

Nov. 21, 1961

J. M. COLLINS

3,009,461

PORTABLE TRACTION DEVICE

Filed Feb. 6, 1959

4 Sheets-Sheet 1

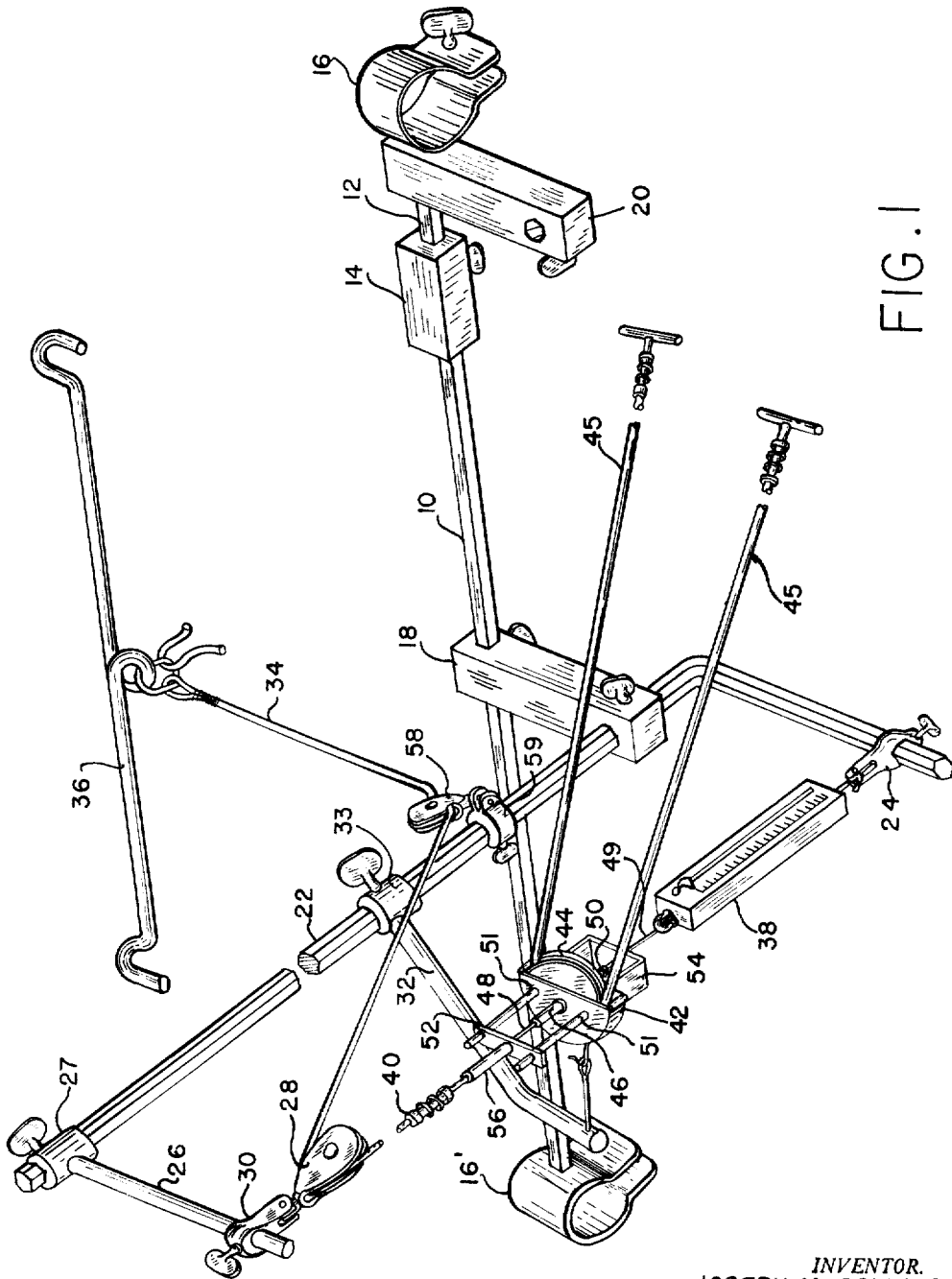


FIG. 1

INVENTOR.  
JOSEPH M. COLLINS

BY *Walter R. ...*  
*Arnold H. ...*  
ATTORNEYS

