

June 14, 1960

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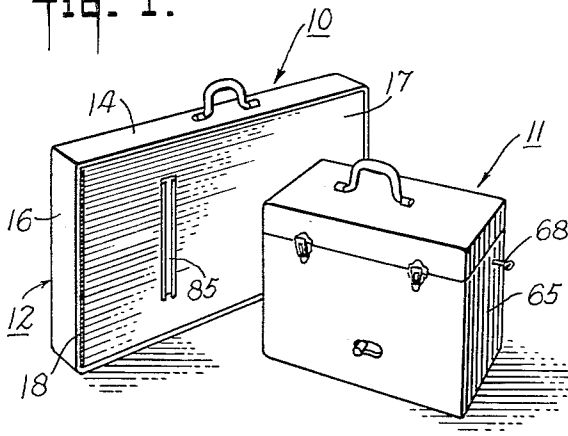
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TRACTION DEVICE

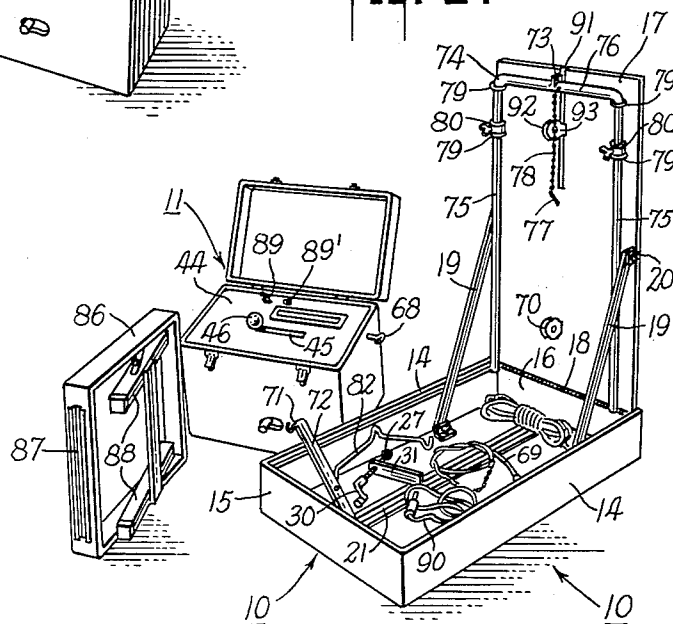
Filed Sept. 21, 1956

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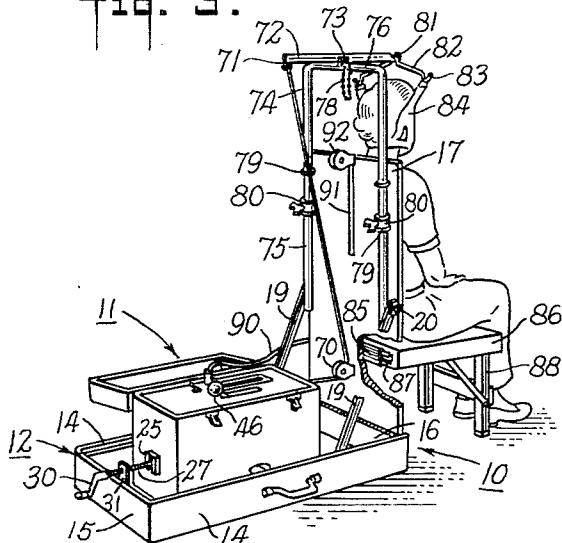
Fig. 1.



719.2.



719.3.



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Fig. 4.

