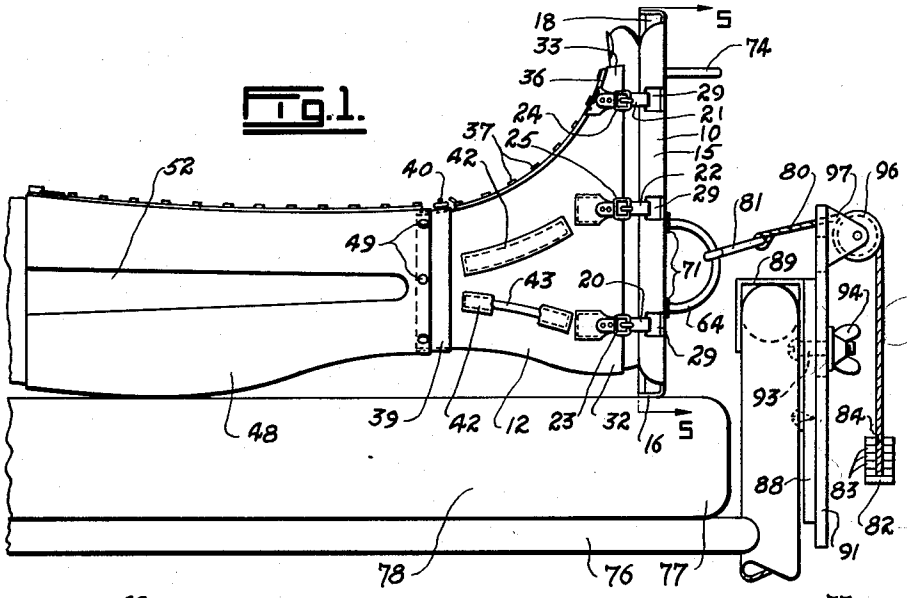
Dec. 7, 1954 H. P. FALLS 2,696,208

SURGICAL TRACTION BOOT

Filed Feb. 4, 1952

Fig. 1.



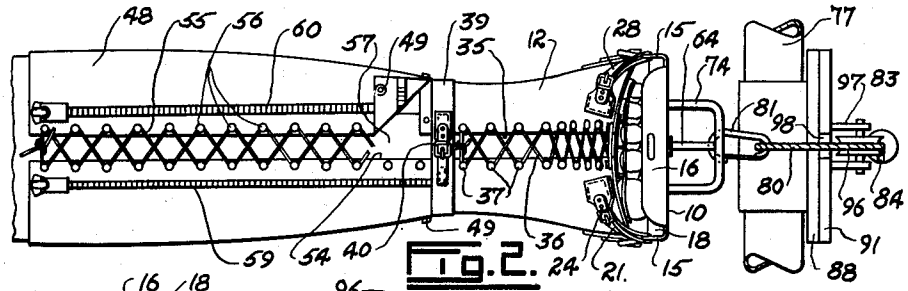


Fig. 2.

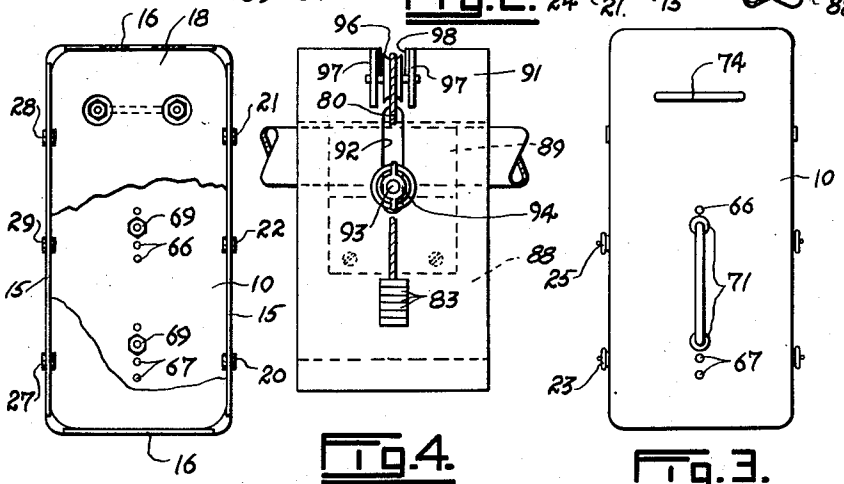


Fig. 4.

Fig. 3.

Fig. 5.

