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E. HOLY, JR
FOOT PROTECTOR

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2 Sheets-Sheet 1

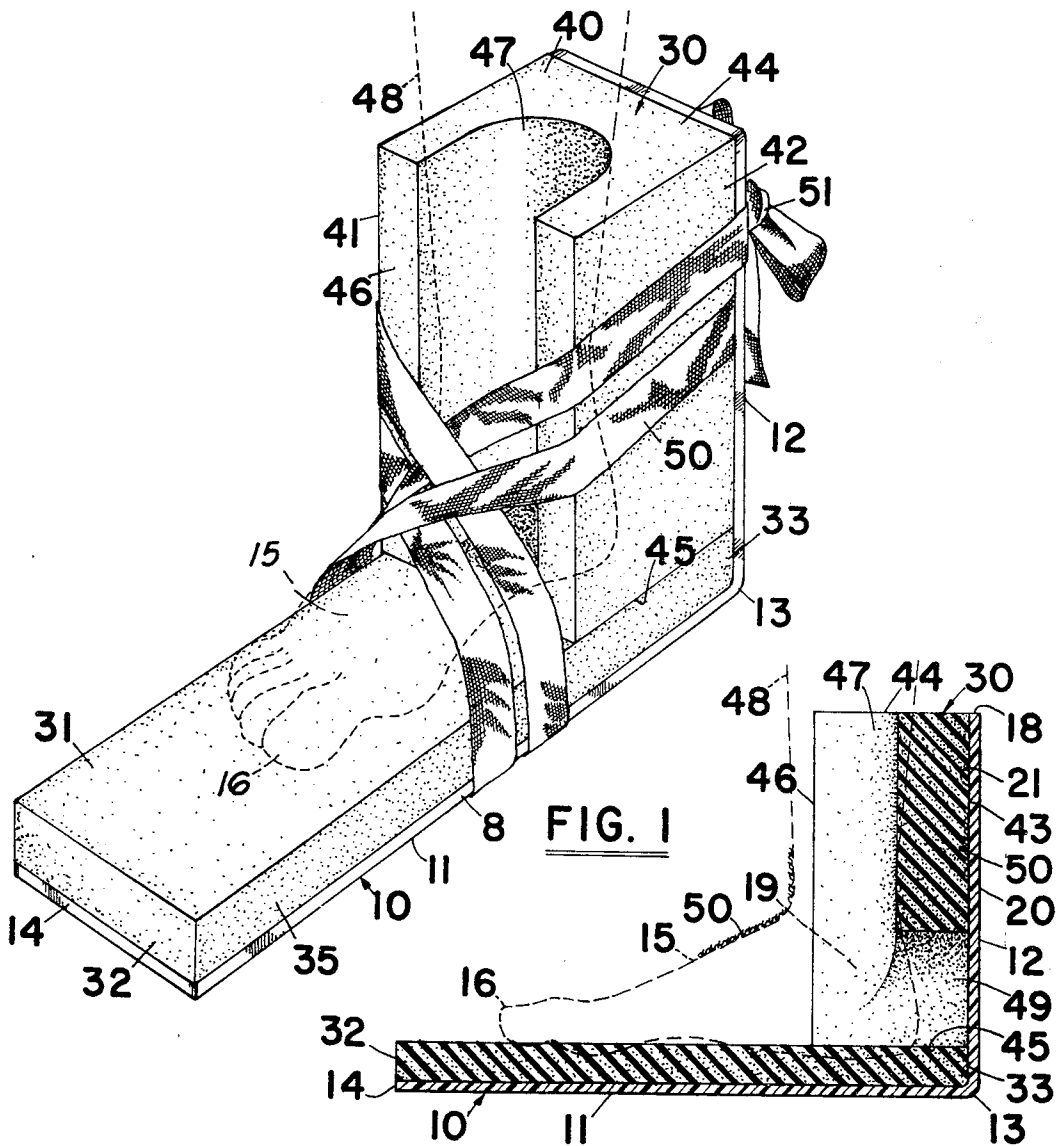
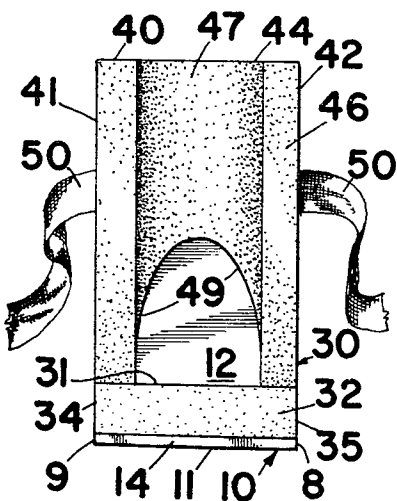


