United States Patent [19]

Oliverius

[11] **3,803,645**

[45] **Apr. 16, 1974**

[54] **INFLATABLE FOOT SUPPORT DEVICE**

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[22] Filed: **June 12, 1972**

[21] Appl. No.: **262,129**

[52] **U.S. Cl.** **5/327,** 297/437, 5/319

[51] **Int. Cl.** **A47c 21/00**

[58] **Field of Search** 5/319, 327, 348; 297/437, 297/423, 438

[56] **References Cited**

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[57] **ABSTRACT**

An inflatable foot support device for use on hospital beds and engageable by feet of a supine person in the hospital bed to substantially restrict internal and external rotation of the feet and to prevent toe and foot drop includes a plurality of walls joined together to form a closed and inflatable chamber having a valve in one of the chamber walls to permit communication of air into the chamber to inflate same and a pair of fastening members extending from the chamber and adapted to be removably secured to respective opposite sides of a hospital bed.

3 Claims, 11 Drawing Figures

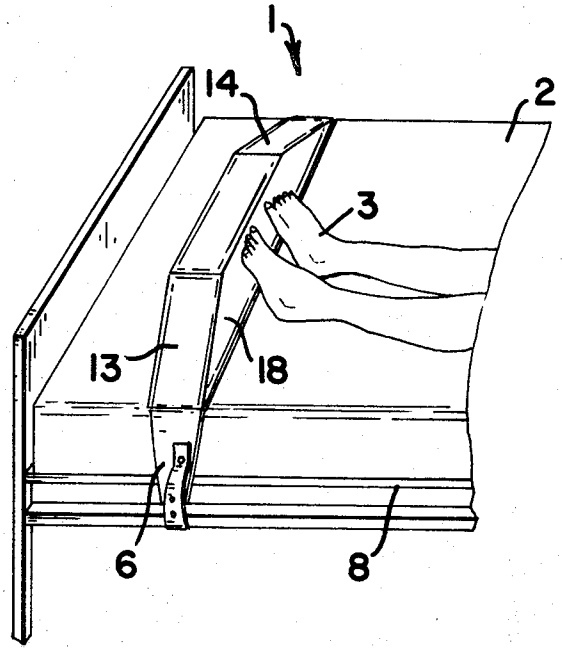


Fig. 1.

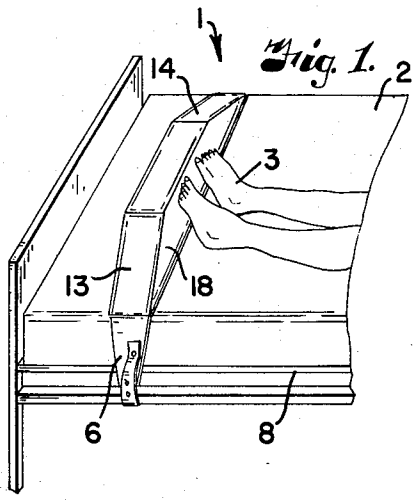


Fig. 5.

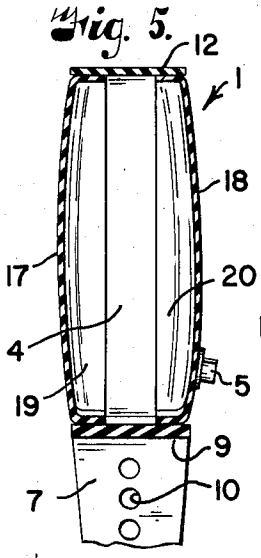


Fig. 4.

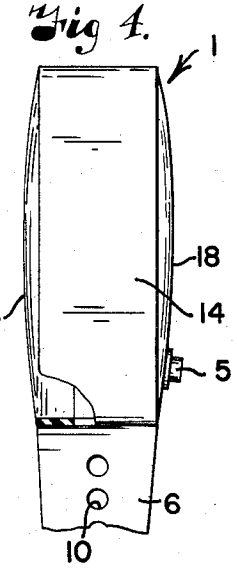


Fig. 2.