INVENTOR
HERBERT PITMAN FALLS
BY
Fetherstonhaugh & Co.
ATTORNEYS

United States Patent Office 2,696,208 Patented Dec. 7, 1954

2,696,208

SURGICAL TRACTION BOOT

Herbert Pitman Falls, Vancouver, British Columbia, Canada

Application February 4, 1952, Serial No. 269,778

7 Claims. (Cl. 128—84)

This invention relates to a surgical boot.

For broken bones or other conditions, it is sometimes necessary for patients to lie in bed with a weight pulling on a foot in a horizontal direction. The weights required for different positions vary, but a great many times it is not possible to apply as much weight as desired since the foot bones break down or the patient is otherwise unable to stand it. In spite of any attempts to solve this problem, the weights are usually applied to the feet and legs by means of adhesive tape in order to distribute the weight over as large an area of the limb as possible. If the adhesive tape is left on for any length of time, it creates skin difficulties.

The main object of this invention is the provision of a surgical boot by means of which a weight may be applied to a foot without the necessity of using adhesive tape or bandages.

Another object is the provision of a surgical boot capable of applying most of a weight or pull to a point above the ankle on the leg without under pressure on the instep.

A further object is the provision of a surgical boot of the type described which may be easily disconnected from the weight so that the patient may move around without having to remove the boot, and which may be easily put on and taken off regardless of whether the foot is bandaged or not.

Yet another object is the provision of a surgical boot to be connected to a weight including means for shifting the pull of the weight in relation to the foot.

A still further object is the provision of a surgical boot to be connected to a weight which will allow the foot to be moved to different positions while the required tension in the proper direction is maintained thereon, and which will keep the heel of the foot away from the bed when the patient is lying on his back.

The surgical boot according to this invention includes a rigid sole plate and an anklet to be secured to a foot in any convenient manner. This anklet is fastened to the foot plate and it is preferable that these fastenings be adjustable. Means is provided on the side of the plate opposite the anklet to which a weighted cable may be attached. In order to ensure the pull being in the right direction relative to the foot and leg, this means may be a curved bracket secured to the plate, the curve of which extends longitudinally of the latter. The anklet may be used alone or it may be formed with or have connected thereto a leg sheath to be applied to a leg. The anklet applies most of the pull of the cable to the leg, and if the sheath is used, it distributes the pull throughout the leg. The anklet, boot and sheath may be provided with suitable lacings to adjust them to feet and legs of different sizes. If desired, one or more zippers may be used in either or both the anklet and sheath for quick and easy application and removal of them, and an elastic insert may be provided in the sheath to make it form fitting.

An example of this invention is illustrated in the accompanying drawings, in which

Figure 1 is a side elevation of the surgical boot on a foot, said figure also including a portion of the lower end of a bed with apparatus mounted on said end over which a weighted cable connected to the boot extends,

Figure 2 is a plan view of the boot when in use,

Figure 3 is an elevation of the bottom of the boot,

Figure 4 is an end elevation of the apparatus over which the weight cable extends, and

Figure 5 is a section taken on the line 5—5 of Figure 1.

Referring to the drawings, **10** is a rigid sole plate which may be made approximately the size of a large human foot, although it is preferable to make it larger than any foot with which it may be used, as shown in Figure 1. This plate may be rectangular in shape. An anklet **12** to be secured to a foot is fastened to the plate in any suitable manner. In this example, the side and end edges of the plate are bent outwardly therefrom to form side flanges **15** and end flanges **16** which, in effect, constitute substantially a continuous peripheral flange around the plate. A cushion pad **18** may be placed on the plate within its flange. It has been found highly desirable to fasten the anklet to the plate at points adjacent the opposite ends thereof and substantially midway therebetween on opposite sides of the anklet. This may be accomplished by adjustable straps **20** and **21** connected to the anklet adjacent the opposite ends thereof and an adjustable strap **22** connected to the anklet substantially midway between the other straps. Straps **20**, **21** and **22** have buckles **23**, **24** and **25**, respectively, secured to them adjacent the anklet. These straps are on one side of the anklet, and similar adjustable straps **27**, **28** and **29** with buckles are secured to the opposite side of the anklet. Straps **20**, **22**, **27** and **29** are in line with the outer end of the anklet. Each of these straps may extend through an opening **29** in the plate flange and is adjustably secured to itself by means of its buckle, see Figure 1. It will be noted that the heel portion **32** and toe portion **33** of the anklet are spaced from the adjacent ends of the sole plate.

The anklet may be secured to a foot in any desired manner. However, in order that it may be adjusted to fit feet of different sizes, it is preferable to split the anklet longitudinally, as at **35**, see Figure 2, and to secure the adjacent sides of the split together by means of lacing **36** which may extend through eyelets in the anklet or, as shown, around hooks **37** on opposite sides of the split. A tongue **38** may be provided beneath the lacing. If desired, a strap **39** may be secured to and extend around the outer end of the anklet, the ends of said straps being adjustably secured together by means of a buckle arrangement **40** or other means. Furthermore, one or more elongated pockets **42** may be provided on the anklet in which stiffening stays **43** may be inserted.

