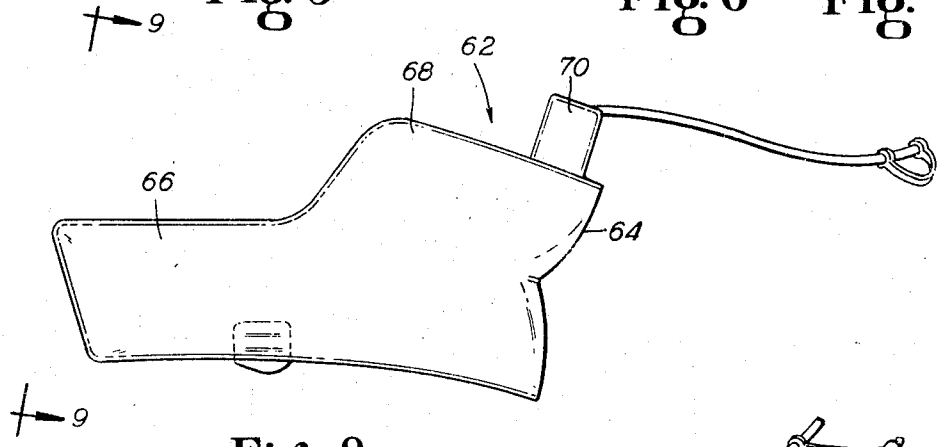


Fig. 8

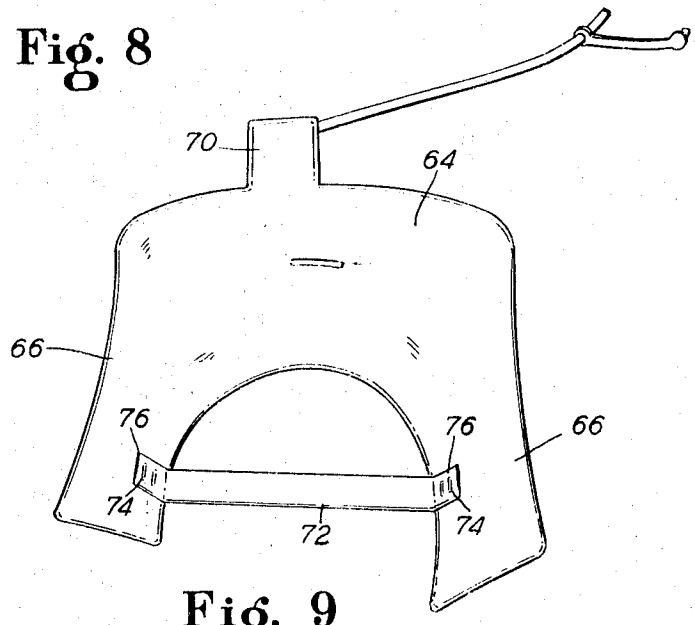


Fig. 9

ATHLETIC ARMOR AND INFLATABLE BAG ASSEMBLY

This application is a continuation-in-part of Ser. No. 249,668, filed May 2, 1971, and now U.S. Pat. No. 3,789,985.

This invention relates to an improved inflatable member for use with curvilinear athletic plates which operate as armor to protect the athlete. The invention relates to such inflatable members alone, as well as in combination with such curvilinear athletic plates.

The use of inflatable air members has been considered in the athletic field to protect the athlete against shocks, as well as cushioning various athletic gear, particularly head gear. A co-pending application by the present applicant and another discloses a new and improved cushioning and sizing means used in combination with substantially rigid head shell, Ser. No. 54,513, filed July 13, 1970 and now U.S. Pat. No. 3,668,704. That co-pending application disclosed and claimed an inflatable member mounted within the shell and having cushioning means along the opposite side walls. The inflatable member includes an elongated air-fill tube with a removable closure for the tube end to seal the tube following inflation of the member after mounting the assembly on the head. This procedure results in both cushioning of the head as well as sizing a predetermined oversized shell to the head of the user.

