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[54] **TRACTION SPLINT ASSEMBLY**

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[52] **U.S. Cl.** ..... **128/84 C,** 128/88

[51] **Int. Cl.** **A61f 5/04**

[58] **Field of Search** 128/84, 85, 86, 87, 128/88

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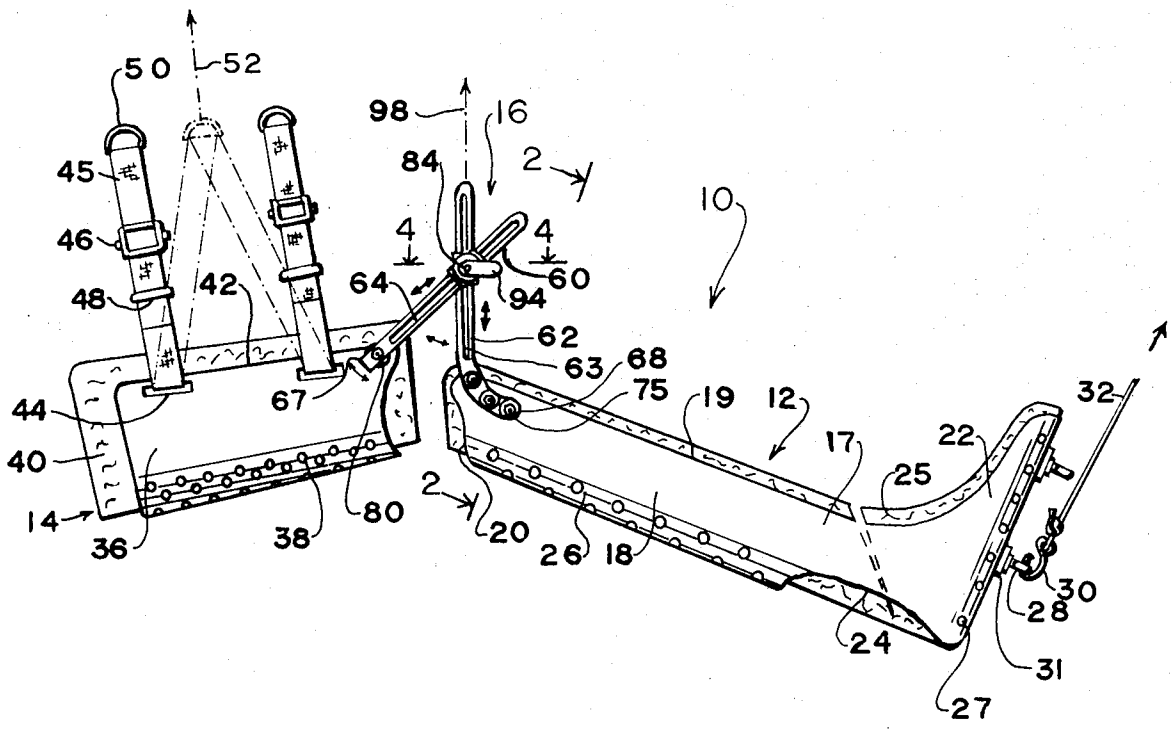
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[57] **ABSTRACT**

An orthopedic traction leg splint assembly is comprised of a forward L-shaped trough-like shell to support the calf, ankle and foot of a patient. A rear trough-like shell supports the patient's thigh. Both shells may be lined with a thick, resilient pad removably secured by an adhesive. The shells are joined by pairs of hinges including longitudinally pivotally connected slotted hinge bars, which may be adjusted to space the shells longitudinally and position them angularly. Straps removably attached to the rear shell and eyebolts on the forward can be secured to support traction ropes. The assembly can be supported by traction ropes, to insure full support of the splint and patient's leg.