The anklet **12** may have a leg sheath formed with or secured thereto. In this example, a leg sheath **48** is removably secured to the outer end of the anklet by means of dome fasteners **49** or other suitable means. This sheath is shaped to fit a leg from the knee down, and preferably has an elastic insert **52** extending substantially from end to end thereof in order to ensure a close fit around the leg upon which it is placed.

This sheath may be adjusted to fit legs of different sizes and it may have means by which it may be quickly and easily applied to or removed from a leg. This may be accomplished by splitting the sheath longitudinally, as at **54**, see Figure 2. The opposite sides of this split may be secured together by suitable lacing **55** extending through eyelets or, as shown, around hooks **56** secured to the sheath on opposite sides of the split. A tongue **57** is provided beneath the lacing. As it would take considerable time to do up or undo the lacing if the sheather were removed frequently, an additional longitudinal split may be formed therein to be held together by means of a zipper **59**. As it may be difficult to close up the zipper **59**, it may be desirable to make a third split extending longitudinally of the sheath on the opposite side of the lacing to be closed by a zipper **60**.

The whole purpose of this surgical boot is to enable a weight to be applied to a foot and leg in order to exert a pull in a substantially horizontal direction when the patient is lying on a bed. Suitable means is provided on the side of the sole plate **10** opposite the anklet for securing a weighted cable to the plate. This is preferably done by means of a curved bracket **64** secured to the bottom of the plate and spaced from the edges thereof, the curve of this bracket extending longitudinally of the plate. This bracket is preferably substantially U-shaped, as shown in Figure 1. It is desirable to be able to shift the bracket to different positions longitudinally of the plate. For this purpose, a plurality of sets of

holes 66 and 67 are formed in the plate substantially midway between the opposite side edges thereof, see Figure 5. The ends of the bracket 64 extend through any set of holes 66 and 67 and have nuts 69 threaded on said ends on the opposite side of the plate to the main portion of the bracket. Shoulders 71 may be provided on the bracket to bear against the outer face of the plate when the nuts are tightened. If desired, another bracket 74 may be connected to the sole plate and extend transversely thereof at a point spaced from the longitudinal bracket. Both of these brackets extend outwardly from the plate the same distance, as clearly shown in Figures 1 and 2.

As previously stated, the purpose of this surgical boot is to enable a weighted cable to exert a longitudinal pull on the foot and leg of a patient. It is customary to secure a weight to one end of a cable which extends over a pulley or roller at the end of the bed, the opposite end of said cable being fastened to the foot.

In Figure 1, 76 represents a bed having a foot end 77 and a mattress 78. A cable 80 is provided at one end with suitable means for removably connecting it to the curved bracket 64, such as a snap 81, while the opposite end of the cable has secured thereto a disc 82 upon which one or more weights 83 may be mounted, each weight having a slot 84 through which the cable extends. This cable extends over suitable apparatus connected to the foot end of the bed.

A base 88 is provided with a bracket 89 adapted to fit over the top of the bed end 77, see Figure 1. A plate 91 is slidably and adjustably secured to the base. In this example, the plate is formed with an elongated slot 92 through which a bolt 93 freely extends from the base and upon which a winged nut 94 is threaded. A pulley 96 is mounted in lugs 97 at the top edge of the plate in line with a recess 98 formed in said edge.

When the cable 80 is connected to the bracket 64 of the surgical boot, it extends through the recess 98 of the plate 91 and over pulley 96. The plate may be raised and lowered to regulate the direction of the pull of the cable on the foot.

In use, the foot is laced in the anklet 12 while resting on the pad 33 of the sole plate 10. The straps 20, 21, 22, 27, 28 and 29 may be adjusted to accommodate the foot within the anklet. If the leg sheath 48 is used, it is laced on the leg tight enough comfortably to fit around the latter, and the elastic insert 52 ensures a proper fitting of the sheath around the calf of the leg. When the patient is laid on the bed, the cable 80 having the required number of weights 83 thereon is drawn over pulley 96 and connected by the snap 81 to the curved longitudinal bracket 64 of the sole plate.