The foregoing co-pending application achieved the advantageous result of both cushioning and sizing by inflating the air chamber after the head gear assembly was placed on the head. It has been discovered that an inflatable air chamber of particular configuration and size can be used to unique advantage when used together with curvilinear athletic plates or armor. As distinguished from the protective head gear of the co-pending application, such an air inflatable member may be used for cushioning alone by fixing the position of the inflatable member relative to the athletic armor, inflating, and then mounting the assembly to an anatomical structure such as the shin bone. On the other hand, the inflatable member may be fixed in position relative to the athletic armor, the assembly may be mounted to the anatomical structure, and the member may then be inflated to cushion, or to size and cushion.

Various types of protective athletic armor is characterized by utilizing curvilinear plates, such as shin guards, thigh guards, hip guards, shoulder pads, and the like. Portions of ski boots and iceskates may also be considered as having curvilinear plate portions in the heel area so that an inflatable member of pre-selected size and configuration can desirably both size and cushion such foot gear.

It is accordingly one important object of the present invention to provide an improved air inflatable member adapted particularly for use with curvilinear athletic plates so that increased and additional advantages are realized to the user for using such conventional athletic armor.

Still yet another important object of the present invention is to provide an improved air-inflatable member of predetermined configuration and dimensions which permits such inflatable member to be fixed in position relative to a selected curvilinear athletic plate while allowing said inflatable member to be conveniently inflated through an air-fill tube which is sufficiently long to extend from beyond the protective athletic armor.

Still yet another important object of the present invention is an improved air-inflatable member which has a particular configuration and size so that it may be used to advantage to protect the shin of the user when used together with athletic armor shin covering. In similar manner, an air-inflatable member of particular configuration and size is used to advantage with knee and shin guard protective armor to protect both the knee and the shin of the user.

Yet still another important object of the present invention is to provide an improved air-inflatable member which is used together with curvilinear plates of foot gear to both size and cushion the foot of the user.

It is yet another important object of the present invention to provide inflatable members of particular configuration and size, which, however are smaller than curvilinear athletic plate so that said inflatable member may be quickly and easily positioned relative to said plate, and replaced quickly and economically when necessary. In attaining this object, the inflatable member is conveniently positioned between the curvilinear athletic plate and a base material to which such plate is fastened, the base material usually being padding or similar cushioning. Such curvilinear plates are conventionally fastened to the base material only at a portion of the peripheral edge so that freedom of movement is maintained, as in shin guards having knee and shin bone coverings. This conventional construction allows the inflatable members of special size and configuration to be readily inserted between the curvilinear protective plate and the base material for use in the advantageous manner indicated.

The objects just recited are attained, as well as still other objects which will occur to practitioners after considering the invention of the following disclosure which includes drawings, wherein:

FIG. **1** is a front elevational view of a conventional shin guard with curvilinear protective plate used in combination with the air-inflatable member of special configuration and size;

FIG. **2** is a sectional view taken along line **2 — 2** of FIG. **1**;

FIG. **3** is a front elevational view of an air-inflatable member used in combination with the shin guard of foregoing FIGS. **1** and **2**;

FIG. **4** is a front elevational view of an air-inflatable member of alternative embodiment used to protect only the shin area of the user in combination with a shin covering;

FIG. **5** is a front elevational view of still another alternative embodiment which can be used with a shin cover or with other curvilinear plates;

FIG. **6** is a front elevation view of curvilinear plate or protective armor for covering the thigh;

FIG. **7** is a sectional view taken along line **7 — 7** of FIG. **6,** further showing the air-inflatable member of foregoing FIG. **5** positioned thereagainst;

FIG. **8** is a side elevational view of an alternative embodiment of an air-inflatable member for cushioning and sizing the heel of the user when wearing foot gear such as ski boots or iceskates; and

FIG. **9** is a bottom elevational view of the embodiment shown in foregoing FIG. **8.**

Use of the same numerals in the various views of the drawings will indicate a reference to the same structures, parts, or elements, as the case may be.

Looking first at the shin guard assembly of FIG. **1**, there is seen the conventional construction including a padding or base material **10.** This includes a somewhat circular upper head portion **12** and a lower elongated shin portion **14.** A circular curvilinear knee plate or armor **16** is fastened to the base material by means such as stitching **17,** but a lower portion (not shown) is free of such stitching and open. A shin curvilinear plate or armor **18** is also fastened by similar stitching along the opposite long side. The top of the shin armor overlaps the knee armor **16,** as shown. The shin armor further includes a plurality of ribs which project on the outside and are recessed on the inside, in accordance with common molding processes.

