

[54] **PORTABLE TRACTION SPLINT**

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[56] **References Cited**

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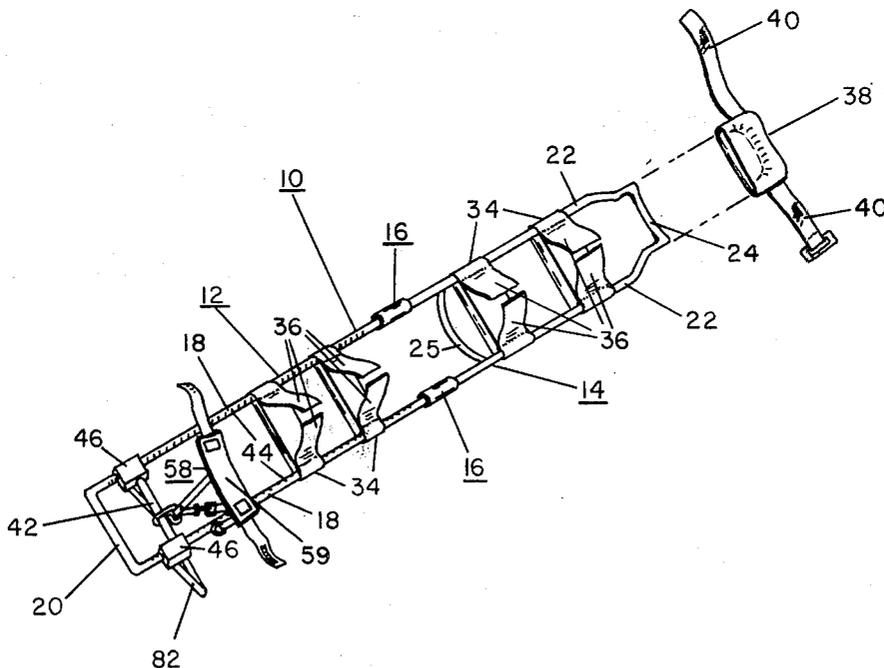
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[57] **ABSTRACT**

The splint comprises upper and lower sections joined together by hinge joints allowing folding over of the splint onto itself. A traction bar is provided slidably movable along substantially the full length of the lower section, ratchet means being included to lock the traction bar in place. A foot lashing of fixed length, but of variable diameter to accommodate feet of different size, is attached between the traction bar and the victim's foot.