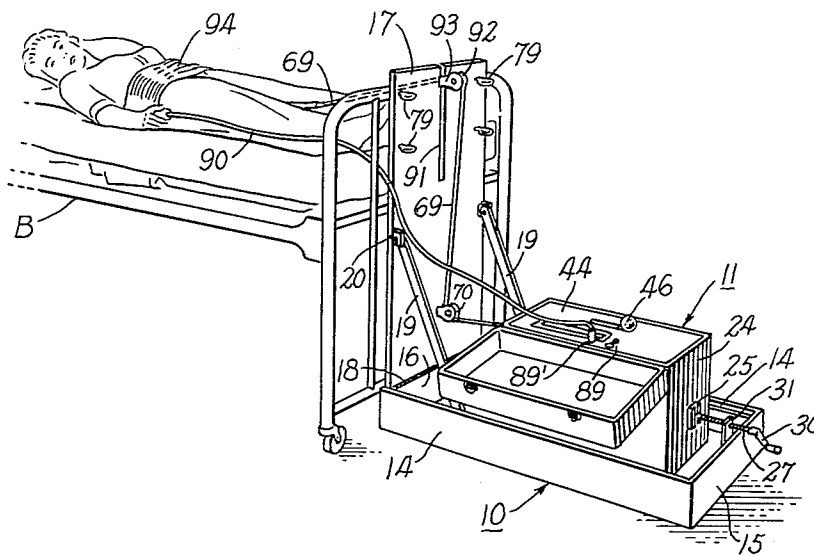
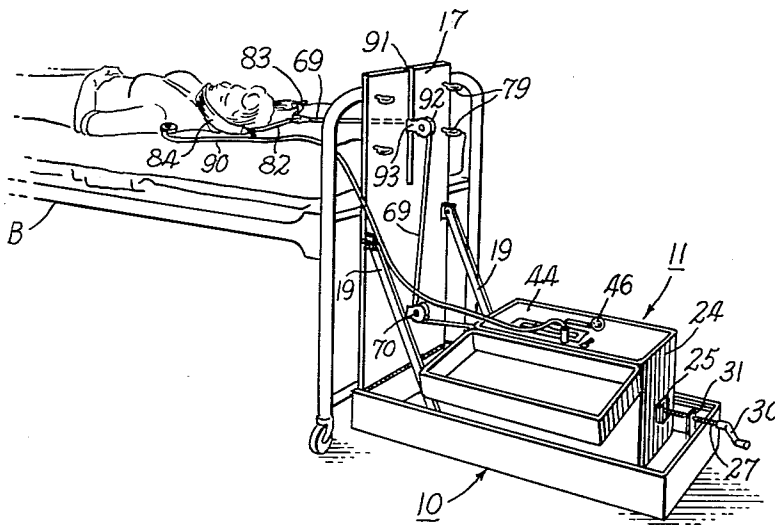


Fig. 5.



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Fig. 6.

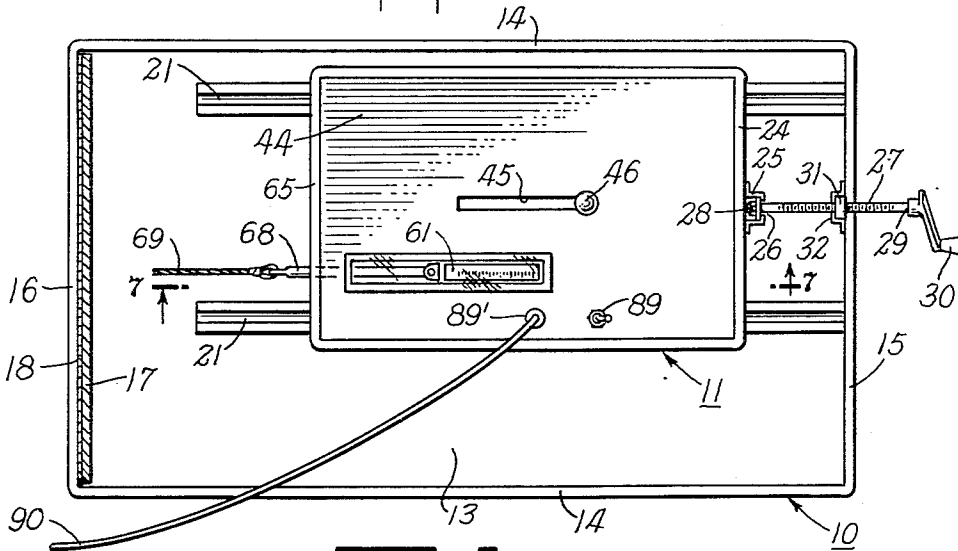
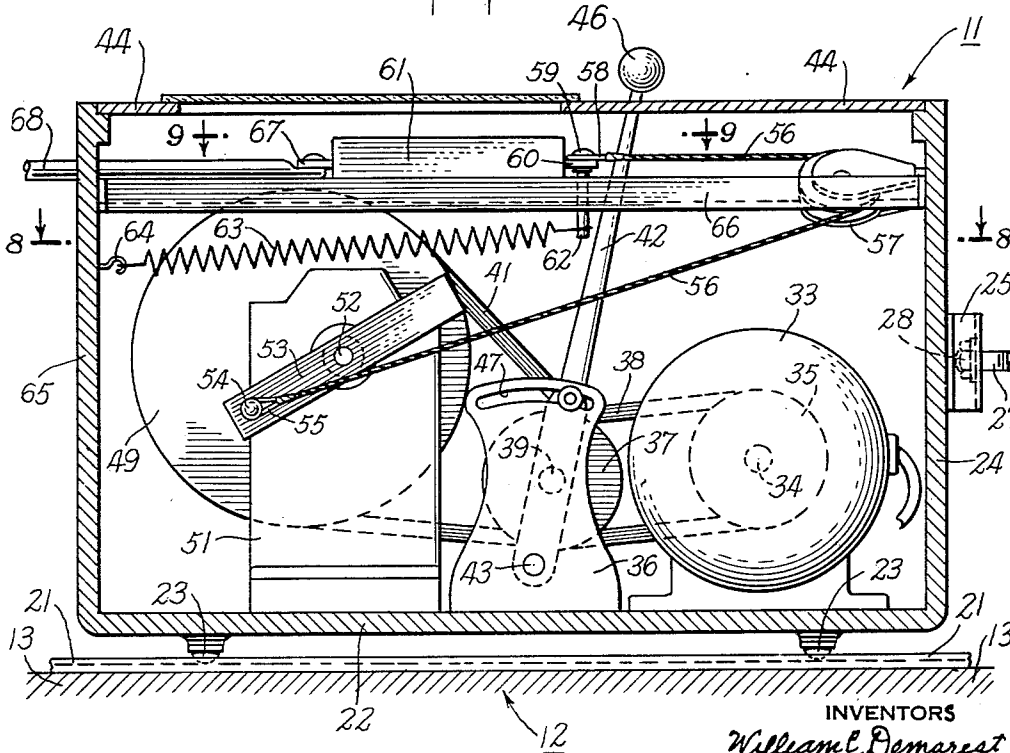