FIG. 2



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2

3,511,233

FOOT PROTECTOR

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9 Claims

ABSTRACT OF THE DISCLOSURE

A foot protector for a bed patient having a flat L-shaped outer casing which is relatively rigid and a resilient cellular lining conforming generally to the curvature of the back of the leg and heel and also having a flat upper surface for receiving the sole of the foot in combination with a releasable strap for retaining the foot, ankle and leg portion in place.

This invention relates to a foot protector and is more particularly concerned with a mechanism for supporting the foot of a bedridden patient so as to protect the foot from abrasion by the sheets.

In the past, many patients have suffered from ulcers or bed sores, particularly around the ankles and feet where these portions of the body come into abrasive contact with the sheets of a bed. Various devices have been suggested to alleviate, prevent, or reduce this abrasive contact. Such prior art devices include mechanisms for supporting the upper sheet in spaced relation above the feet so that the feet may move more readily without contact with the upper sheet. Such a mechanism, of course, is expensive, heavy, and, at times, uncomfortable. Also, it does not eliminate entirely the abrasive contact between the feet and the sheets. Various protective members have been suggested to be worn by the patient so as to protect the foot against wear by the sheets. Such mechanisms have usually not proved satisfactory since they have either been expensive or uncomfortable and do not permit exercise of the feet therein.

The present invention, which obviates the difficulties described above, includes a flat L-shaped, relatively rigid outer casing which supports a lining formed of resilient cellular material shaped to receive the lower leg, ankle and foot. A strap passing over the foot and lower leg portion of the patient retains the foot and leg portion in place. The dimensions of the foot protector of the present invention are greater than the foot and sufficient to prevent any appreciable contact of the foot or the ankle or the lower leg portion with the bed sheets.

In modified forms of the present invention, the foot protector is provided with a support member which rests upon the bed and is pivotally mounted to the rectangular base of the casing so as to support the casing and permit limited pivoting of the base to the left and right of the vertical. A removable pin locks the support member to the base in any one of several selected angular positions.

Accordingly, it is an object of the present invention to provide a foot protector which will prevent or reduce the likelihood of a patient having bed sores in the region of the foot or ankle.

Another object of the present invention is to provide a foot protector which will protect the bony protuberances of the foot, such as the ankle and toes, etc.

Another object of the present invention is to provide a foot protector which is inexpensive to manufacture, durable in structure, and efficient in operation.

Another object of the present invention is to provide a foot protector which is lightweight and disposable and will conform to any shape and size of any foot.

Another object of the present invention is to provide

a foot protector which will retain the foot in proper anatomical alignment and will prevent inversion, eversion, flexure, and extension of the foot.

Another object of the present invention is to provide a foot protector which, if desired, may be sterilized in gas.

Another object of the present invention is to provide a foot protector which is easy to attach and to remove from a foot of a patient.

Another object of the present invention is to provide a foot protector which is comfortable.

Another object of the present invention is to provide a foot protector which, when worn by a patient, will not prevent the patient from walking.

Another object of the present invention is to provide a foot protector which does not contact the heel and will permit the circulation of air through and along a substantial portion of the foot, as it is supported.