6 Claims, 6 Drawing Figures



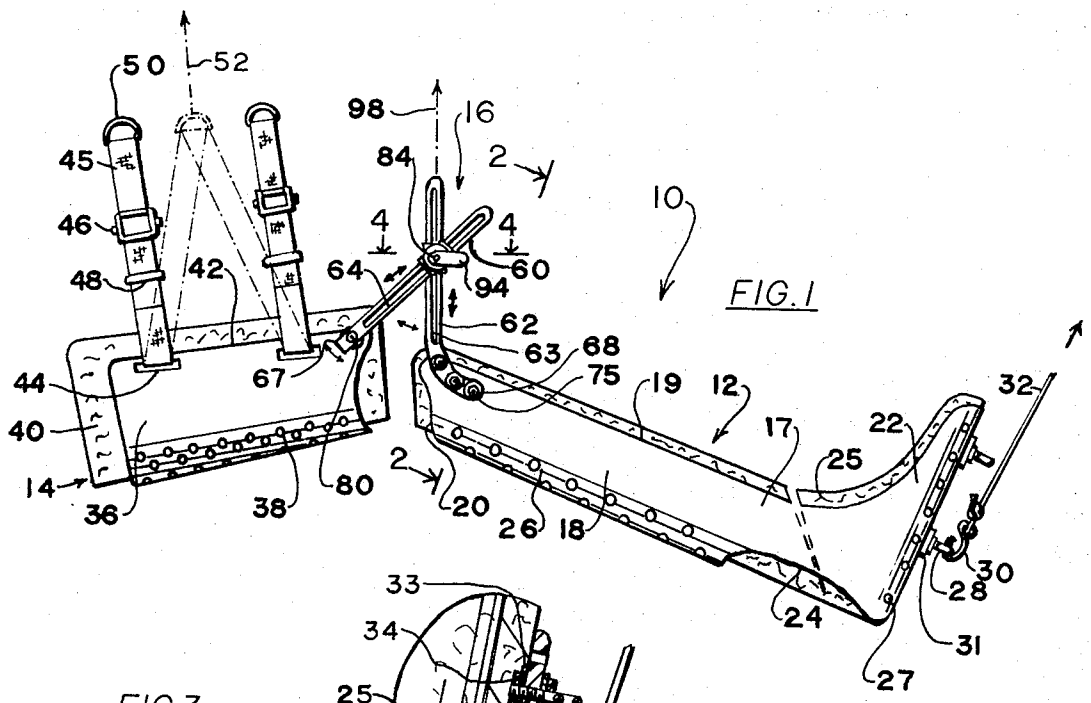


FIG. 1

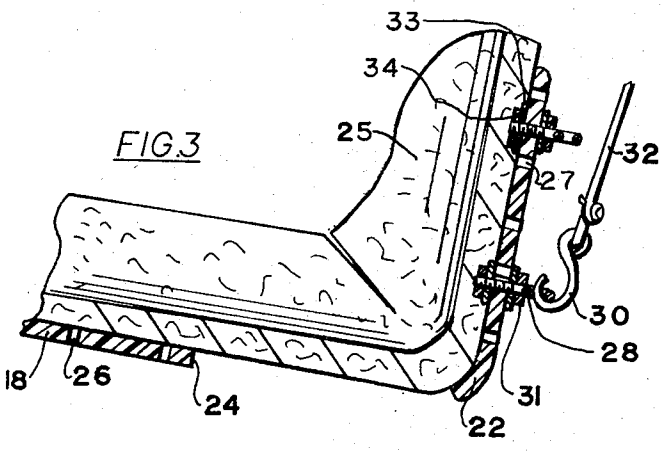


FIG. 3

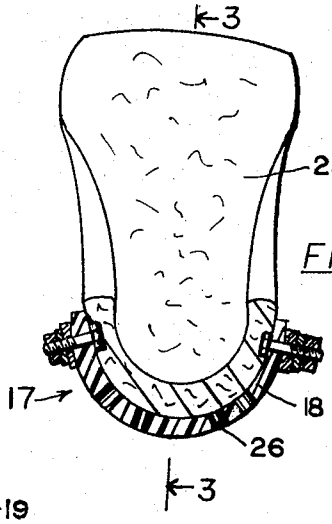


FIG. 2

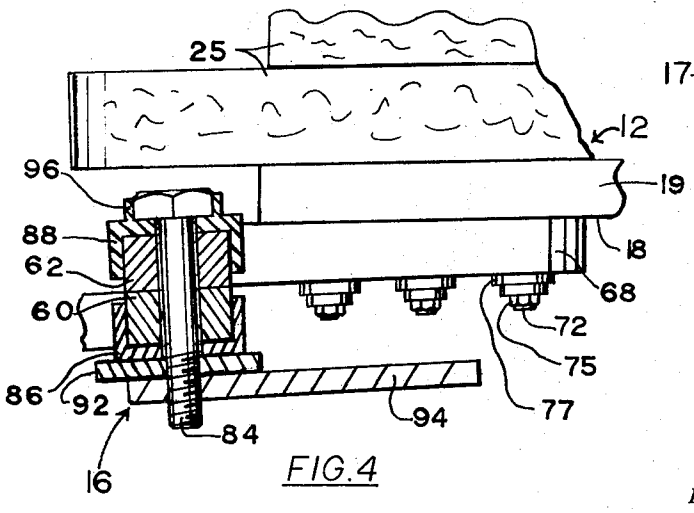


FIG. 4

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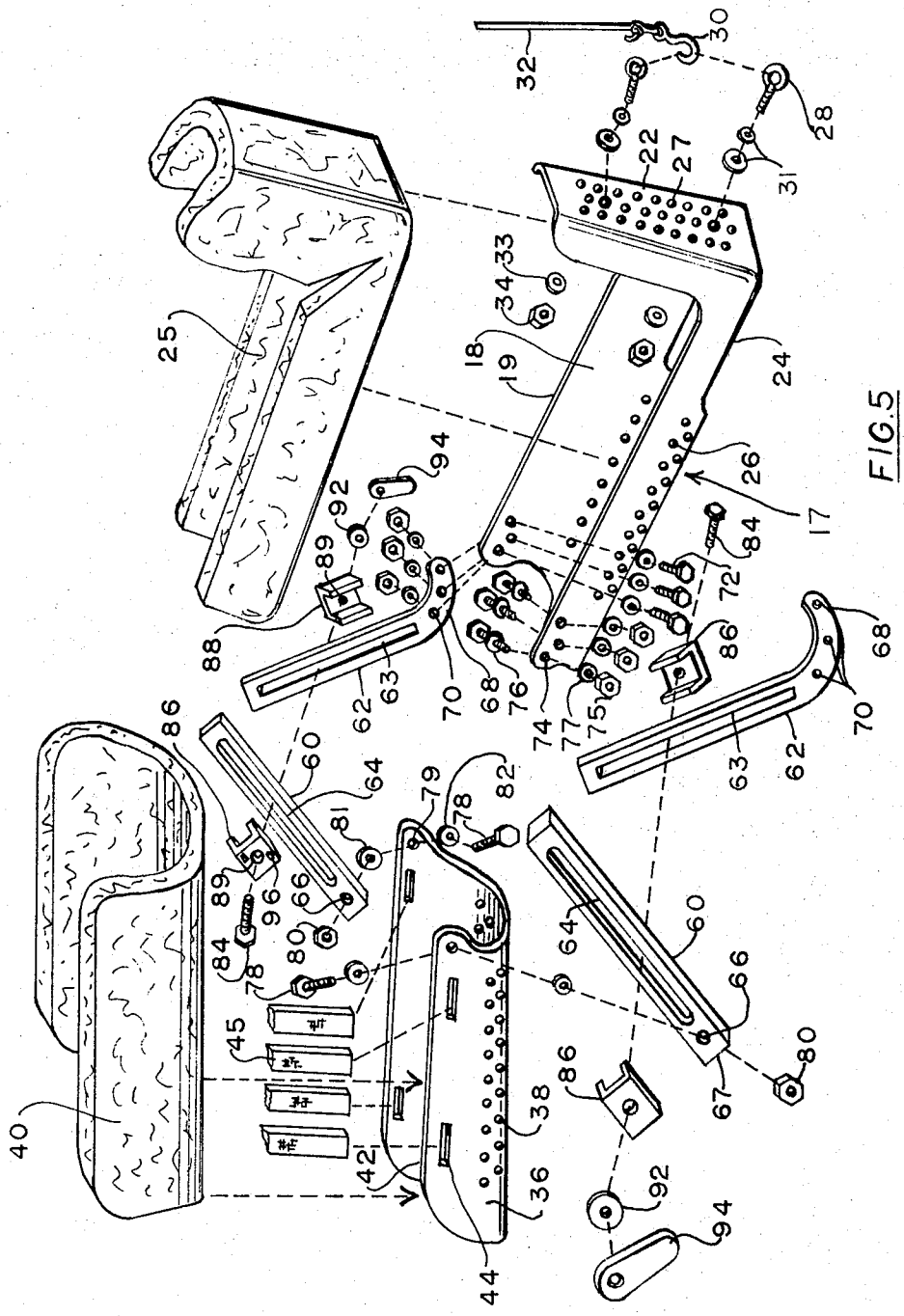


FIG. 5

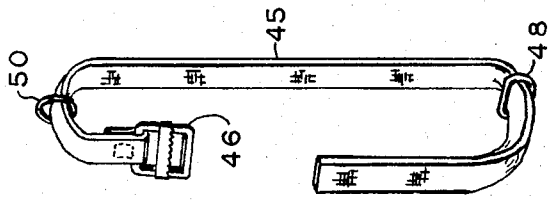


FIG. 6

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TRACTION SPLINT ASSEMBLY

This invention relates to the art of surgical splints, and more particularly concerns an improved adjustable traction splint.

