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I. L. MARTIN
TRACTION APPARATUS

2,808,051

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2 Sheets-Sheet 1

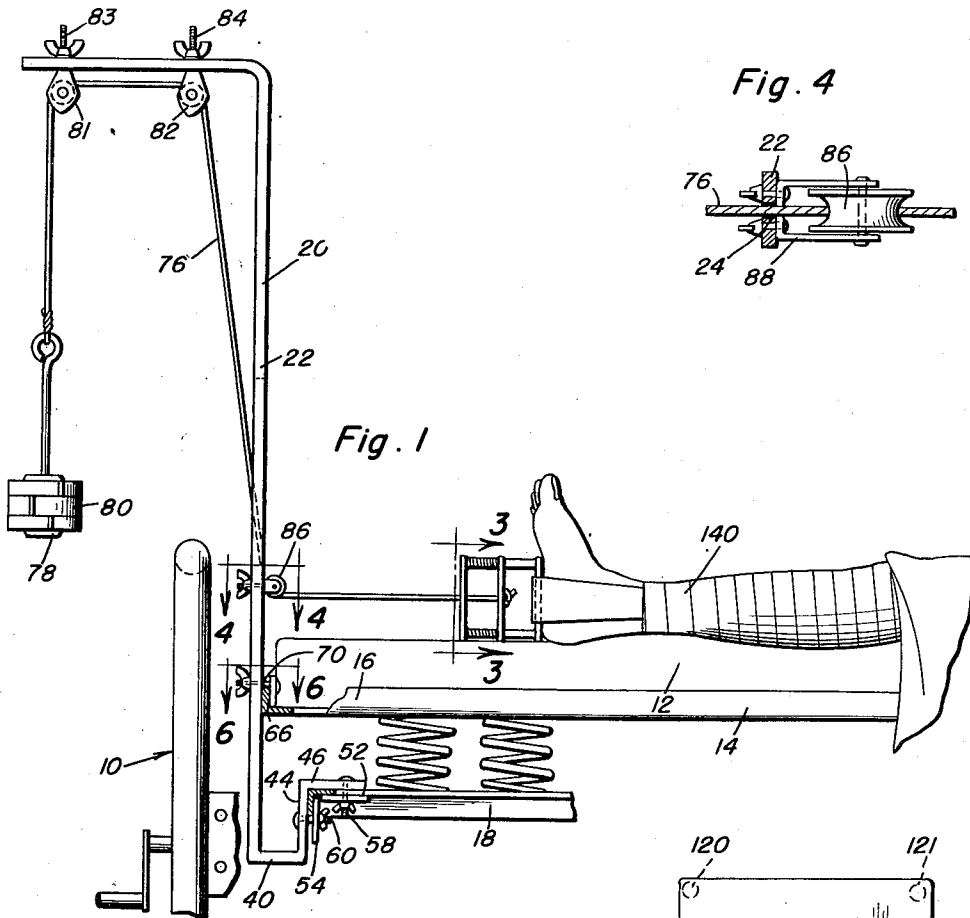


Fig. 4

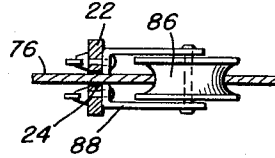
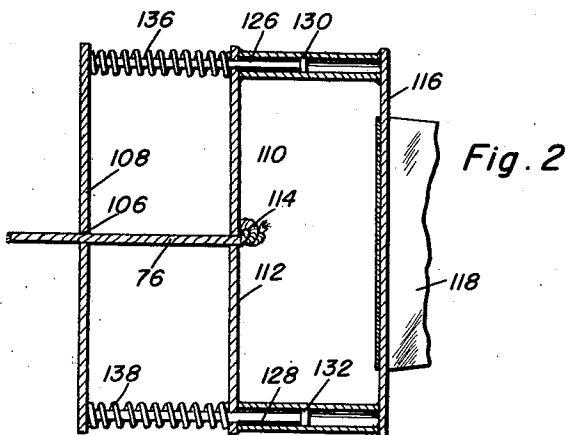
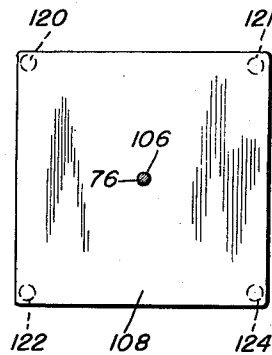


