

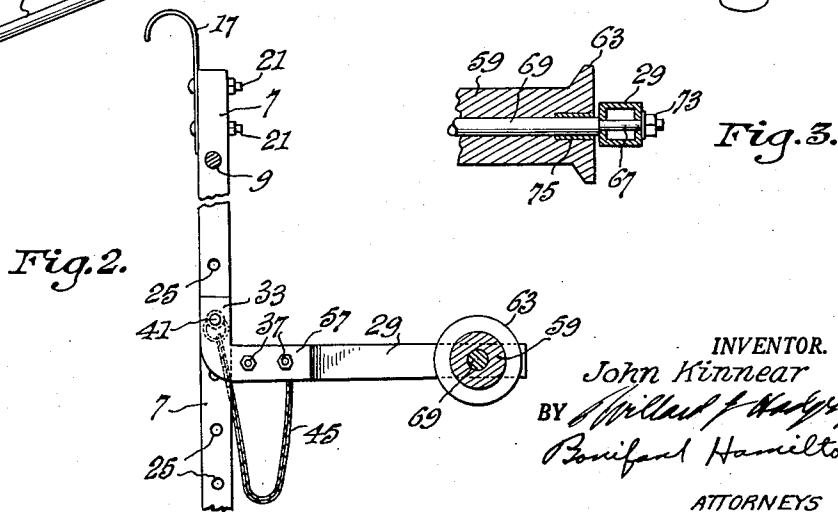
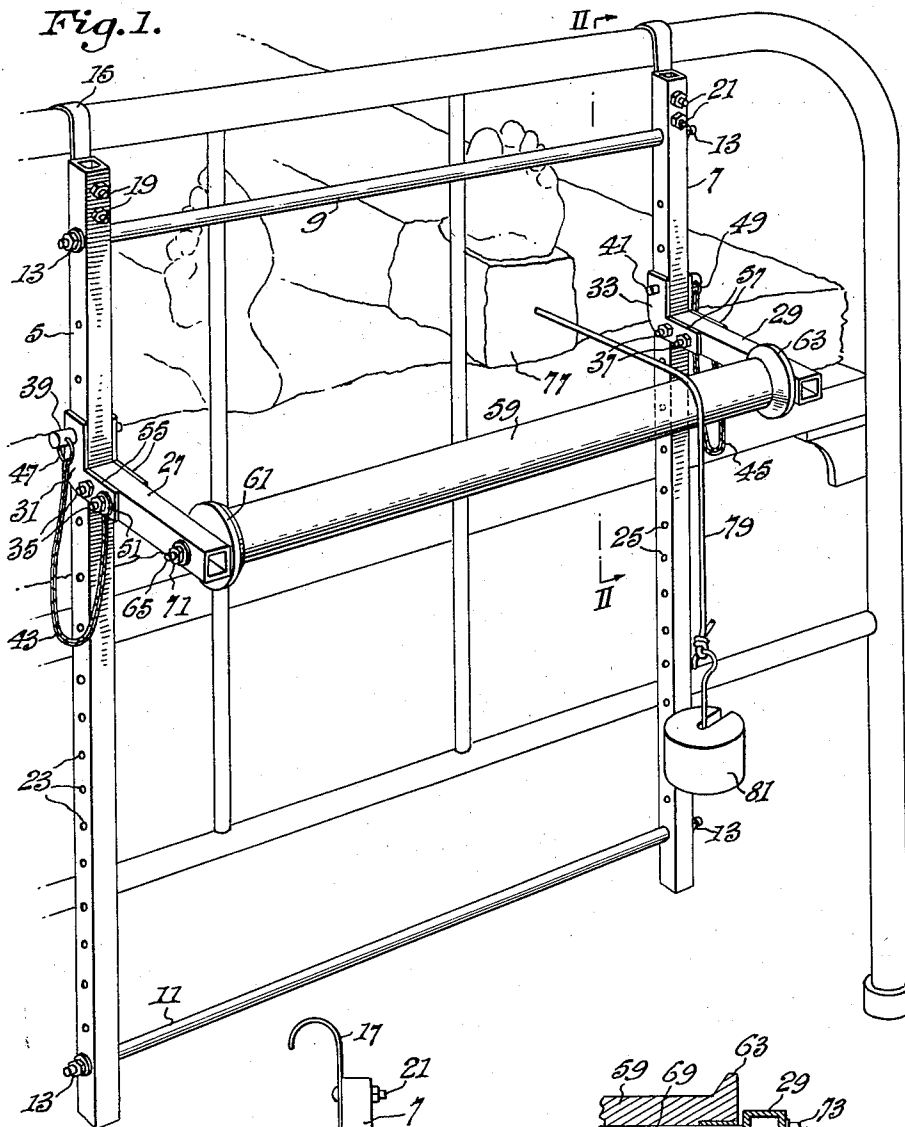
Oct. 20, 1959

J. KINNEAR

2,909,175

SURGICAL TRACTION APPARATUS

Filed Jan. 8, 1958



INVENTOR.
John Kinnear
 BY *Willard F. Hays*
Rosifant Hamilton
 ATTORNEYS

1

2,909,175

SURGICAL TRACTION APPARATUS

John Kinnear, Hudson Falls, N.Y.