Nov. 21, 1961

J. M. COLLINS

3,009,461

PORTABLE TRACTION DEVICE

Filed Feb. 6, 1959

4 Sheets-Sheet 2

FIG. 4

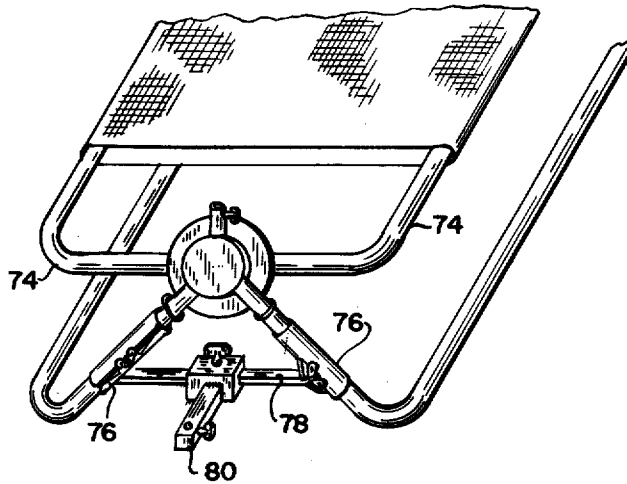


FIG. 2

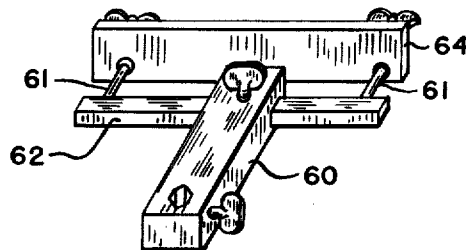
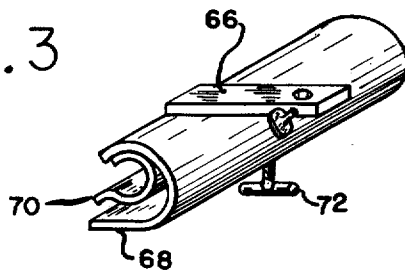