Fig. 3



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2 Sheets-Sheet 2

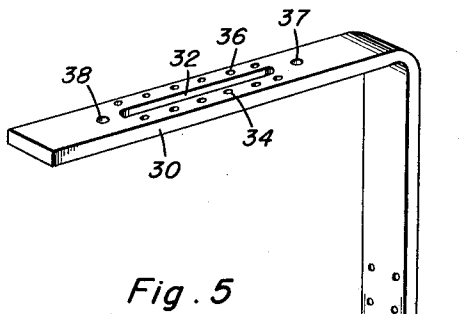


Fig. 5

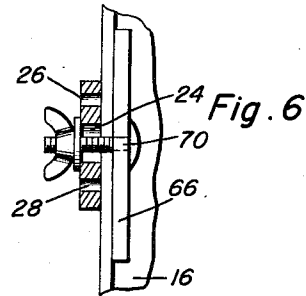


Fig. 6

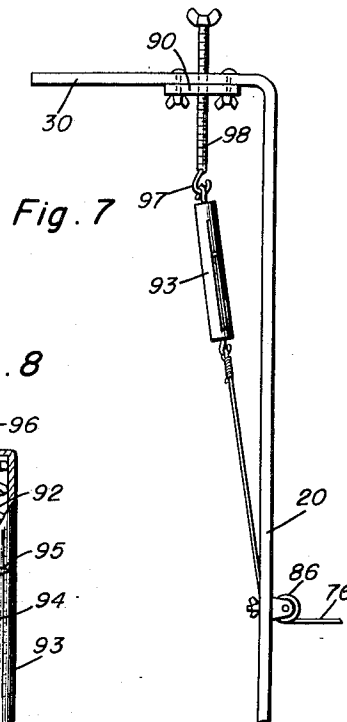


Fig. 7

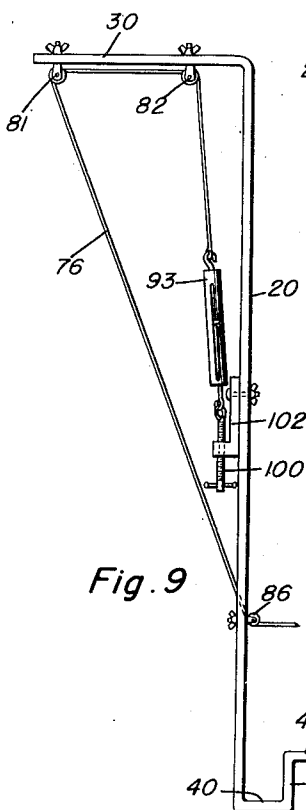
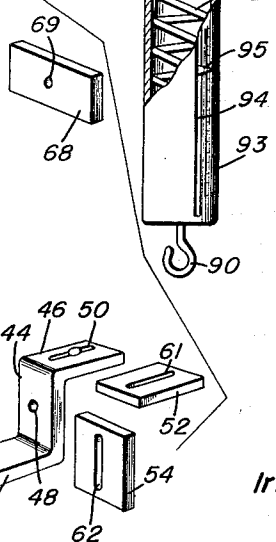


Fig. 9

Fig. 8



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TRACTION APPARATUS

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2 Claims. (Cl. 128—84)

This invention relates to surgical appliances and particularly to traction apparatus for patients requiring traction for the treatment of fractures, dislocations or other disorders.

An object of the present invention is to provide an improved traction apparatus which is useful in the treatment of patients requiring traction, the apparatus maintaining a constant traction force on the patient and maintaining some force should the patient apply pressure to the traction plate or slide in the bed.

When a part of the anatomy is placed in traction, for example the leg of a person, a weight is generally attached to a rope and after extending over pulleys on an upright support, attached to a fitting, such as a traction plate or foot plate beneath the foot of the individual. This plate is secured to a bandage which extends beneath the wrapping on the patient's leg. Should the patient slide in the bed, the traction plate comes to rest on the foot of the bed or the traction upright support thereby reducing the retractive force on the patient's leg to zero. The same harmful effect is achieved should the patient apply a force on the traction plate in a direction the same as the traction force that is applied by the weight through the rope. Accordingly, a more specific object of the invention is to provide an improved traction plate assembly that has a spring loaded stop at one end so that when the patient slides down in the bed, the spring loaded stop comes to rest on the upright support thereby preventing the complete loss of traction.