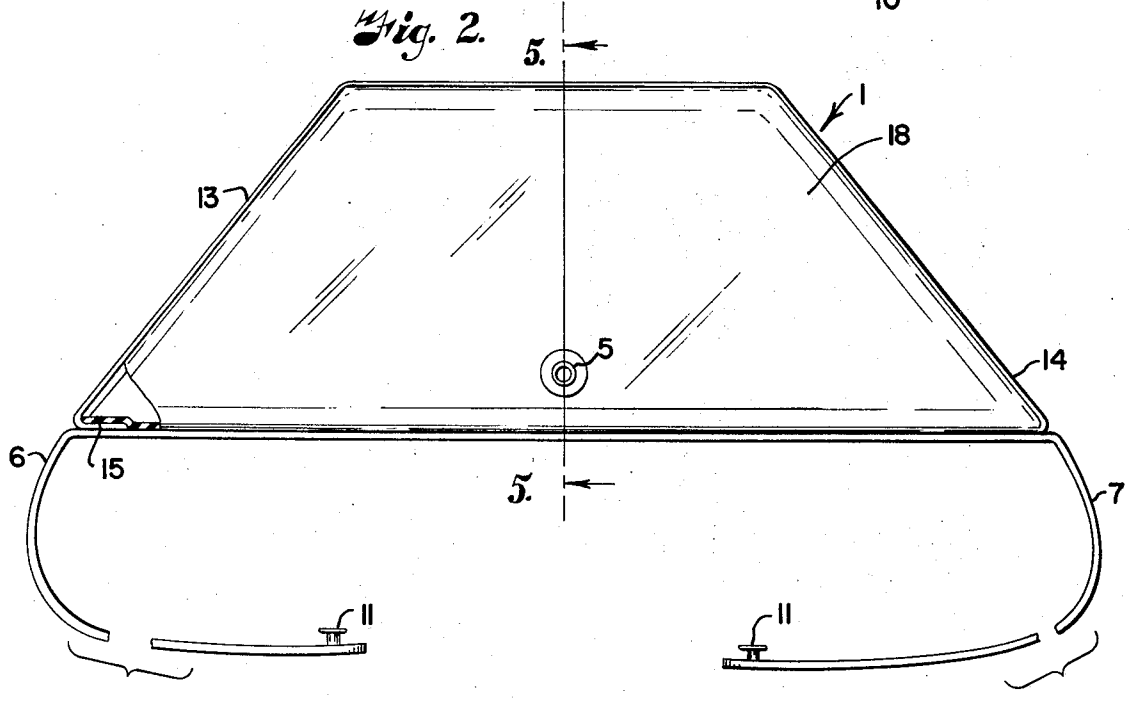


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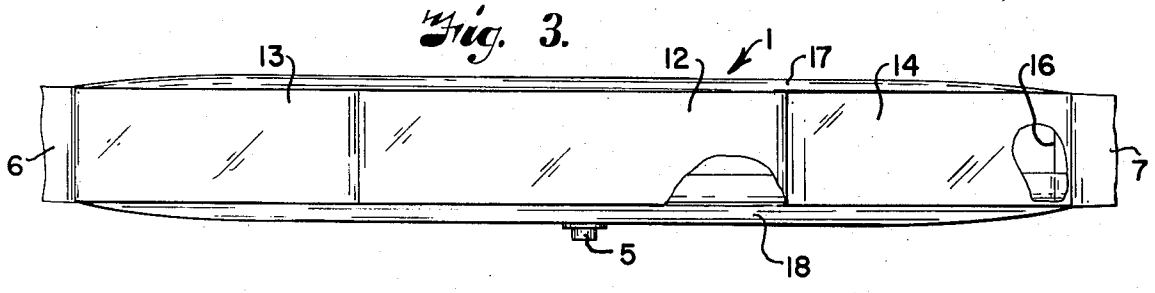


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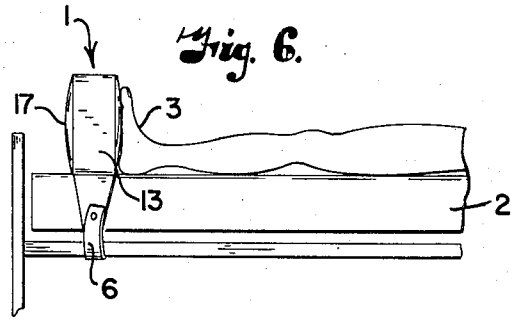


Fig. 11.