FIG. 3



INVENTOR  
JOSEPH M. COLLINS

BY

*Wade Rountz*  
*Arnold H. Cole*  
ATTORNEYS

Nov. 21, 1961

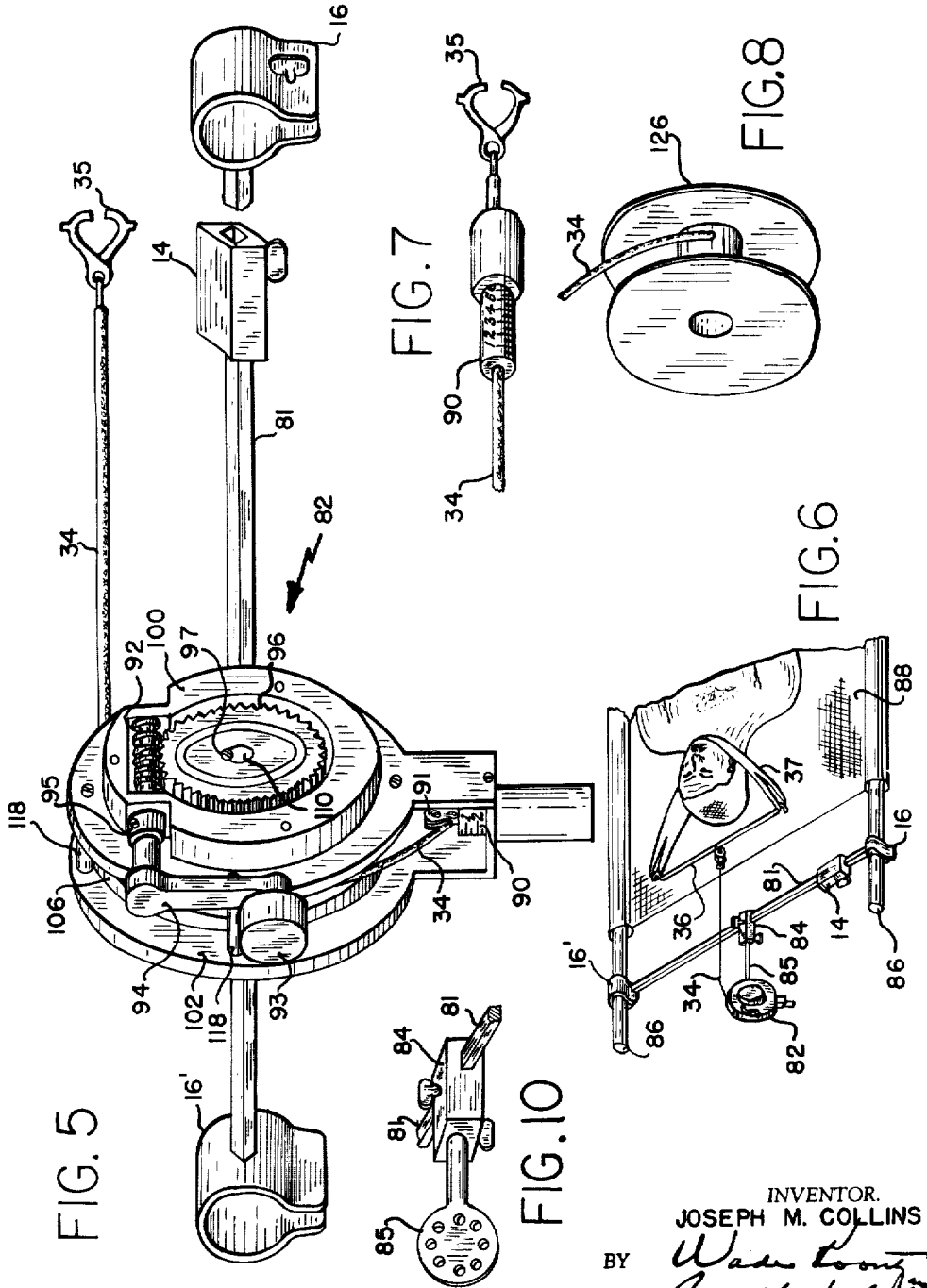
J. M. COLLINS

3,009,461

PORTABLE TRACTION DEVICE

Filed Feb. 6, 1959

4 Sheets-Sheet 3



INVENTOR.  
 JOSEPH M. COLLINS  
 BY *Wade County*  
*Arnold H. Cole*  
 ATTORNEYS