Another object of the present invention is to provide a foot protector which will absorb moisture from the foot.

Another object of the present invention is to provide a foot protector which will allow passive exercising of the foot as the foot protector is being worn.

Another object of the present invention is to provide a foot protector which can readily slide on the sheets of a bed.

Another object of the present invention is to provide a foot protector which is smooth along the side contacting the bed so that it may readily be moved and yet rough along the surface which will contact the floor when the patient is walking.

Another object of the present invention is to provide a foot protector which will position and maintain the foot in prescribed angular positions with respect to the bed.

Other objects, features, and advantages of the present invention will become apparent from the following description when taken in conjunction with the accompanying drawings wherein like characters of reference designate corresponding parts throughout the several views and wherein:

FIG. 1 is a perspective view of a foot protector constructed in accordance with the present invention, the broken lines depicting the lower leg, ankle, and foot of a patient wearing the foot protector;

FIG. 2 is a vertical sectional view, on a reduced scale, of the foot protector illustrated in FIG. 1;

FIG. 3 is a front elevational view of the foot protector illustrated in FIGS. 1 and 2;

FIG. 4 is a bottom plan view of a modified form of the foot protector illustrated in FIG. 1 and showing an arresting pin removed from its hole, the broken lines showing selected angular positions to which the base may be pivoted;

FIG. 5 is a fragmentary bottom plan view, similar to FIG. 4, but showing a third embodiment of the invention; and

FIG. 6 is a vertical sectional view of modified form of the invention illustrated in FIG. 4, the foot being shown in broken lines and the bed sheet being shown, draped over the end of the foot protector.

FIRST EMBODIMENT

Referring now in detail to the embodiments chosen for the purpose of illustrating the present invention and particularly to FIGS. 1, 2 and 3, it being understood that, in its broader aspects, the present invention is not limited to the exact details herein depicted, numeral 10 denotes generally the outer relatively rigid casing of the foot protector. Preferably the casing 10 is initially formed from a flat sheet of relatively rigid plastic material. While I employ a medium impact polystyrene as the sheet material

from which the casing 10 is formed, it is most apparent that many other organic polymeric condensation resins may be employed in place of the polystyrene material. For example, the polyolefins such as polyethylene and polypropylene, could be used; the polyamides, such as nylon, could be used; the vinyls, such as polyvinyl acetate or polyvinyl chloride or polyvinyl chloridevinyl acetate copolymer could be used; or the phenolic resins could be used, etc. Furthermore, while it is desirable from a weight standpoint and from a comfort and appearance standpoint to use a plastic for the casing 10, nevertheless, if desired, the casing could be formed from sheet metal, wood, chipboard, or the like. The primary requirements are that the casing 10 be sufficiently rigid so as to maintain its shape and support the foot while, at the same time, being sufficiently flexible to permit a limited movement of the foot within the elastic range of the material.

The casing 10 includes a rectangular base 11 and a rectangular back 12 joined along a common straight transverse edge 13. The back 12 is substantially perpendicular to the base 11 and, for convenience and strength, the back 11 and the base 12 are usually formed as an integral member.

The outer end 14 of base 10 is parallel to edge 13 while the side edges 8 and 9 of base 10 are parallel to each other and perpendicular to edge 13 and end 14.

The length of base 11 from the common edge 13 to the outer end 14 is in excess of the length of the largest normal foot of a person. Therefore, the foot 15 of the patient, when received in the foot protector, will have his toe 16 located well inwardly of the end 14. Also, the distance from side edge 8 to the side edge 9 is wider than a normal foot. Therefore, the foot 15 is normally disposed inwardly of side edges 8 and 9.

The lower surface or face 17 of the base 11 is serrated or roughened, as by sandblasting, so as to provide an irregular surface with sufficient friction for the patient to walk safely while wearing the foot protector.