Traction splints assemblies known heretofore have had a number of features which made their use and adjustment difficult and contributed to patient discomfort. Some required elastic bandages to bind patient's limbs, others required use of loose towels, pillows, or loose foam rubber or felt pads. These frequently shifted when in use or pressed sensitive parts of limbs to cause extreme patient discomfort. Often loose clips were used to hold the loose pads in place, and these often fell off, or shifted to loose their effectiveness. Moreover the impaired limb could not be X-rayed in the splint assemblies nor could the assembly be sterilized easily.

The present invention is directed at overcoming the above and other difficulties and disadvantages of prior traction splints, particularly those used for immobilized legs of bedridden patients.

According to the invention, there is provided a traction splint assembly having an L-shaped forward calf and foot supporting section, and a rear thigh supporting section, each section basically comprising a shell having a trough-like configuration. The shells are lined by a thick resilient pad which is removably cemented in place, so it may be discarded after use. The shells are made of strong, lightweight metal or a dimensionally stable polyester plastic reinforced by fiberglass to insure toughness and durability. Other plastic materials may be used at somewhat greater cost than the fiberglass plastic. The sections are joined by a balanced hinge assembly which permits relative longitudinal and angular adjustment of the two sections.

It is therefore, a principal object of the present invention to provide a traction splint assembly which is easily adjustable in length to fit patients of different heights.

It is a further object of the present invention to provide a traction splint assembly which is capable of balanced adjustment thereby avoiding twisting and lateral shifting.

It is another object of the present invention to provide a traction splint assembly which may be autoclaved to insure sterilization.

It is another object of the present invention to provide a traction splint assembly which is lightweight and relatively simple in construction.

These and other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which:

FIG. 1 is a side view of the traction splint assembly embodying any invention;

FIG. 2 is an enlarged cross-sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary longitudinal sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is an enlarged fragmentary horizontal sectional view taken along line 4—4 of FIG. 1;

FIG. 5 is an exploded perspective view showing parts of my traction splint assembly; and

FIG. 6 is a perspective view of a support strap in open position.

Referring now to the drawings wherein like reference characters designate like or corresponding parts

throughout, there is illustrated in FIGS. 1 through 4, an articulated traction splint assembly generally designed as reference numeral 10 and comprising a forward section 12 which supports a patient's calf and foot, and a rear section 14 which supports the patient's thigh. The sections 12 and 14 are pivotally and slidably joined by a hinge assembly 16.

The forward section 12 includes an outer L-shaped shell 17 formed with an elongated trough 18 open at the top 19 to support a patient's calf and ankle and foot. The front end of the shell 17 is formed with an upright channel 22 to receive the patient's foot. A cutout 24 is formed in the shell 17 at the juncture of the trough 18 and the channel 22 where the patient's heel and ankle will be located and supported by a felt pad 25. The entire shell 17 is lined with the one-piece, thick fibrous felt pad 25 removably attached to the shell interior by a suitable adhesive. Upper edges of the pad 25 project outwardly beyond the upper edges of the shell 17. Ventilation holes 26 and 27 are formed in the bottom of the trough 18 and at the end of the channel 22. A pair of eyebolts 28 are set in holes in the channel 22 for selectively receiving an S-hook 30 to which a suspension rope 32 is attached. Each of the eyebolts 28 are secured by a pair of washers 31, 33 and a nut 34.

The rear section 14 includes an outer shell 36 formed as a trough open at the top and both ends. The shell 36 is wider but shorter than the shell 17 and is shaped to receive the lower part of the thigh of a patient. Ventilation holes 38 are formed in the bottom of the shell 36 which may be lined with a thick resilient pad 40 snugly fitted in the shell and removably secured in place by an adhesive. The pad 40 extends outwardly of the shell 36 at both ends and upwardly beyond upper edges 42. A pair of slots 44 formed in the shell 36 at each side near the upper edges 42 are each adapted to receive a strap 45. There are two identical straps at each side.

Each strap 45 as best shown in FIG. 6, has a buckle 46 at one end to engage the other end of the strap which is free. A flattened ring 48 holds the free end of the strap and another ring 50 may be engaged by a traction rope 52 (indicated by dotted lines in FIG. 1). The rope 52 can be secured to the rings 50 of all of the four straps 45 and brought together to form a sling.