Nov. 21, 1961

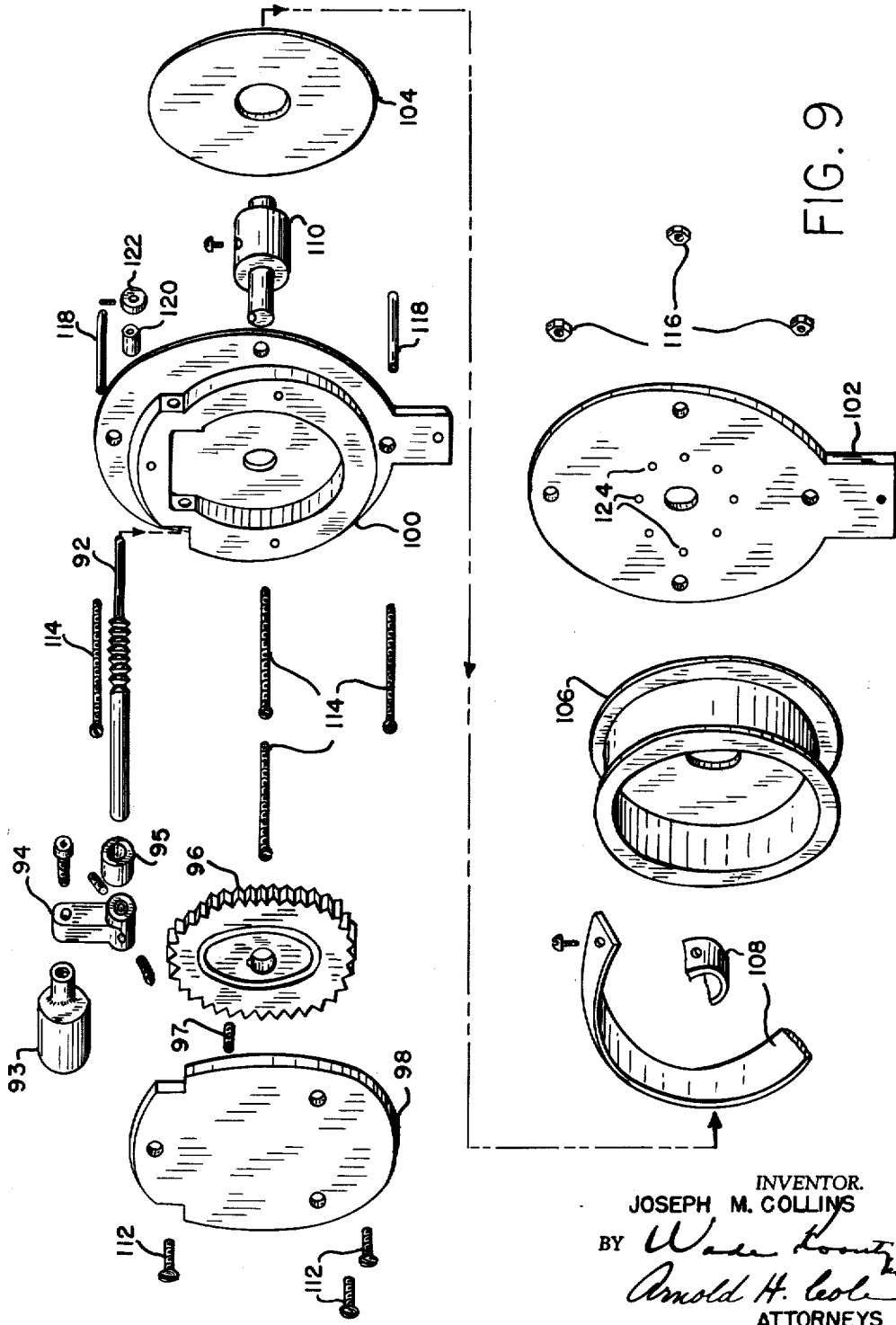
J. M. COLLINS

3,009,461

PORTABLE TRACTION DEVICE

Filed Feb. 6, 1959

4 Sheets-Sheet 4



1

3,009,461

**PORTABLE TRACTION DEVICE**

Joseph M. Collins, Hickam A.F.B., Hawaii

Filed Feb. 6, 1959, Ser. No. 791,782

3 Claims. (Cl. 128-84)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the United States Government for governmental purposes without payment to me of any royalty thereon.

This invention relates to portable, detachable traction devices with traction control apparatus, which by means of adapters may be attached to either simple litters or stretchers, or to Stryker frames or hospital beds. In place of the conventional traction weights it uses spring tension to supply the traction force which force is regulated by a simple turnbuckle or a worm gear. This feature provides a constant traction force which is not affected by swaying or jolting motion, which makes it particularly useful where a patient requiring traction is being transported by air, sea or land conveyance.