The back 12 has an upper edge 18 which terminates above the ankle portion 19 of the foot 15, but well below the knee of the patient. The outer face 20 of the back 12 (as contrasted to face 17), has a smooth surface so that the foot protector can slide on the bed sheets when the foot protector is worn and the patient is prone on the bed.

Inwardly of the casing 10 and secured thereto is the resilient cellular lining, denoted generally by numeral 30. This lining 30 is formed preferably from foamed polyurethane. The lining 30, therefore, is sponge-like or resilient and cellular. Hence, lining 30 may be formed from natural sponge or from a synthetic sponge. While I prefer to use foamed urethane, it will be obvious to those skilled in the art that other foamed polymeric condensation resins could be employed in place of the urethane, if desired. The primary characteristic of the lining is that it be soft and yieldable so that a person's foot in the foot protector may be exercised without being irritated by the lining 30. It should be capable of absorbing moisture, as are most spongelike materials.

In more detail, the lining 30 includes a flat rectangular foot panel 31 formed from a sheet of foamed polyurethane. Foot panel 31 is received on top of and conforms to the rectangular shape of base 11. This lower surface of panel 31 is affixed to the inner or upper surface of base 11 by means of adhesive or other bonding.

As seen in the drawings, the panel 31 has a straight front edge 32 which is disposed coplanar to the front edge 14 of base 11. The panel 31 has a back edge 33 which abuts the inner surface of the back 12, adjacent the common edge 13. The width of the base 11 from its side edge 34 to its side edge 35 is equal to the width of the base 11, side edge 34 being coplanar with side edge 9 and side edge 35 being coplanar with side edge 8.

The lining 30 also includes an ankle retainer denoted

generally by numeral 40. This ankle retainer is a U-shaped member having flat outer sides 41 and 42 disposed parallel to each other and a flat back side 43 which is perpendicular to and joins the ends of sides 41 and 42. The ankle retainer 40 also includes a flat upper end 44 and a flat lower end 45 disposed parallel to each other and perpendicular to the sides 41, 42 and back side 43.

The ankle retainer 40 has a flat front side 46 parallel to the back side 43; however, this front contains a central, forwardly opening, vertically disposed, U-shaped channel, denoted by numeral 47, the channel 47 projecting axially throughout the length of the ankle retainer 40. Channel 47 may be contoured to the shape of leg 48, if desired. This main channel 47 is of such dimensions as to receive therein the back side of the lower portion of a person's leg 48 and the ankle 19 of the person, as illustrated in FIGS. 1 and 2.

Communicating with the channel 47 and being disposed at right angles thereto, is a heel ventilating recess, denoted by numeral 49. This heel ventilating recess 49 opens downwardly toward the lower end 45 and, like channel 47, is U-shaped, being inverted in its normal position as seen in FIG. 3.

The back side 43 is secured by adhesive to the inner surface 21 of back 12 while the bottom end 45 rests upon and abuts the upper surface of panel 31. The back side 43, therefore, is parallel to back edge 33 of panel 31 while the side 41 and 42 are in common parallel planes, respectively, with the side edges 34 and 9 and 35 and 8. The ankle retaining block 30, therefore, is disposed parallel to back 12 and perpendicular to and at one end of the panel 31 and base 11.

It is now seen that the channel 47, which opens forwardly, thereby separates a pair of spaced forwardly extending ankle retainers against which the sides of the ankle 19 and the sides of the leg 48 are received.

Interposed centrally between the inner surface 21 of back 12 and the back surface 43 of the ankle retainer 40 is a transversely extending, flat flexible, fabric or tape, denoted by numeral 50. The ends of tape 50 project sideways from between the two abutting surfaces 21 and 43 and are sufficient in length that the tape 50 can be wrapped around the foot 15 and ankle 19 of a person's leg 48 and tied in a bow 51, as illustrated in FIG. 1. Thus, the tape 50 provides a means for yieldably retaining the foot in place in the foot protector. Since the strap 50 passes primarily around the upper surface of the foot 15, adjacent the ankle 19, the forwardly extending toe end of the foot 15 is essentially free for exercising. Furthermore, the resilient nature of the lining 30 is such as to permit limited exercising of the foot and ankle. The more rigid casing 10 will also permit a type of isometric exercise which will maintain strength in the muscles and retard atrophy.