A further object of the invention is to improve the means for applying attractive force to the limb of the individual. Ordinarily, weights are used with the doctor or technician applying the proper mass to the pan in order that the correct force be transmitted to the patient's limb. By substituting a definite load measuring device and means for applying a force through the rope, the force may be measured directly and varied in accordance with the needs of the patient as prescribed by the doctor.

Some of the features of the invention are that it may be used for any type of traction, for example leg, arm, neck, etc.

These together with other objects and advantage which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a fragmentary elevational view of a typical hospital bed with a patient in the bed, the patient's leg being held in traction by one form of the invention;

Figure 2 is a longitudinal sectional view of the traction plate and means on the plate for preventing complete loss of traction upon striking the upright support of the appliance for the foot of the bed;

Figure 3 is an enlarged transverse sectional view taken on the line 3—3 of Figure 1;

Figure 4 is an enlarged sectional view taken on the line 4—4 of Figure 1;

Figure 5 is an exploded perspective view of a part of the upright support assembly for the traction apparatus; Figure 6 is an enlarged sectional view taken on the line 6—6 of Figure 1;

Figure 7 is a fragmentary elevational view of a modified form of the invention;

Figure 8 is an elevational view of a yieldable device which is used to measure the tension in the rope that applies a traction force to the patient's limb; and

Figure 9 is an elevational view of a further modification of the traction apparatus.

The bed 10 in Figure 1 is of standard construction and as such it includes a mattress 12, a bed spring 14 on which the mattress is placed, and suitable means supporting the bed spring. The illustrated bed spring 14 includes an upper frame 16 together with a lower frame 18, each frame being of angular section.

A support 20 has means at its lower end for attachment to the bed spring 14 and specifically, to the frames 16 and 18 thereof. The support comprises an upright 22 having a longitudinal slot 24 together with a row of apertures 26 on one side of the slot, and a row of apertures 28 on the other side of the slot. A lateral extension 30 is at the upper end of the support, and this extension is provided with a longitudinal slot 32 on each side of which there is a row of apertures 34 and 36 respectively. Apertures 37 and 38 are in alignment with the longitudinal axis of the slot 32 and are spaced from the ends thereof.

The lower end of the upright support 20 has a lateral extension 40 from which plate 44 extends, this plate having an extension 46 at its upper edge. Aperture 48 is in plate 44, while there is a longitudinal slot 50 in the plate 46. Plates 44 and 46, with plates 52 and 54 form two separate sets of jaws, the jaws 46 and 52 being in engagement with the horizontal flange of frame 18, while jaws 54 and 44 are in engagement with the vertical flange of frame 18. Adjustable fasteners, as bolts 58 and 60 are passed through slots 61 and 62 in jaws 52 and 54 and also through slots 50 and 48 in jaws 46 and 44. Wing nuts or the equivalent are on the bolts 58 and 60 and are used for tightening the jaws on the frame 18. This holds the upright support firmly secured to the bed spring frame 18. Also aiding in this function of supporting the upright support 20 is another pair of jaws 66 formed by a surface of the upright support intermediate the upper and lower ends thereof, together with a plate 68 having an aperture 69 in it accommodating bolt 70 on which there is a wing nut. This bolt passes through aperture 69 and also through the longitudinal slot 24 of the support 20 and is adapted to hold the vertical flange of the frame 16 firmly clamped therebetween.

As shown in Figure 1, there is a rope 76 having a pan 78 at one end on which removable weights 80 are adapted to be placed. This rope extends over pulleys 81 and 82, these pulleys having bolts 83 and 84 extending therefrom which pass through apertures 38 and 37 in the lateral extension 30. When the wing nuts are attached to the bolts 83 and 84, the pulleys 81 and 82 are held firmly fastened in place on the lateral extension 30. The rope 76 extends through longitudinal slot 24 and beneath pulley 86 that is secured to the upright portion of support 20. Pulley 86 includes, in addition to the pulley wheel, a bracket 88 having bolts secured thereto, these bolts being located in selected apertures of the two groups 26 and 28 on opposite sides of slot 24. The location of pulley 86 is determined by the height above the mattress at which the traction force is desired to be applied.