The present practice in transporting patients, especially in the armed forces, is to place them on simple litters, which are then suspended one above the other, in the transporting vehicle. In the case of transport by air the litters are hung from the ceiling of the plane's cabin by suitable straps and fasteners, one side of the litter being made fast to a vertical support rod to prevent undesirable sway. If a patient requires traction on body or limbs he is placed on an orthopedic turning frame, such as a Stryker frame, which has to rest on the floor, and weights are used to supply the necessary traction force. Not only are Stryker frames cumbersome and expensive, but when a plane takes off or lands, or when it is in turbulent air, the weight swings and jolts, causing as much as two and a half times the normal traction force to be exerted which is not only painful to the patient but detrimental to the healing process. The same objections to the orthopedic turning frame with weights obtain when the patient is being transported by land or sea conveyance.

There are several devices using spring means to replace traction weights for attachment to hospital beds, but there is no known means for attaching traction devices of any kind to simple litters or spring traction devices to Stryker frames.

It is an object of this invention to provide a simple device for supplying safe, accurate and constant traction to the head, body or limbs of a human patient requiring traction due to injury or disease.

It is a further object to provide such a device which can be attached to simple litters as well as to hospital beds and Stryker frames.

It is a further object to provide such a device which is portable, easily attached or detached, is inexpensive to manufacture, can be assembled in a convenient kit form and easily stacked or stored on air, sea or land conveyances.

The above and still other objects, advantages and features of my invention will become apparent upon consideration of the following detailed description, especially when taken in conjunction with the accompanying drawings, in which:

FIG. 1 is an isometric view showing the essential elements of the invention for attachment to a litter;

2

FIG. 2 is an isometric view showing an attachment for securing the device to a bed;

FIG. 3 is an isometric view showing a modification of this invention for attachment to the side rail of a litter;

5 FIG. 4 is an isometric view showing a modification of this invention for attachment to a Stryker frame;

FIG. 5 is an isometric view showing a modification employing a clock spring wound by a worm gear;

10 FIG. 6 is an isometric view showing the modification of FIG. 5 attached to a litter;

FIG. 7 is a view showing a spring scale for supplying traction;

15 FIG. 8 is a view of a drum for winding the traction cable by means of a worm gear and without the clock spring;

FIG. 9 is an exploded view of the modification of FIG. 5; and

FIG. 10 is a detailed view of the slide unit attachment.

20 In the embodiments of this invention as illustrated in the figures, the two parts of an adjustable carriage bar, 10 and 12, are shown joined by a union 14 which is welded to the long piece of the carriage bar 10 and is secured to the short piece 12 by a thumb screw. Adjustable ring clamps 16 and 16', of a size to fit over the ends of a common litter pole, are welded to the ends of the adjustable carriage bar 12 and 10 so that they may be secured to the said poles by thumb screws. Two adjustable slide units, 18 and 20, are provided to slide along the said adjustable carriage bar so that they may be fixed at any convenient location on said bar by thumb screws. One end of each slide unit is provided with a hexagonal hole to fit an adjustable upright traction rod 22, bent at the lower end at a right angle to which is fixed an adjustable anchor clamp 24. At the upper end of said upright traction rod is an overhead securing bar 26, adjustable on said rod 22 by a securing ring 27 and a thumb screw. An overhead swivelled pulley 28 is attached to said securing bar 26 by an adjustable anchor clamp 30 and carries a traction cable 34. Adjustable upright traction rod 22 carries a swivelled pulley 58 adjustable on said rod 22 by securing ring 59 and also carries adjustable bar 32 for securing a traction safety control housed in drum casing 42.