5 Claims, 6 Drawing Figures



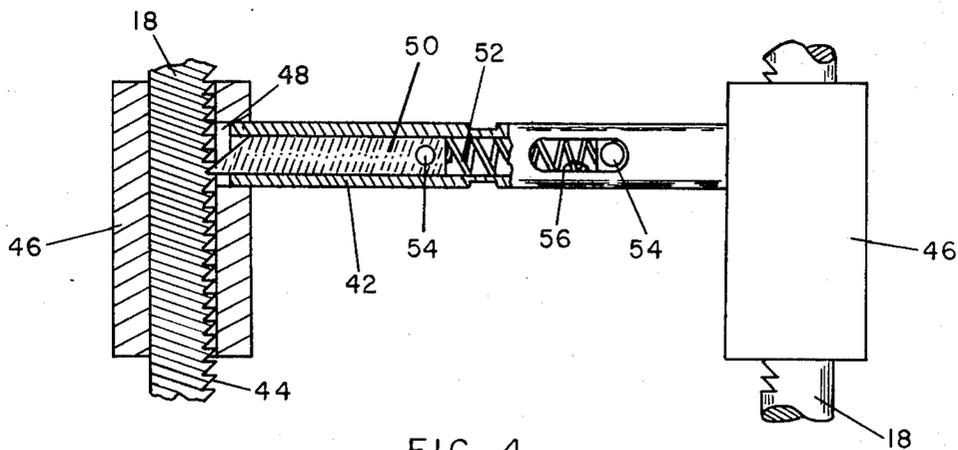


FIG. 4

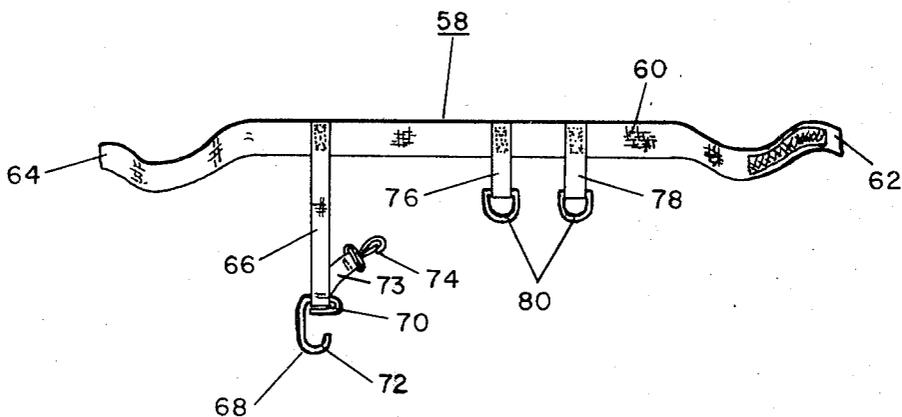


FIG. 5

PORTABLE TRACTION SPLINT

BACKGROUND OF THE INVENTION

This invention relates to portable traction splints for use at the scene of accidents and the like, and particularly to traction splints which are readily adjustable in size to accommodate victims of various sizes.

Traction splints of the type carried in emergency vehicles are well known. In general, such splints should be simple to operate, compactable and of light weight for ease of transportation, and should be adjustable in size to provide proper traction substantially regardless of the size of the victim.

While known commercially available splints more or less satisfy these requirements, there is room for improvement as exemplified by the splint of the instant invention.

DESCRIPTION OF THE DRAWING

FIG. 1 is a view in perspective, and partly exploded, of a splint in accordance with this invention.

FIG. 2 is a view in perspective, on an enlarged scale, of a portion of the side supports of the splint shown in FIG. 1.

FIG. 3 is a side view, partly broken-away, showing the securing of the leg of a victim to the splint shown in FIG. 1.

FIG. 4 is an enlarged view, partly broken-away, of a lower portion of the splint shown in FIG. 1.

FIG. 5 is a view of a foot lashing used with the splint shown in FIG. 1.

FIG. 6 is a plan view of a lower portion of the splint shown in FIG. 1 showing the lashing of a foot to the splint.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

With reference of FIG. 1, the splint 10 comprises a generally rectangular frame including a lower section 12 and an upper section 14, each section being of generally U-shape, and the two sections being connected together via a pair of double-hinged joints 16. The lower section 12 includes two side bars 18 integrally joined by a connecting bar 20, and the upper section 14 likewise includes two side bars 22 integrally connected by a bar 24. For greater rigidity, the upper section additionally includes a transverse bar 25 secured, as by welding, to the side bars 22, the bar 25 curving downwardly out of the plane of the side bars 22 to provide room for a limb secured between the side bars, as described below.

As shown in FIG. 2, the double-hinged joint 16 between each of the upper and lower sections 12 and 14 comprises a short bar or link 26 pivotally attached to an end of each side bar 18 and 22 by means of a pin 28, a vertical slot 30 being provided in the end of each bar 18 and 22 to receive an end of the link 26. By virtue of the hinged-joint connection between the two sections 12 and 14, the splint can be readily folded onto itself, thus reducing the length of the splint and facilitating handling and storage thereof.

To lock the splint 10 in its unfolded, extended configuration, collars or bushings 32 are provided frictionally slidable along the side bars 22 and links 26. The bushings 32 are of a length greater than that of links 26, and when in place over the links 26 and pins 28, as shown

in FIG. 1, pivoting of either frame section 12 or 14 about the hinge-joint is prevented.

Extending transversely between the side-bars 18 and 22 of each frame section 12 and 14 are a number of limb supports 34 of known type. Preferably, the supports 34 comprise a closed loop of an elastic material, e.g., elasticized nylon, and each support includes a pair of extending bands 36 which, as shown in FIG. 3, can be disposed about the limb to rigidly secure it to the splint. For simplicity and rapidity of joining the bands 36 around the limb, the bands 36 preferably include means such as known self-adhering fabric connectors, one band containing a strip of fabric including plastic hooks, the other band containing a strip of fabric including plastic loops. Alternately, conventional buckle means can be used.

Shown herein is a leg splint, and to this end, the side bars 22 of the upper section 14 curve downwardly out of the main plane of the splint frame and towards one another to form a more narrow section fitting under the upper thigh and buttock of the victim as shown in FIG. 3. A buttock support pad 38 is provided covering the connecting bar 24, and a pair of straps 40 including buckle and/or self-adhering fabric means at the ends thereof are provided secured to the pad 38 for firmly securing the upper thigh of the victim to the splint.