SECOND EMBODIMENT

Referring particularly to FIGS. 4 and 6, it will be seen that the foot protector of FIGS. 1, 2 and 3 is provided with a pivotally mounted support member 60 which enables the foot protector to rest at a predetermined angle. In more detail, the support member 60 is a flat rectangular plastic member having a central hole 61 through which passes a pivot pin 62. The pivot pin 62, thence, passes through a hole 63, along the centerline C in base 11, adjacent edge 13. By such an arrangement, support member 60 is pivotally secured flat against the outer surface of base 11, in a plane parallel to the plane of base 11 and perpendicular to back 12. The axis of pivot, i.e., pivot pin 62, is perpendicular to the planes of base 11 and support member 60 so that support member 60 may pivot thereabout in its plane parallel to the plane of base 11.

The support member 60 is longer than the width of base 11 and protrudes sideways on both sides of base 11 beyond the sides 8 and 9. Support member 60 has a straight bot-

5

tom edge 64 which is spaced from the axis of pivot, i.e., pivot pin 62, by a distance greater than the distance from back 12 to pin 62. Hence, the base 11 may readily pivot about pivot pin 62 through a limited arc on both sides of the vertical, when the edge 64 rests upon a bed and supports the casing 10 above the bed surface.

Vertically above hole 61, the support member 60 is provided with a second hole 65 which is selectively alignable with any one of a plurality of radially disposed, circumferentially spaced holes 66 in base 11, the hole 66 being at distances from hole 63 equal to the distance from hole 61 to hole 65.

A removable plastic pin 67, carried by a flexible strap 68, is passed through hole 65 and into any one of the holes 66, as illustrated in FIG. 6. The strap 68 is secured by one end to pivot pin 62. The other end portion of strap 68, which carries pin 67, is provided with a removing tab 69, outwardly of pin 67. When the pin 67 is in place in its holes, the foot 15 within the protector is disposed at a prescribed angle from the vertical or is disposed vertically, as desired. The foot 15, however, cannot be readily pivoted from its prescribed angular position, unless the pin 67 is removed, as in FIG. 4.

THIRD EMBODIMENT

The third embodiment is quite similar to the second embodiment except that the support member 60a is asymmetrical, having a vertical edge 70a inwardly of side 8 or side 9, as the case may be. Thus, member 60a protrudes from only one side of base 11 rather than protruding from both sides, as does support member 60. This enables the foot 15 and its protector to be pivoted counterclockwise in FIG. 5.

In more detail, the support member 60a is identical to support member 60, and is pivotally secured to the base 11 in an identical way by pivot pin 62a. The pivot pin 62a carries a strap 68a having a tab 69a and a pin 67a, identical to the strap 68, tab 69 and pin 67. The pin 67a removably protrudes through hole 65a in member 60a and selectively into any one of the arcuately arranged holes 66a in base 11. This determines the angular position of the base 11 with respect to the bottom edge 64a of member 60a.

Support member 60a also has a hole 65b which is diametrically opposed to hole 65a so that, when desired, the support member 60a may be rotated 180 degrees to a position as illustrated by broken line in FIG. 5, thereby permitting edge 64b to function as the supporting edge in place of edge 64a. This positions vertical side 70a on the right, rather than on the left in FIG. 5. By such an arrangement, the foot protector of FIG. 5, which is normally for a left foot, is converted to a foot protector for the right foot.

When the foot protector of FIG. 5 is used for the left foot, edge 64a engages the bed and base 11 forming an acute angle therewith. Hence, the patient may readily pivot his foot 15 inwardly or rest it by pivoting it outwardly until edge 64a rests flat on the bed.