35 The traction and safety control apparatus consists of a spring scale 38, such as is used in weighing fish or vegetables and graduated from 0 to 25 pounds, attached to the rod 22 by adjustable anchor clamp 24. The upper end of the scale 38 is attached to the traction cable 34 through a turnbuckle 46 engaging an upper rod 48 and a lower rod 49 having opposite threads. A drum 44 drilled to fit the turnbuckle, is welded to the said turnbuckle 46 so that rotation of the drum rotates the turnbuckle, and a remote control cable 45 is given a few turns around said drum so that it can be rotated at a distance from the litter. Turning the drum 44, by hand or by the remote cable, increases or decreases the traction force on the traction cable 34 which is communicated to the patient through the crossbar 36. To prevent the turnbuckle from becoming disengaged from the upper threaded rod 48, and thus causing loss of all traction, the said rod 48 is welded to a steel strap 52 which slides freely on two guide stop rods 51 provided with stops at their upper ends and secured to the drum casing 42. As a further precaution against loss of traction, the lower threaded rod 49 has a nut 50 welded to it in such a position that it comes against

a stop 54 before the rod becomes entirely disengaged from the turnbuckle 46.

A modification of this invention is shown in FIG. 2 for attachment to a hospital bed. A slide carriage bar 62 is shown carrying an adjustable carriage unit 60 provided with a hexagonal hole for securing the adjustable upright traction rod 22 of FIG. 1. Two bolts 61 provided with wing nuts, are welded to the slide carriage bar 62 and passed through holes in a flat steel bar 64 for securing the said slide carriage bar 62 to the upright parts of a hospital bed.

Another modification is shown in FIG. 3 where a carriage unit 66 is shown permanently welded to a steel tube 68, split down its length to fit easily over the canvas covered part of a litter pole, and forming the outer casing of a clamp for attaching the invention to the side of a litter. An inner casing 70, of spring steel, and of a shape and size to fit inside the outer casing 68 and over the canvas covered portion of a litter pole, is shown with a securing bolt 72 threaded into the said outer casing to exert pressure on the said inner casing and secure the said clamp to said litter pole.

A further modification is shown in FIG. 4 where an orthopedic turning frame, known as a Stryker frame 74 is fitted with two frame clamps 76 similar to the clamps for the ends of a litter pole as in FIG. 1, but of a size and placed at an angle to fit over the said frame, and welded to a slide carriage bar 78. An adjustable slide unit 80, similar to the same units shown in FIGS. 1 and 2, is provided to carry the adjustable upright traction rod 22.

A further modification is shown in FIG. 5, where a worm gear and clock spring motor replace the turnbuckle and spring scale of FIG. 1, contained in a housing generally designated as 82. Cover plate 98 has been removed to show a worm 92, turned by crank 94 and crank handles 93, engaging a worm wheel 96 which is keyed by drift screw 97 to a shaft 110 which winds a clock spring 108 and puts tension on cable 34 through a drum 106 which is fastened to the other end of the said clock spring. This is best seen in the exploded view FIG. 9 and its use on a litter in FIG. 6.

An adjustable slide unit 84 is shown fixed on a carriage bar 81 by a thumb screw, said bar 81 being attached to the handles 86, of a litter 88 by ring clamps 16 and 16'. Traction cable 34 is shown attached to a cross bar 36 which engages a standard orthopedic head harness 37 and supplies traction to the head of a patient shown on the litter. Said slide unit 84 is attached to the worm gear mechanism 82 by screws passed through holes in slide unit attachment 85, shown in detail in FIG. 10, and engaged in tapped holes 124 in rear housing cover plate 102.

In FIG. 9 the parts of the worm gear and clock spring mechanism are shown, 92 being the worm, 96 the worm wheel and 98 the worm gear cover plate. The crank handle, the crank and a worm lock collar are shown as 93, 94 and 95, respectively. The worm gear housing is shown as 100 and the rear housing cover plate as 102. A spring winding shaft, to be keyed into the worm wheel 96 by drift key screw 97, is shown as 110 and a clock spring 108 to be fastened to the said winding shaft 110 and to the drum 106. As spring winding shaft 110 is rotated by worm wheel 96 the said clock spring is wound or unwound thus increasing or decreasing tension on the said drum 106 and the cable 34 attached thereto. A bushing 120 and a lock collar 122 hold the said worm in position in the housing 100, the large washer 104 holds the clock spring in place in drum 106 and the screws 112, bolts 114, spacers 118 and nuts 116 are used to hold the assembly together. At the bottom of assembly 82 is shown a spring scale 90 attached to the housing plates 100 and 102. At the upper end of said scale is attached a pulley 91 through which the cable 34 is passed and attached to drum 106 so that as ten-

sion is applied to said cable the amount thereof is indicated on said scale.