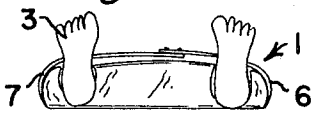


Fig. 7.

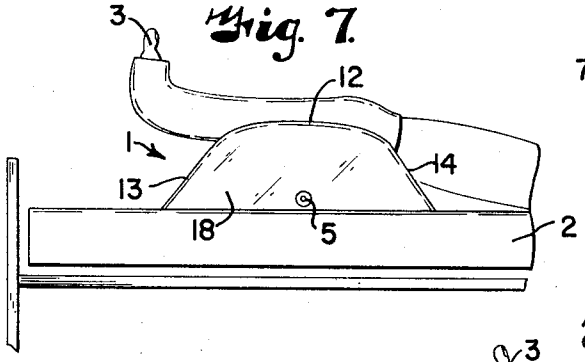


Fig. 8.

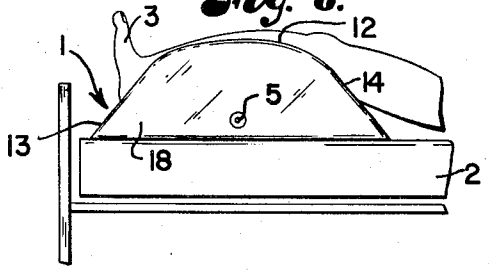


Fig. 10.

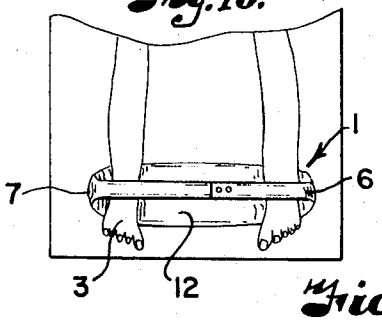
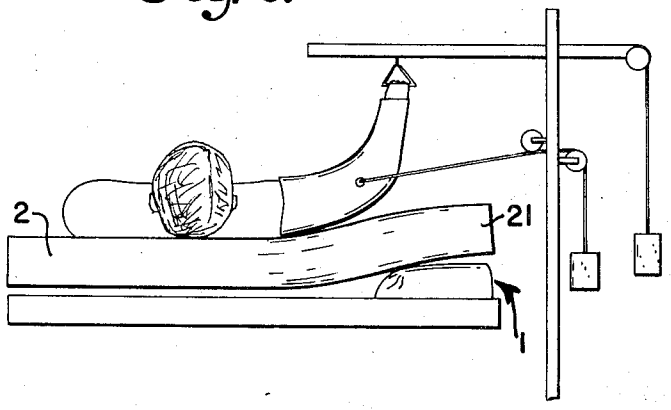


Fig. 9.



INFLATABLE FOOT SUPPORT DEVICE

The present invention relates to foot support devices for use on hospital beds and more particularly to an inflatable foot support device engageable by feet of a supine person to subtantially restrict internal and external rotation of the feet and to help prevent toe and foot drop.

The principal objects of the present invention are: to provide an inflatable foot support device which is easily installed in a selected position on a hospital bed by one person and which may be used on the bed with side rails thereof in the up position; to provide such an inflatable foot support device which has a curvature when inflated that is substantially similar to a shape of the bottom of feet; to provide such an inflatable foot support device for use with any standard hospital bed and which is easily adjustable longitudinally of the bed to accommodate short or tall patients; to provide such an inflatable foot support device having a height sufficient to keep sheets and blankets off of or out of contact with patients' feet and toes and sensitive skin thereof; to provide such an inflatable foot support device which is adapted to substantially resist internal and external foot rotation and to help prevent toe and foot drop; to provide such a foot support device extending substantially the full width of a hospital bed; to provide such an inflatable foot support device adapted to maintain feet substantially normal or at an angle of ninety degrees with the leg and particularly the tibia and fibula thereof and to substantially eliminate toe drop and nerve atrophy and the complications associated therewith; to provide such an inflatable foot support device which is easily washed and maintained in a sanitary condition but which is economical whereby the foot support device may be disposable; to provide such an inflatable foot support device which is adapted to be easily packaged or stored in a relatively small space; to provide such an inflatable support device which is adapted to elevate limbs with or without a cast thereon; to provide such a support device adapted to provide lateral countertraction when placed under a mattress of a patient under traction; and to provide such an inflatable support device which is economical to manufacture, durable in construction, positive and versatile in use, easily cleaned, disposable if desired, and particularly well adapted for the proposed use.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example certain embodiments of this invention.