When the embodiment of FIG. 5 is used as a right foot protector, edge 64b is the lower edge and forms an acute angle with base 11. This enables the right foot to be pivoted inwardly or rest at an acute angle pointing upwardly and outwardly.

The foot protectors thus described above are sufficiently inexpensive that they may be thrown away after being utilized. On the other hand, they may be placed in a suitable gas, for sterilization, in the event that they are to be used for subsequent patients or become soiled. The foot protectors of the first embodiment of the present invention permit a person to walk wearing one foot protector. Of course, it would be awkward to walk wearing two such foot protectors. When, however, the patient is in a prone position on the bed, the smooth surface of

6

back 12 of the first embodiment and edges 64, 64a or 64b of the subsequent embodiments permit ready movement of the foot 15, the foot protector sliding along the bed sheet.

It is advisable, when a person is to be in bed for an appreciable period of time, to arrange the bow 51 of the first embodiment along the front of the foot protector, rather than at the rear, since the bow 51 may become untied, due to movement of the foot, causing the bow 51 to ride along the sheet. Also, this bow 51 may interfere with the sliding of the foot protector, as described above.

Since the heel 19 is essentially open, due to the passageway 49, there is no pressure exerted on the heel which would tend to cause bed sores. Also, circulation of air around the foot 15 and the circulation of blood throughout the foot 15 is not appreciably restricted by the foot protectors of the present invention.

Since the ends 14 and 32 are appreciably forward of the toe 16 of a person's foot 15, there is no danger of the toe 16 coming in contact with the sheet 71.

It will be obvious to those skilled in the art that many variations may be made in the embodiment here chosen for the purpose of illustrating the present invention without departing from the scope thereof, as defined by the appended claims.

I claim:

1. A foot protector comprising a casing and a lining, said casing being formed of sheet material, said lining being formed of a resilient material and being secured to the inner surface of said casing and wherein said lining includes a foot panel and an upstanding ankle retainer with said angle retainer including a forwardly open channel into which is received the ankle of a person, as the person's foot is received on the foot panel.

2. The foot protector defined in claim 1 including flexible retaining means for retaining the foot of a patient in place in said lining.

3. The foot protector defined in claim 1 wherein said lining is provided with a pair of channels which receive the back leg portion, ankle, and heel of a person.

4. The structure defined in claim 1 wherein said casing is formed of relatively rigid plastic and said lining is formed of foamed polyurethane adhered to said plastic.

5. The foot protector defined in claim 1 including a support member connected to said casing for supporting said casing in an angularly disposed condition.

6. The foot protector defined in claim 1 wherein said casing defines a back and a base joined along a common transverse edge and including a support member mounted on said base, said support member protruding outwardly of said common edge.

7. In a foot protector comprising a padded foot receiving means and a support member, said foot receiving means including a foot receiving portion and an ankle receiving portion and wherein said support member is connected to said foot protector in such a manner as to position a supported foot in a correct angularly disposed condition, said support member is pivotally mounted on said foot protector and includes means for securing said support member in various angular positions with respect to said foot protector.

8. The foot protector defined in claim 4 wherein said support member protrudes sidewise beyond one side of said foot protector and terminates inwardly of said foot protector on the opposite side, said support member being rectangular and having opposed sides for selective engagement with the bed, said support member being so dimensioned that when the selected of said sides engages said bed it is outwardly of said foot protector.

9. In a foot protector as described in claim 7 wherein said foot protector includes retaining means for retaining the foot of a patient in place on said foot receiving means.

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7

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ADELE M. EAGER, Primary Examiner

U.S. Cl. X.R.

128—166; 5—327

Notice of Adverse Decision in Interference

In Interference No. 97,636 involving Patent No. 3,511,233, E. Holy, Jr.,
FOOT PROTECTOR, final judgment adverse to the patentee was rendered
May 24, 1972, as to claims 1, 2 and 4.

[Official Gazette July 4, 1972.]