An air-inflatable bag or member **20** is used in combination with the conventional shin guard illustrated. The air-inflatable member of particular configuration and size has a somewhat circular head portion **22** and a lower elongated shin portion **24** separated by a reduced width neck portion **26.** The air-inflatable member is formed from a pair of oppositely disposed side walls which are joined together by a peripheral heat seal **28.** In addition, a plurality of transverse body heat seals **30** are shown in the shin portion **24** to partly compartmentalize the shin portion. Air entering the inflatable member communicates with the loosely defined compartments between the heat seals **30** in a manner which is evident.

An air-fill tube **32** has a flared end **34** which is heat sealed to one of the side walls of the air-inflatable member. Such a junction of air tube to side wall forms an air entry into the air chamber defined betwen the oppositely disposed and peripherally heat sealed side walls. The other end of the air-fill tube has a removal closure shown generally as **36.** Such a closure includes a mounting ring or annulus **38** which frictionally slides along the continuous cylindrical wall of the air-fill tube. A flexible strap **40** connects the annulus **38** to a friction-sealing plug **42** which has a grasping flange or enlarged head **44.**

The embodiment just described is used in combination with the shin guard shown in FIGS. **1** and **2** by inserting the shin portion **24** through the open top of the shin armor **18,** and inserting the head **22** through the bottom opening of the knee armor **16.** The air-fill tube is of a length sufficient to extend from behind the shin armor so that it may be conveniently used for inflation of the air-inflatable member. The air-fill tube is conveniently positioned at the reduced width neck portion **26** of the air-inflatable member so that it does extend from the overlapping junction of the shin cover and the knee cover.

The views of FIGS. **4** and **5** illustrate other embodiments of air-inflatable bags which utilize the features of the invention. Such bags or members are used together with athletic armor, particularly curvilinear plates. In general, trapezoidal inflatable member **46** of FIG. **4** has the wide side at the top from which projects an air foyer or tab **48,** one side wall portion thereof has the air-fill tube mounted thereto. The entire inflatable member in the collapsed or non-inflated condition is inserted between the shin cover, such as that previously illustrated, and the base material. The small side or end **50** adjoins the lower portion of the shin cover, and the wide side or end with the air foyer portion **48** is positioned near the top of the shin cover so that air-fill tube may extend out of the open top from behind the shin guard. The air inflatable member **52** shown in FIG. **5** may be used in like manner by inserting in the non-inflated condition behind the shin cover, although such an embodiment is rectangular in configuration. Such an embodiment also shows elongated vertical heat seals **54** which follow the long axis of the rectangular configuration but terminate short of the opposite short sides so that air passageways for the enclosed air chamber are provided.

The air-inflatable member is inserted in the non-inflated condition between a curved athletic armor and a soft base material such as padding, sponge rubber, soft plastic, and the like to attain advantages of the invention. The inflatable member may be placed between the curved armor and the anatomical structure with curved plates such as thigh armor, shown as **56** in FIG. **6.** The armor includes a curved plate **58** which has a plurality of projecting ribs **60.** Ties such as **61** may also be provided to hold the armor against the anatomical part or structure, although thigh armor is designed to be held in place by close fitting athlethic trousers or the like. The air-inflatable member shown in FIG. **5** is used to particular advantage with armor plates such as that shown in FIGS. **6** and **7.** The sides of the curved armor plates **56** are spaced generally at equidistances so that a rectangular configuration of the air-inflatable member is suitably used in association with said athletic plate.

The foregoing illustrations show an air-inflatable member consisting essentially of two side walls, each of which lies in a single plane. Such side walls, however, may assume a set curved configuration such as that illustrated by the heel and foot air-inflatable member **62** of FIGS. **8** and **9.** A unitary air-inflatable member is still provided but in the configuration of a preset arch. Such a member is in the form of an arch having a central heel portion **64** to cover the back of the heel, and having spaced side foot portions **66** to cover the sides of the foot. The top of the central heel portion **64** is shown with a raised heel portion **68** having an air foyer or tab **70** projecting from the top edge, the air-fill tube communicating with the air chamber at this point. In the non-set configuration of an arch, the air-inflatable member **62** may be considered as an elongated structure which is horizontally oriented. The upper edge of such an extended horizontally oriented structure would have the raised portion **68** substantially at a central portion of the upper edge of the opposite ends or sides of the inflatable member.