The drawings constitute a part of this specification and include an exemplary embodiment of the present invention and illustrate various objects and features of the inflatable foot support device.

FIG. 1 is a perspective view of an inflatable foot support device embodying features of the present invention and shown in position on a hospital bed.

FIG. 2 is an enlarged side elevational view of the inflatable foot support device with portions broken away to show construction details.

FIG. 3 is an enlarged top plan view of the inflatable foot support device with portions broken away to show construction details.

FIG. 4 is an enlarged elevational view of one end of the inflatable foot support device with portions broken away to show construction details.

FIG. 5 is an enlarged transverse sectional view taken on line 5—5, FIG. 2.

FIG. 6 is an elevational view of the other end of the foot support device and shown in position on a hospital bed with feet of a supine person in engagement therewith.

FIG. 7 is a side elevational view of the foot support device in position to provide support for a leg cast.

FIG. 8 is a side elevational view of the foot support device in position to provide support for a leg of a supine person.

FIG. 9 is an end elevational view of the foot support device in position under a mattress to provide lateral countertraction for a patient on the hospital bed and under traction.

FIG. 10 is a top plan view showing the foot support device in use as an abduction support.

FIG. 11 is a side elevational view showing the foot support device securing feet in position.

Referring more in detail to the drawings:

As required detailed embodiments of the present invention are disclosed herein, however, it is to be understood that the disclosed embodiments are merely exemplary of the invention which may be embodied in various forms. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriate detailed structure.

In the disclosed embodiment of the present invention, the reference numeral **1** generally designates an inflatable foot support device for use on a bed **2** and engageable by feet **3** of a supine person in the bed **2** thereby substantially restricting internal and external rotation of the feet **3** and toe and foot drop. The inflatable foot support device **1** includes a plurality of walls of preferably flexible material joined together to form a closed and substantially air-tight inflatable chamber **4** which will collapse to substantially flat condition for shipping and storage. The device has a valve **5** in one of the chamber walls to permit communication of air into the chamber **4** thereby inflating same. A pair of fastening devices **6** and **7** extend from opposed portions of the chamber **4** and are adapted to be removably secured to a respective opposite side of a frame **8** of the hospital bed **2**.

In the illustrated structure, the chamber **4** has a bottom wall **9** which is a generally planar elongated member with the fastening devices in the form of straps **6** and **7** being integral with and extending from opposite ends of the bottom wall **9**. The straps **6** and **7** are adapted to secure the device **1** to the bed **2** and each have a plurality of longitudinally spaced apertures **10** therein and a suitable fastening member **11** thereon which is adapted to be received in a selected one of the respective apertures **10**, after the strap extends around the respective side frame members of the frame **8** of the hospital bed **2**.

The walls defining the chamber **4** include a top wall **12** positioned above and in substantial lateral alignment with the bottom wall **9**. End walls **13** and **14** are integral with and extend from opposite ends of the top wall **12** and the end walls **13** and **14** have end portions **15** and **16** respectively which are suitably secured to the bottom wall **9** adjacent respective opposite ends

thereof, as by a suitable adhesive, heat sealing or the like.

Laterally spaced side walls **17** and **18** are positioned adjacent respective opposite lateral edges of the bottom wall **9**, top wall **12**, and end walls **13** and **14** to thereby define the closed chamber **4**. The side walls **17** and **18** have peripheral edge flange portions **19** and **20** respectively which extend substantially normal to the side walls **17** and **18** and are suitably secured to the bottom wall **9**, top wall **12**, and end walls **13** and **14**, as by a suitable adhesive heat sealing, or the like to thereby form a closed air tight chamber which is inflatable.