The front and rear sections 12, 14 of the splint assembly 10 can be adjusted angularly and lengthwise with respect to each other by means of the hinge assembly 16. At each side of the splint assembly 10 are two hinge bars 60, 62. The hinge bar 60 is a straight flat member with a long central slot 64 extending longitudinally and terminating just short of a hole 66 (FIG. 5) near the bottom end 67. The hinge bar 62 is also a straight flat member with long central slot 63, which terminates at the bottom in an arcuate, coplanar foot portion 68. This acuate foot portion has holes 70 to receive a plurality of registering holes 74 formed in the upper rear corner of the trough 18. The bolts 72 are each secured by a nut 75 and a pair of washers 76,77. The hinge bars 62 are thus fixed in angular position with respect to trough 18 as clearly shown in FIG. 1. The hinge bars 60 are pivotally attached to upper front corners of the trough 36 by a bolt 78 inserted through a registering hole 79 on each side of the trough 36 and secured by a nut 80 and a pair of washers 81, 82. The bars 60, 62 are disposed in abutment, in crossed arrangement. A bolt 84 is inserted through the insecting slots 63, 64 and extends through an aperture 89 in each of a pair of

rectangular flanged guide plates **86, 88** located respectively on the outer sides of bars **60, 62.** The bolt **84** extends through the holes **89** in these plates. Each bolt is secured by a washer **92** and a nut **94.** Protruding portions **96** which are integral with the plates **89** engage the heads of the bolts **84** and prevent their rotation.

By the hinge arrangement described, it will be apparent that the bars **64** may be pivotally adjusted with respect to thigh supporting section **14.** The hinge bars may be slidably and rotatably adjusted with respect to each other to adjust the longitudinal spacing between the front and rear sections **12, 14,** and the relative angular position of the sections. A traction rope **98** may be attached to the bars **62,** or if desired a conventional bow hinge may be connected by the traction rope **98** to the bars **62** for suspending the splint in traction at the hinge assembly **16.**

The shell-like troughs **18** and **36** may be made of a strong, tough, light-weight, chemically stable material which is transparent to X-rays, and which can be autoclaved to sterilize it. A suitable material for this purpose is polyester plastic reinforced with fiberglass. This material is relatively inexpensive. It may easily be molded to a desired form and will retain its form in spite of severe stresses and strains applied to it. Other comparable reinforced plastic material as well as metals may also be used.

It will be apparent now that the traction leg splint desired, embodies all the features and characteristics essential to a satisfactory splint. The splint has been proven by extensive testing to afford patients in leg traction greater comfort than has been possible heretofore while simplifying the traction equipment required.

It should be understood that the foregoing relates to only a preferred embodiment of the invention, and that it is intended to cover all changes and modifications of the example of the invention herein chosen for the purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention claimed is:

1. A traction leg splint assembly for a patient comprising

a forward trough-like shell shaped to support said patient's calf and foot;

a rear trough-like shell shaped to support said patient's thigh, both of said shells being open at the top to define free upper edges at opposite sides;

thick resilient pads removably cemented in place inside said shells and lining the same to space the patient's leg from said shells at all points;

hinges at opposite sides of said shells joining adjacent ends of said shells, each of said hinges being of a length so as to extend above the top of the free upper edges of the trough-like shells and comprising a pair of crossed, mutually rotatable and slidable hinge bars;

attachment means releasably connecting said pair of hinge bars for adjustably positioning said shells with respect to each other both longitudinally and angularly; and

a traction rope means connected to said hinge to support said assembly in a balanced position.

2. A traction leg splint assembly as defined in claim **1,** wherein said shells are made of thin, lightweight, strong, reinforced plastic material which is transparent to X-rays and capable of withstanding high temperatures while being autoclaved.

3. A traction leg splint assembly as defined in claim **1,** further comprising removable, adjustable pairs of straps attached to opposite sides of said rear shell for support by another traction rope means.

4. A traction leg splint assembly as defined in claim **1,** wherein said forward shell has a general L-shaped configuration with a bottom portion for receiving said patient's calf and ankle, and an upstanding end portion for receiving said patient's foot, both of said portions having ventilation holes therein.

5. A traction leg splint assembly as defined in claim **4,** further comprising other attachment means on said end portion for engaging still another traction rope means to support said assembly at said end portion.

6. A traction leg assembly as defined in claim **4,** wherein said hinge bars have longitudinal central slots which intersect when said hinge bars are crossed and said attachment means comprise pivot means extending through the intersection flots of said hinge bars, one of said hinge bars in each pair thereof being pivotally attached at one end to said rear shell, the other of said hinge bars in each pair thereof being fixed at one end to said forward shell, whereby said shells are mutually adjustable in position longitudinally and angularly with respect to each other and are securable in such position.

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