The arched position is assumed and held by a linking tube portion **72** which is connected by heat seals or bonding points **74** at the opposite ends to the arms **66** at the lower edge thereof. The connecting link is sufficiently long to hold the member in the desired configuration of an arch when the opposite ends are secured to the spaced side foot portions. Communicating air passages **76** allow the air to move through the air chamber defined by the heel portion, side foot portions and the linking tube portion.

The air-inflatable member **62** is placed around the heel of the user, and the linking tube **72** extends along the bottom of the heel in such position. Such linking member then fits against the bottom of the heel. The linking member is preferably secured to outside lower

edge portions of the side foot portions to result in an improved arched configuration. A foot gear, such as a ski boot or iceskate, is mounted over the foot and the air-fill tube **32** extends out of the top of such foot gear so that it may be used to inflate member **62.** Such inflation both cushions and sizes the foot securely in the foot gear. In this respect, portions of the substantially rigid foot gear in the heel area may be considered as the curvilinear plate or athletic armor. The foot gear is finally secured by lacing or the like, and the air-fill tube may either extend out of the top of the foot gear or be tucked within the foot gear.

The claims of the invention are now presented, and the terms of such claims may be further understood by reference to the view of the drawings and the language of the description as presented herewith.

What is claimed is:

1. A unitary foot inflatable member for use with a substantially rigid foot gear, including,

a pair of flexible plastic side walls forming an air chamber therebetween, said side walls being sealed along their peripheral edges, said side walls having a configuration and dimension sufficient to cover a heel portion and substantial side foot portions of the user,

an air-fill means communicating with said air chamber, and means to seal said air-fill means to retain air blown into said air chamber of said inflatable member to allow said inflatable member to be inflated when positioned within said foot gear, and

said inflatable member having upper and lower edges, said inflatable member being elongated with a central heel portion and side foot portions, said side foot portions being spaced from each other in a preset arched configuration, and

a linking member connected at the opposite ends to the lower edge of the side foot portions so that the linking member fits against the bottom of the heel, whereby the inflatable member assumes said preset arched configuration.

2. An inflatable member which includes the features of claim **1** above, wherein said linking member is a plastic strip and is connected at its opposite ends to the lower outside portions of the spaced side foot portions.

3. An inflatable member which includes the features of claim **1** above, wherein said linking member has a tubular configuration which communicates with the air chamber formed by the side walls.

4. An inflatable member for use with a substantially rigid foot gear, including

a pair of flexible plastic side walls forming an air chamber therebetween, said side walls being sealed along their peripheral edges, said side walls having a configuration and dimensions sufficient to cover a heel portion and substantial side foot portions of the user,

an air-fill means communicating with said air chamber, and means to seal said air-fill means to retain air blown into said air chamber of said inflatable member to allow said inflatable member to be inflated and positioned within said foot gear,

said inflatable member being elongated with a central heel portion and opposite side foot portions, said side foot portions being spaced from each other in a preset arched configuration, and

a linking member of tubular configuration joining said spaced side foot portions to assume said preset arched configuration, said linking member of tubular configuration communicating with the air chamber formed by the side walls.

5. An inflatable member which includes the features of claim **4** above, wherein said air-fill means comprises an air fill tube having a cylindrical wall and being sealed at one end to the inflatable member in communication with the air chamber, said air-fill tube being sufficiently long to extend beyond the foot gear to allow said inflatable member to be inflated when positioned within the foot gear, and wherein said means to retain air comprises a removable closure for sealing the open end of the airfill tube.

6. An inflatable member which includes the features of claim **5** above, wherein said removable closure includes a plug for frictionally sealing the tube, and flexible means connected to said plug and engaging said tube, whereby said plug is carried by said tube when released from said other end of the air-fill tube.

7. An inflatable member which includes the features of claim **4** above, wherein said central portion is raised and wherein said air-fill means communicates with the air chamber at said raised portion.

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