As shown in Figure 7, a modification of the means of applying traction force to the patient is contemplated.

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In this case the rope 76 is entrained under pulley 86 on the upright support 20. However, the end of the rope is secured to a hook 90 which is attached to spring 92, the latter being disposed in casing 93 having a longitudinal slot 94 through which pointer 95 protrudes. The surface of the case may be calibrated in pounds. The upper end of the case 93 has a hook 96 which is connected with a hook 97 on the end of screw 98. The screw is mounted for rotation in a threaded aperture formed in the block 99, the latter being bolted or otherwise secured to the lateral extension 30 with screw 98 passing through aperture 37 or through slot 32. The spring structure described is seen best in Figure 8 and consists of a set of spring scales. In operation adjustment of screw 98 causes a tension force to be applied to the rope 76, this force being measured in the scales directly.

As seen in Figure 9 a further modification is contemplated. Here the pulley arrangement is identical to that of Figure 1, however, the rope 76 is entrained over the outermost pulley 81 first and then over the innermost pulley 82. The scales are attached at the end of the rope, one end of the scales being connected to screw 100. Screw 100 is carried in a threaded passage in bracket 102, the latter being bolted or otherwise secured in place on the support 20 intermediate the upper and lower ends thereof. The operation of this form of the tensile force applying means is the same as that mentioned in connection with the embodiment of Figure 7.

When a patient has a part of his body in traction, there is a distinct tendency for the patient to be pulled or slid in the bed. Sometimes the patient is pulled so far that the foot plate that is customarily used for attaching the rope to the patient, comes to rest upon the lowermost pulley, for example the illustrated pulley 86, the upright support or a part of the bed. This relieves the tension in the rope and of course, destroys the traction on the patient. By utilizing the structure seen best in Figures 2 and 3 this problem is in a large way solved and avoided. Rope 76 is passed through an aperture 106 in plate 108. The rope is attached to intermediate plate 110, as by being passed through an opening 112 in it and knotted as at 114. The traction plate 116 beneath which the bandage 118 extends, is fitted with four sleeves 120, 121, 122 and 124 at the corners thereof. These sleeves are welded or otherwise rigidly fixed in place. They are also welded or otherwise rigidly secured to the intermediate plate 110, this plate having apertures aligned with the bores of the sleeves. Four sliding pins, such as pins 126 and 128 have enlargements 130 and 132 at the ends thereof, these pins and enlargements being slidable in the sleeves and fixed to the plate 108. Four springs, for example springs 136 and 138 are supplied, there being one spring on each rod. This springs seat on plate 108 and intermediate plate 110 and oppose the movement of the plate 108 with respect to the intermediate plate 110 in one direction.

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In application the bandage 118 is fitted under the wrapping 140 of the patient's limb as is customary practice. This bandage extends under traction plate 116 thereby attaching the traction plate assembly to the patient's limb. Then, when tension is applied to the rope 76 the force is transmitted to intermediate plate 110 and through the four sleeves, to the traction plate 116. As the patient is slid in the bed by the tension necessary for placing the patient's limb in traction, instead of having the traction plate 116 come directly to bear against a stationary object, for example upright support 20 or pulley 86, the plate 108 bears against the pulley 86 or upright support 22. However, this plate is capable of yielding due to its spring support, whereby the traction is not completely broken, but rather, is diminished gradually until such time that the springs are completely compressed.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In a traction device which includes an upright support, a traction rope, pulley means on said support guiding said rope, said upright including a slot through which said rope extends, a traction plate, means for securing said traction plate to the patient, a plurality of guides on the traction plate, an intermediate plate opposite the traction plate having said extended rope secured thereto, said guides connecting said intermediate plate to said traction plate, an outer plate opposite said intermediate plate connected to said guides for constraining the travel of said outer plate, resilient means reacting against said outer plate and said intermediate plate opposing the movement of said outer plate in one direction, and means for applying traction force to said rope.

2. The combination of claim 1, said last named means comprising a spring scales to which said rope is terminally connected, and a bracket connected to said scale and slidably on the support for adjusting along the support to vary the traction force applied to the rope by said scales.

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