It is desirable that the foot support device **1** be a substantially narrow and elongated structure which is stable in use with the structure having a length substantially equal to the width of a mattress used on a standard hospital bed **2**. Therefore, the bottom wall **9** has a length substantially greater than a length of the top wall **12** and the end walls **13** and **14** are each inclined upwardly and inwardly from a respective end of the bottom wall **9** and to a respective end of the top wall **12**. The end wall **13** and **14** are thereby arranged to define respective acute angles between the end walls **13** and **14** and the bottom wall **9** and between the end walls **13** and **14** and the top wall **12**.

The width of the bottom wall **9**, top wall **12**, and end walls **13** and **14** is substantially less than the respective length thereof whereby the spacing between the side walls **17** and **18** is substantially less than the length of the top wall **12** so that the chamber **4** is an elongated structure. A width in the nature of 4 to 6 inches has been found to provide a stable structure.

The device **1** preferably has a height greater than the length of the feet **3**, such as in the nature of 12 to 15 inches, to thereby maintain sheets and blankets off of or out of contact with patient's feet and toes and sensitive skin thereof.

It is preferred that the bottom wall **9** and the straps **7** and **8** extending therefrom be a one-piece member and have a thickness substantially greater than a thickness of the other walls of the chamber **4** whereby the bottom wall **9** defines a base for the support device **1** and substantially resists deformation thereof when the device is inflated.

The side walls **17** and **18** preferably extend bulge or curve outwardly when the device **1** is inflated which is substantially similar to a shape of the bottom of the feet to thereby resist internal and external rotation of the feet **3** of a patient in the hospital bed **2**. The side walls **17** and **18** are also adapted to maintain the feet **3** of the patient substantially normal or perpendicular to the legs thereof, such as at an angle of approximately 90° with the tibia and fibula of the respective legs thereby substantially eliminating toe or foot drop and nerve atrophy which require substantial therapy and rehabilitation to correct.

The valve **5** is preferably positioned to be out of engagement with the feet **3** and legs of the patient, therefore, the valve **5** is mounted in one of the side walls, for example, side wall **18**, and the valve **5** may be any suitable member which is adapted to permit communication of air into the chamber **4** to inflate same.

The walls and straps of the foot support device **1** may be formed of any suitable material to form an air tight chamber, however, it is preferable that synthetic resin such as vinyl, or like material be used whereby the foot support device **1** may be easily cleaned and maintained in a sanitary condition. Vinyl has been found to be satisfactory and thicknesses in the nature of 0.010 to 0.015 inches have been found to be satisfactory for the top wall **12**, end walls **13** and **14**, and side walls **17** and **18** and thicknesses in the nature of 0.020 to 0.030 inches have been found to be satisfactory for the bottom wall **9**.

In using a foot support device constructed as illustrated and described, the chamber **4** is inflated to the desired pressure by means of communicating air through the valve **5** into the chamber **4**. The inflated device **1** is placed in the desired position longitudinally of the hospital bed **2** and the straps **6** and **7** extend around respective sides of the frame **8** of the hospital bed **2** and the fastening members **11** on the straps **6** and **7** are inserted into selected apertures **10** in the straps **6** and **7** to secure the foot support device in the selected position on the hospital bed **2** whereby engagement of the feet **3** with one of the side walls **17** and **18** will substantially resist internal and external rotation of the feeet **3** and substantially prevent foot and toe drop.

The foot support device **1** may be turned longitudinally of the bed **2**, as illustrated in FIGS. **7** and **8**, to thereby provide support for the limbs or legs of a patient in the hospital bed **2** with or without a cast on the respective leg. The top wall **12** is preferably centered under the knee of the respective leg to be supported.

The foot support device **1** is a particularly versatile structure and is adapted to be used to provide countertraction for a patient under traction, as by being inflated and positioned on one of the side walls and under a mattress **21** adjacent the edge of the hospital bed **2** toward which the traction is applied to thereby resist movement of the patient toward said edge which would reduce the effectiveness of the traction.