To provide traction to a limb secured to the splint 10, a traction bar 42 (FIG. 1) is provided slidably movable along the side bars 18 of the lower section 12, a ratchet mechanism being provided for locking the traction bar 42 against movement towards the splint upper section 14. Thus, as shown in FIG. 4, each side bar 18 is provided on its inner surface with a series of notches 44 providing a ratchet track, and a block 46 is provided on each bar 18 for movement therealong. Each block 46 has an opening 48 therethrough exposing the ratchet track, and each end of the traction bar 42, which is hollow, is secured to the block 46 within the block opening 48, as being press-fitted or pinned in place therewithin. Slidably mounted within the traction bar 42 are a pair of pins or ratchet catches 50 having angled outer ends, a compression spring 52 being disposed between the two ratchet catches 50 for biasing them in the outwardly extended, ratchet-locking position. A pin 54 is secured to the inner end of each catch 50 and extends transversely outwardly from the traction bar 42 through slots 56 through the wall thereof. To unlock or release the ratchet mechanism, the pins 54 are squeezed towards one another to retract and disengage the ratchet catches 50 from the ratchet track.

Of particular importance herein, as more fully described hereinafter, is that the ratchet track formed by the notches 44 extends substantially the entire length of the lower section 12 (see FIG. 1), whereby the traction bar 42 can be locked substantially anywhere along the length of the lower section.

For securing the traction bar 42 to a limb secured to the splint 10, a foot lashing 58 as shown in FIGS. 3, 5, and 6 is used. The foot lashing 58 comprises a first strap 60 having free ends 62 and 64, the ends including means such as the aforementioned self-adhering fabric means for adhering the ends to one another, and a second strap 66 secured to the first strap 60 intermediate its ends. The second strap 66 is secured to a hook 68 having two end loops 70 and 72, a further extension 73 of the second strap 66 terminating in a snap catch 74. Secured to the first strap 60 between the free end 62

thereof and the point of attachment of the second strap 66 are a pair of short straps 76 and 78 each terminating in a buckle 80. The various straps of the foot lashing 58 can be made of fabric, e.g., canvas, and the straps sewn to one another by conventional stitching. Likewise, the second strap 66 can be secured to the hook 68 by means of a loop stitched around the hook loop 70. Preferably, as shown in FIGS. 3 and 6, but omitted from FIG. 5 for greater clarity, a pad 59 is disposed between the lashing 58 and the victim's foot for greater comfort.

Completing the splint 10 is a support 82 (FIGS. 1 and 3) by means of which the lower end of the splint can be raised off the ground. The support 82 comprises a U-shaped bar, the ends of which are pivotally secured to the movable blocks 46 to which the traction bar 42 is secured, the pivotal securing means allowing folding over of the support 82 against the lower section 12 during storage of the splint.

In use, the splint 10, in its locked, extended configuration, is disposed beneath the leg and buttock of the victim, as shown in FIG. 3, and the leg securely bound to the splint by means of the support bands 36 and the buttock pad straps 40. The foot lashing 58 is secured to the victim's foot (FIGS. 3 and 6) by positioning the point of attachment of the first 60 and second 66 straps of the lashing on one side of the leg, just above the ankle bone, and wrapping the first strap 60 about the ankle, the free ends of the first strap overlapping and being secured to one-another. As shown, one or the other of the short straps 76 and 78 secured to the first strap 60, depending upon the girth of the ankle being secured, is disposed more or less diametrically opposite to the second strap 66, i.e., on the other side of the foot just above the ankle bone, and the snap catch 74 extending from the hook 68 is secured to the strap buckle 80. The two straps 76 and 78 are of equal length, and the combined lengths of the strap extension 73, the snap hook 74 and the strap 76 or 78 to which the hook 74 is connected are approximately equal to the length of the strap 66 between the hook 68 and the strap 60. Thus, equal tension is applied by the foot lashing 58 to each side of the foot.

The traction bar 42 is then moved towards the foot (the ratchet catch pins 54, FIG. 4, being squeezed together to disengage the ratchet mechanism), the hook 68 (FIG. 3) of the lashing is looped about the bar 42, and the traction bar moved in the direction away from the foot to place the limb in traction, the ratchet mechanism associated with the traction bar 42 locking the traction bar in position.

Of particular importance is that the splint 10 can be used with victims of greatly varying sizes. First, as previously noted, the traction bar 42 can be locked substantially anywhere along the length of the lower section 12 of the splint. Thus, for example, with a splint having an upper section 14 length of about 23 inches, a lower section 12 length of about 28 inches, and a foot lashing 58 having an extending length of about 11 inches, the splint is useful on legs varying in length between 18 and 40 inches, i.e., on an adult of a height in the order of 6 feet 10 inches down to children of a height in the order of 3 feet 7 inches.