Application January 8, 1958, Serial No. 707,835

1 Claim. (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 Government for governmental purposes without the payment of any royalty thereon.

This invention relates to surgical apparatus and more particularly to a traction device which is adapted for the treatment of fractures.

It has been common practice for a great many years to treat fractures by means of traction devices which are intended to overcome the muscular contraction which automatically occurs in case of a fracture, the purpose being to hold the fractured bones in proper position until they are well knit together. Among the apparatus previously used was one consisting of a relatively large frame consisting of a number of members and devices whereby the length of the frame may be adjusted at will. On one end thereof was a member adapted to be seated against the body of the patient and at the other end was a traction device which was intended to apply tension to the limb. Usually, such tension was obtained by weights attached to a cord or rope which was in turn attached to a stirrup or other device on the body of the patient. One such device included a drum or the like on which the rope was to be wound by means of a hand-wheel and after the desired tension was obtained by winding, the hand wheel was held in place by a spring. The spring tension did not have any great effect and did not determine the amount of tension in the device. Furthermore, the apparatus was heavy, cumbersome, and expensive. It was uncomfortable, since the patient had great difficulty in moving, and also there was continuous pressure by the apparatus against the body. The tension was neither constant nor could it be accurately predetermined. Slight movements of the patient would cause changes in the tension. Because of the bulky character of the device, the patient could not shift the position of his body, rendering it very painful to wear the device for any length of time.

Because devices of the above character immobilized the patient to his detriment, it has become customary to dispense with such a frame and to provide a tension device consisting of a considerable number of pulleys with a rope passing over the pulleys, one end of the rope being attached to the patient and the other end being attached to hanging weights. Because of the pulleys involved and the friction of the bearings thereof, the tension of the device was most unreliable. A slight movement of the patient may change the angle of a rope or the rope may ride off of the pulley and become jammed between the pulley and the frame thereof. Such accidental displacement is usually not noticeable and it happened many times where a patient did not have the use of the device at all for long periods of time. Passers-by may accidentally knock off some of the weights and also because of the accessibility thereof, either the patient or a visitor may actually change the weight to accommodate the patient. Very often the weights become caught in the frame of the bed and the utility is lost for a period of time. Actual tests have shown that even

2

though the rope and pulleys and weights were all in their proper position, the actual tension was from five to thirty-five percent less than the weight placed in the devices. Furthermore, the tension also changes whenever the bed is moved or when the linen on the bed is changed.

Also it has been proposed to use an apparatus which has for its essential feature a reel wherein a strap or the like is wound on a drum which is held by a coiled spring; the spring having an excess of potential capacity so that it is wound only partly, the intended result being that in use even though the length of the strap which is attached to the patient may vary within wide limits, the tension produced by the spring on the strap during such variations is intended to remain substantially constant. Such equipment, however, is complicated structurally and not reliable in actual operation even though there may be provided means for adjusting the tension of the spring to any desired amount of traction.

The present invention provides traction equipment of a highly simplified structure which includes an elongated pulley or roller over which the traction cord travels. This elongated roller permits the traction cord to slide freely laterally over the surface of the pulley when the patient shifts his position or turns over, thereby maintaining the weight continuously in proper alignment with the patient's leg to give true traction at all times.

Further objects and advantages of the present invention will become apparent as the description proceeds, and the features of novelty will be pointed out in particularity in the appended claim.

The invention will be understood more readily from a consideration of the accompanying drawings, wherein

Fig. 1 is a perspective view of the improved traction apparatus showing the same mounted on the foot frame of a hospital bed;

Fig. 2 is a vertical section taken on the line II—II of Fig. 1, looking in the direction of the arrows; and

Fig. 3 is a fragmentary sectional elevation illustrating the internal structure of the roller.

Referring more particularly to the drawings, the improved traction apparatus of the instant invention includes a frame composed of widely spaced tubular upright bars 5 and 7, the spacing between these bars being almost that of a hospital bed, these upright bars 5 and 7 being held rigidly spaced and braced by upper and lower cross bars 9 and 11 which extend through and project beyond the upright, vertical bars 5 and 7 and have their projecting ends threaded for the reception of locking nuts 13. These vertical bars 5 and 7 are suspended from the top portion of the foot frame of the bed by suspension hooks 15 and 17 which are bolted to the vertical bars 5 and 7 as indicated at 19 and 21, and the vertical bars are provided with a series of lateral through holes 23 and 25 for adjustably mounting horizontal bracket arms 27 and 29 which are held on the vertical bars 5 and 7 by connecting angle plates 31 and 33 bolted to the horizontal bracket arms as is indicated at 35 and 37 and which are secured adjustably to the vertical bars 5 and 7 by pins 39 and 41 which are passed through holes provided therefor in the angle plates 31 and 33 and through corresponding selected holes of the series 23 and 25 in the vertical bars 5 and 7. The pins 39 and 41 are guarded against loss by having safety chains or the like 43 and 45 suitably secured thereto as by means of rings 47 and 49 permanently attached to the pins 39 and 41 and also to collar 51, passed over bolts 35 and 37 and held secure by the locking nuts for these bolts.