The foot support device **1** is also adapted to be used as an abduction support, as best seen in FIGS. **10** and **11**. After total hip replacement surgery, it is desirable to hold the legs of the patient apart and support same in a slightly elevated position. When used as an abudction support, the foot support device **1** is only partially inflated and placed under the legs of the patient and with the legs in engagement with respective end walls **13** and **14** whereby V-shaped pockets or recesses are formed by the weight of the respective legs on the end walls **13** and **14**. The straps **6** and **7** are then moved around the legs of the patient and are suitably secured together, as by the fastening member **11** on one of the straps **6** and **7** being inserted into a selected one of the apertures **10** in the other of straps **6** and **7** thereby holding the device **1** in position and holding the legs of the patient in the desired position.

It is to be understood that while I have illustrated and described one form of my invention, it is not to be limited to the specific form or arrangement of parts herein described and shown.

What I claim to secure by Letters Patent is:

1. An inflatable foot support device comprising:

a. a plurality of walls joined together to form a closed chamber having one generally upright wall thereof engageable by feet of a supine person;

b. said chamber has laterally spaced side walls and vertically spaced top and bottom walls each having opposite ends and spaced end walls extending be-

tween said side walls and respective ends of said top and bottom walls;

c. means on one of said chamber walls to permit communication of air into said chamber to inflate same;

d. means connected to and extending from said chamber walls for removably securing said chamber in a selected position on a bed;

e. said means for securing said chamber in a selected position on a bed comprises a strap for each end of said bottom wall and extending outwardly therefrom with each of said straps having a fastening member thereon;

f. said bottom wall and said straps are a one piece member;

g. said top wall and said end walls are a one piece member;

h. said end walls each have an end portion secured to said bottom wall; and

i. said side walls each have a peripheral edge flange having respective portions thereof secured to said bottom wall and to said top wall and to said end walls to thereby define the closed chamber.

2. An inflatable foot support device comprising:

a. a plurality of flexible walls joined together to form a closed chamber having one wall thereof engageable by feet of a supine person, said chamber being inflatable and substantially air tight;

b. valve means on one of said chamber walls to permit communication of air into said chamber to inflate same;

c. a pair of opposed straps extending from said chamber, said straps each being engageable with a respective portion of a bed frame;

d. means on each of said straps for removably securing same in engagement with the respective portion of the bed frame;

e. said chamber has laterally spaced side walls and vertically spaced top and bottom walls each having opposite ends and spaced end walls extending between said side walls and respective ends of said top and bottom walls;

f. said pair of straps are arranged with a respective one of said straps extending from each of the opposite ends of said bottom wall;

g. each of said straps has a plurality of longitudinally spaced apertures therein and a fastening member thereon to be received in a selected one of said respective apertures;

h. said bottom wall has a length substantially greater than a length of said top wall;

i. said top and bottom walls and said end walls each have a length substantially greater than a width thereof;

j. said end walls are each arranged to define an acute angle between each of said respective end walls and said bottom wall and an acute angle between each of said respective end walls and said top wall;

k. said bottom wall and said pair of straps are a one piece member;

l. said bottom wall and said pair of straps have a thickness greater than a thickness of the other walls of the plurality of walls of said chamber;

m. said top wall and said end walls are a one piece member;

n. said end walls each have an end portion extending therefrom and secured to said bottom wall at respective opposite ends of said bottom wall; and

o. said side walls each have peripheral edge flange portions secured to said bottom wall and to said top wall and to said end walls respectively to thereby define the closed chamber.

3. An inflatable foot support device for use on a mattress of a bed comprising:

a. a foot support member having a bottom wall, top wall, spaced side walls and spaced end walls joined together to form a closed inflatable chamber, said top, side and end walls being flexible and the bottom wall having a thickness substantially thicker than the spaced walls to resist deformation thereof on inflation of said support member, said foot support member having a length substantially the same as the width of a bed and adapted to rest on a bed mattress;

b. means on said foot support member for selective communication of air with the chamber interior for inflating the foot support member and supporting the walls in extended position;

c. said foot support member having a generally upright wall thereof for engagement by a foot of subline person on said bed;

d. strap means connected to and extending from each end of said chamber bottom wall, with each strap having a fastening member thereon for removably securing said foot support member in a selected transverse position along the length of a bed mattress.

* * * * *