Second, as noted above, the foot lashing 58 is provided with two (or more, as desired) short straps 76 and 78 connected to the first, ankle strap 60, whereby, within a relatively wide range of ankle girths, one of the two short straps 76 or 78 is disposed approximately dia-

metrically opposite the point of attachment of the second strap 66 with the ankle strap 60. By attaching the snap catch 74 end of the second strap 66 to this short strap, tension is applied to the leg on opposite sides thereof (FIG. 6), i.e., at opposite ends of a line perpendicular to a vertical plane through the longitudinal axis of the leg. This arrangement, applying equal traction to each vertical side of the ankle, is effective to maintain the foot perpendicular to the leg while traction is being applied. As known, this is generally desired for reasons of comfort and avoidance of further injury to the victim during transportation.

The foot lashing 58, as can be observed, provides a major portion of the vertical support for the foot. A further advantage of the splint 10 is that the foot lashing 58 is of a fixed, relatively short length between the traction bar 42 and the victim's ankle. Thus, the amount of vertical support provided by the foot lashing is the same regardless of the length of the limb and regardless of the axial disposition of the traction bar 42 along the splint frame. This feature is particularly desirable in comparison with known splints where the traction applying means is fixedly disposed at the lower end of the splint, and various size limbs are accommodated by varying the length of the foot lashing extending between the foot and the traction applying means. The longer the foot lashing, the less is the vertical support provided the foot.

Various known ratchet means, other than the particular one shown for positioning the traction bar 42 along the splint frame, can be used. Also, a ratchet mechanism can be dispensed with, and other traction bar locking means can be used. For example, the traction bar 42 can be locked in place by means of a strap extending between the traction bar 42 and the connecting bar 20 of the lower frame section 12.

Also, other means for securing the traction bar 42 to a foot are within the scope of this invention. For example, in place of the first strap 60 of the lashing 58 shown herein, a hollow inflatable tubing can be used having free ends which can be secured to one another. In such case, only a single short strap for attachment to the snap catch 74 need be provided, variations in ankle size being accommodated by different amounts of inflation of the ankle encircling tubing.

While described for use with a leg, splints in accordance with this invention can be used, suitably modified, on arms. Such modifications, clear to persons skilled in these arts, relate to the dimensions of the splint and lashings, and to the substitution of, e.g., a crescent shaped, crutch-type upper end, for the upper or buttock end of the splint 10.

What is claimed is:

1. A portable traction splint comprising:

a pair of elongated side members and means for securing a limb therebetween, at least one of said side members including a ratchet track extending axially therealong,

traction means mounted on said side members, said traction means comprising a pair of blocks mounted one each on each of said side members for movement therealong, and a hollow bar extending transversely between said side members and secured to said blocks, one of said blocks having an opening therethrough in alignment with said bar and exposing said track,

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a ratchet mechanism for locking said traction means against movement towards one end of said side members, said mechanism comprising a ratchet catch disposed within said hollow bar and biased to extend outwardly from one end thereof through said block opening and into engagement with said track, and means for retracting said catch inwardly of said bar for disengaging it from said track, and limb lashing means for securing said traction means to a limb secured to said splint, limb length variations being accommodated by varying the position of said traction means along said side members.

2. A splint as in claim 1 including a compression spring disposed within said bar for biasing said catch, and wherein said retracting means comprises a pin secured to said catch and extending transversely away from said bar through a slot in the wall thereof.

3. A limb lashing for securing a limb to a splint comprising:
 an elongated first member including securing means whereby said member can be disposed around and secured to a limb,

a second elongated member extending transversely from said first member and secured thereto at a first point, said second member having a first connecting means at its free end and a second connecting means intermediate said first point and said free end,

a third elongated member extending transversely from said first member and secured thereto at a

second point spaced from said first point, said third member having a third connecting means at the free end thereof, said first and third connecting means being connectable to one another,

the dimensions of said lashing being such that, when in its operative disposition for securing a limb to a splint, the distance between said first connecting means and said first point when measured along said second member is substantially equal to the distance between said first connecting means and said second point when measured along said third member.

4. The lashing of claim 3 wherein said first elongated member comprises a hollow inflatable tubing.

5. The lashing of claim 3 including a fourth elongated member extending from said first member transversely thereto and secured to said first member at a third point spaced from said second point and having a fourth connecting means at the free end thereof connectable to said first connecting means, said third and fourth members, including the connecting means attached thereto, being of substantially the same length, whereby, depending upon the girth of a limb secured by said lashing, said first connecting means can be connected to either of said third or fourth connecting means to provide two connections between said first connecting means and said first elongated member of substantially equal length.

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