The angle plates 31 and 33 are right angle plates, so that the arms 55 and 57 thereof are horizontal and maintain the bracket arms 27 and 29 continuously horizontal in all positions of adjustment of the bracket arms.

These horizontal bracket arms 27 and 29 constitute mounting means for elongated smooth surfaced, preferably wooden roller 59 which has end flanges 61, 63 and is mounted on the horizontal bracket arms 27 and 29 by restricted mounting ends 65, 67 of an elongated axle member 69 which extends longitudinally through roller 59. The mounting ends 65 and 67 of the axle are threaded at their outer extremities for the reception of lock nuts 71, 73 which rigidly secure the mounting ends 65, 67 of the axle in place in the horizontal bracket arms 27 and 29. The roller 59 rotates with respect to the axle 69, and at each end contains a hard metallic bearing 75 which inhibits excessive wear on the roller during service.

It will be seen from Fig. 1 that traction on a patient's fractured leg is established by a suitable connector 77 secured to the leg and also to a traction cord 79 which is passed over the roller 59 and has traction weights 81 secured to the free end of the cord 79, such weights being freely suspended from the roller 59 by the cord 79, and impart continuous traction pull on the patient's leg in a straight line independently of the patient shifting his position on the bed, or turning over, as such changes in position merely cause the traction cord 79 to slide correspondingly along the elongated roller 59, while being retained on the roller by the end flanges 61 and 63.

Also it will be apparent that the traction apparatus of this invention is usable equally with tall and short patients, without requiring any structural changes in the equipment.

Also, while embodiment of the invention illustrated on the accompanying drawings and described in detail in the foregoing description represents a preferred embodiment of the invention, it will be apparent that various structural changes may be made without departing from the scope of the invention, as may be required by given circumstances; and accordingly it will be understood that it is intended and desired to embrace within the scope of the invention such modifications and changes as may be necessary or desirable to adapt the invention to varying conditions and uses, as defined by the following claim.

I claim:

A surgical traction device for the treatment of fractures, which comprises a frame adapted to be suspended on a hospital bed frame and having a pair of upright bars spaced apart at a suitable distance somewhat less than the width of the hospital bed, an upper spacer bar extending through the upright bars and rigidly secured thereto for rigidly holding the upright bars in parallel

spaced relation, a lower spacer bar also extending through the upright bars and rigidly secured thereto for continuously rigidly maintaining lower portions of the upright bars in spaced parallelism, suspension means secured to the upright bars for suspending the bars on an end frame of the hospital bed, a bracket arm horizontally extending outwardly from each upright bar, means for adjustably mounting each bracket arm on its upright bar, the bracket arms extending outwardly from the upright bars in parallelism with respect to each other, an axle bar rigidly mounted on the bracket arms and interconnecting the bracket arms, an elongated, substantially uniform, smooth-surfaced roller having substantially the same uniform diameter throughout its length to provide a uniform, straight cylindrical surface for the roller mounted on the axle bar and in the bracket arms, and rotatable relative to the axle bar, a traction cord adapted to be connected to a patient's fractured limb and passing over the roller in slidable engagement with the smooth, uniformly cylindrical surface of the roller, there being traction weight means attached to the traction cord and suspended thereby, means on the traction cord for connecting the traction cord to a fractured limb, the traction cord and weight means being freely slidable along the uniformly cylindrical, smooth-surface roller responsive to shifts in position of a patient on the bed for continuously maintaining straight line traction pull on the fractured limb independently of the position of the patient with respect to the bed, an end flange adjacent to each end of the roller and concentric therewith and having a diameter substantially larger than that of the cylindrical roller thereby defining a retaining collar at each end of the roller for preventing accidental displacement of the traction cord from the uniform surface of the roller independently of any position assumed by the patient with respect to the bed, and wear-resisting bearings interiorly of the roller and enclosing the axle bar and defining stub sleeves therefor for inhibiting excessive wear on the roller resulting from service rotations thereof on the axle bar.

References Cited in the file of this patent

UNITED STATES PATENTS

780,988	Gorham	Jan. 31, 1905
2,697,645	Mitchell	Dec. 21, 1954

FOREIGN PATENTS

526,943	Belgium	Mar. 31, 1954
---------	---------	---------------