A further modification would employ a cable drum 126 which would be turned directly by winding shaft 110 through the worm wheel 96 and worm 92 without the intervention of a clock spring, the tension being supplied through the spring scale 90.

A further modification would remove the spring scale 90 from the housing 82 and place it between the cable 34 and the tongs 35 as shown in FIG. 7.

From the description and the drawings it is clear that this invention meets the objectives set for it. Not only does it supply safe, accurate and constant traction, eliminating the need for cumbersome weights, but it can be attached to any type of bed, litter or cot. It is simple, easily attached or detached, and can be transported and stored with a minimum of weight and space requirements. The novel use of a spring traction force accurately controlled by means of a turnbuckle or worm gear, makes it suitable for use in permanent or field hospitals. Its unique adaptability to simple litters or cots makes it especially useful where patients requiring traction must be moved long distances from the scene of a disaster to a hospital or from one hospital to another. Under such circumstances beds are impractical since field ambulances or airplanes are designed to use simple litters in order to accommodate as many patients as possible.

It is to be understood that the above described arrangement is merely illustrative of the applications of the principles of the invention. Numerous other arrangements may be devised by those skilled in the art without departing from the spirit and scope of the invention.

What I claim as new is:

1. A traction device suitable for use with a litter, said traction device comprising a horizontal member capable of being detachably secured to said litter, said member forming a support for said traction device, a vertical member supported by said horizontal member and arranged for movement therealong, locking means for securing said vertical member in any desired position along said horizontal member, means for allowing vertical adjustment of said vertical member, a bent portion located at the lowermost portion of said vertical member at an angle to said vertical member and to said horizontal member, an arm adjustable for vertical movement on the upper portion of said vertical member lying in a vertical plane with the said bent portion of said vertical member, a spring scale attached at one end to said bent portion of said vertical member, a turnbuckle secured to the other end of said scale, a cable running from said turnbuckle, pulley means mounted on said adjustable arm, a second pulley means vertically adjustable on said vertical member, said cable extending through said first-mentioned pulley and said second pulley to an object to receive a traction force.

2. A device as defined in claim 1 including means for remotely rotating said turnbuckle to vary its length, thereby varying the effective length of said cable to control the tension applied to said cable when it is secured to an object.

3. A traction device comprising a horizontal supporting member, a vertical member supported by said horizontal supporting member and arranged for movement therealong, locking means for securing said vertical member in any desired position along said horizontal supporting member, means for allowing vertical adjustment of said vertical member, a bent portion located at the lowermost portion of said vertical member at an angle to said vertical member and to said horizontal supporting member, an arm adjustable for vertical movement on the upper portion of said vertical member lying in a vertical plane with the said bent portion of said vertical member, a spring scale attached at one end to said bent portion of said vertical member, a turnbuckle secured to the

5

other end of said scale, a cable running from said turn-buckle, pulley means mounted on said adjustable arm, and a second pulley means vertically adjustable on said vertical member, said cable extending through said first-mentioned pulley and said second pulley to an object to receive a traction force.

References Cited in the file of this patent

UNITED STATES PATENTS

1,077,629	Mighell	Nov. 4, 1913	10
1,580,507	Lidgett et al.	Apr. 13, 1926	
2,282,653	Herzmark	May 12, 1942	

2,377,940  
2,690,177  
2,808,051

152,892  
1,084,049

6

Hughes ----- June 12, 1945  
Hogan ----- Sept. 28, 1954  
Martin ----- Oct. 1, 1957

FOREIGN PATENTS

Belgium ----- July 2, 1904  
France ----- June 30, 1954

OTHER REFERENCES

U.S. Armed Forces Medical Journal, volume V, No. 4, pp. 596-598.