By referring to Figure 1, it will be seen that regardless of the setting of the plate 91, the pull of the cable does not tend to tip the plate owing to the bracket 64. The straps 20, 22, 27 and 29 apply most of the pull to the leg beyond the ankle of the foot. Strap 39 assures this when the anklet is used alone, and said strap along with the leg sheath distribute the pull throughout the leg when said sheath is used. With this arrangement, no one part of the leg or foot is subjected to any excessive pressure. Straps 21 and 28 mainly serve to position the anklet relative to the sole plate. The pad 33 fits the curves of the bottom of the foot so that the latter is quite comfortable in the boot. The patient can turn his foot to have either side or end of the sole plate resting on the mattress without changing the direction of the pull of the cable. In other words, said pull is always in substantially the same plane as the patient's leg. It will be noted that the plate retains the heel above the bed mattress. This eliminates pressure at the heel which is one of the difficulties experienced prior to the discovery of this surgical boot. As the edges of the plate are turned up, the wear of the bed sheets is reduced to a minimum.

Should the patient desire to walk around, it is only necessary to disconnect the weighted cable. The brackets 64 and 74 maintain the sole plate in a substantially horizontal plane when they are resting on the floor. The boot may be quickly removed merely by opening the zippers 59 and 60, undoing the strap 39, and unlacing the anklet. If desired, a zipper may be provided in the anklet similar to the zippers in the leg sheath. If it is necessary to bandage the foot or anklet, the ankle straps and lacing may be adjusted to fit over the bandage.

An important feature of the invention lies in the fact that the bracket 64, the sole plate and the anklet apply the principal pull to the leg beyond the ankle. This enables a greater weight than usual to be applied to the cable without danger of the foot bones breaking down or being dislocated. If it is desired to change the pull relative to the foot, it is only necessary to move the bracket 64 longitudinally of the plate and/or to adjust the anklet straps in order to do this.

What I claim as my invention is:

1. A surgical boot comprising a rigid sole plate larger than a human foot, an anklet for covering a foot from above the ankle to the bottom thereof, means adjustably connecting the anklet to both side edges of the plate, said anklet being open at the bottom to permit the bottom of a foot therein to bear against the plate, a strap around the top of the anklet, means for adjustably securing the ends of the strap together around the leg of a foot in the anklet above the ankle thereof, and means secured to the face of the plate remote from the anklet spaced from the edges thereof to which a weighted cable may be attached.

2. A surgical boot as claimed in claim 1 in which the means for adjustably connecting the anklet to the plate sides comprises a plurality of spaced adjustable straps connecting each side of the anklet to the adjacent side of the plate.

3. A surgical boot as claimed in claim 1 in which the anklet is split from top to bottom thereof and the adjacent sides of the split are expansibly secured together by lacing.

4. A surgical boot as claimed in claim 1 including a plurality of spaced elongated pockets on the outer surface of the anklet extending between the top and bottom thereof, and stiffening stays in said pockets.

5. A surgical boot comprising a rigid sole plate, an anklet to be secured to a foot fastened to the plate on one side thereof, a curved substantially U-shaped bracket secured to the opposite side of the plate midway between the side edges thereof and extending a short distance longitudinally of the plate, said bracket being spaced from one end of the plate in line with the top of the anklet, and a loop slidably mounted on the bracket to be connected to a weighted cable, said loop being free to slide around the curve of the bracket from end to end thereof.

6. A surgical boot comprising a rigid sole plate, an anklet to be secured to a foot fastened to the plate on one side thereof, a plurality of sets of holes in the plate substantially midway between its side edges and extending in line longitudinally thereof, a curved substantially U-shaped bracket on the side of the plate remote from the anklet and having its free ends fitting in a set of holes, means for removably securing the bracket in any set of holes, said bracket always being spaced from one end of the plate in line with the top of the anklet, and means for slidably connecting an end of a weighted cable to the bracket.

7. A surgical boot comprising a rigid sole plate, an anklet to be secured to a foot fastened to the plate on one side thereof, a curved substantially U-shaped bracket secured to the opposite side of the plate midway between the side edges thereof and extending a short distance longitudinally of the plate, said bracket being spaced from one end of the plate in line with the top of the anklet, means on the bracket for slidably connecting an end of a weighted cable to the bracket, and another substantially U-shaped bracket connected to the plate and extending transversely thereof spaced from the longitudinal bracket, both of said brackets extending outwardly from the plate the same distance, and the bottom of the U of the transverse bracket being flat to provide lateral stability when the surgical boot is walked on.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
570,085	Clausson	Oct. 27, 1896
932,066	Smith	Aug. 24, 1909
1,904,942	Heigl	Apr. 18, 1933
2,280,025	Bollinger	Apr. 14, 1942
2,319,609	La Crosse	May 18, 1943
2,469,361	Anderson	May 10, 1949