Fig. 7.



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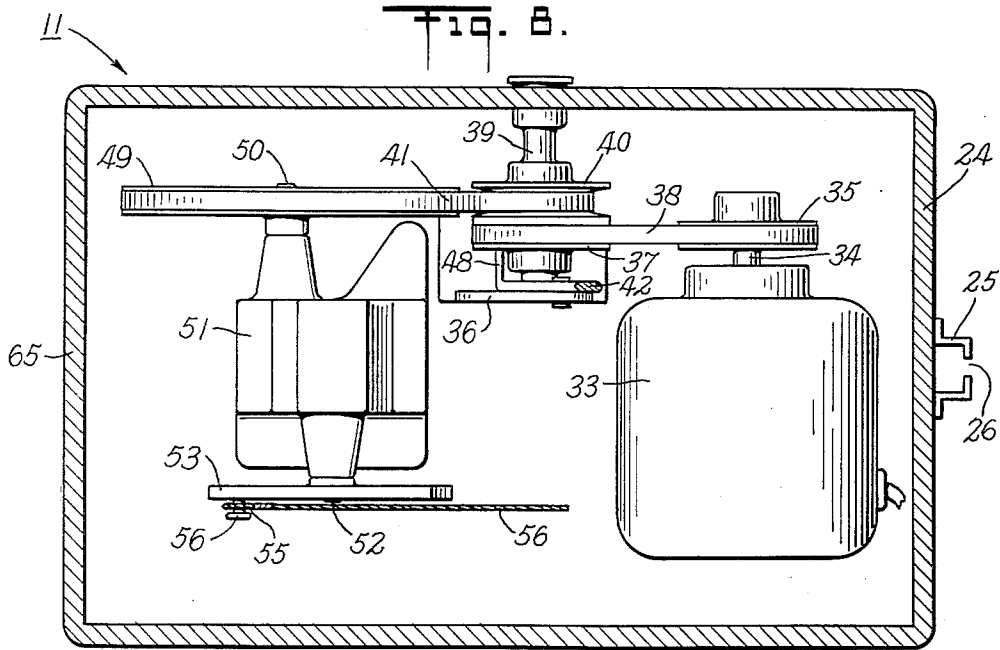
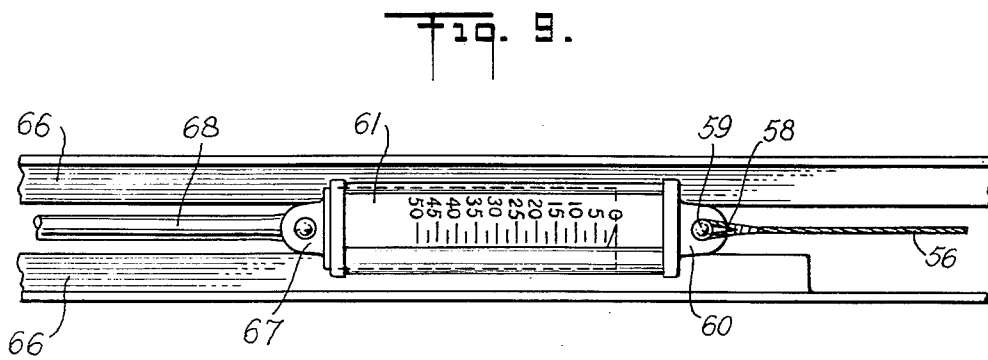
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TRACTION DEVICE

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8 Claims. (Cl. 128—75)

This invention relates to a physio-therapy apparatus, and more particularly to a traction apparatus for effecting physio-therapeutic treatment, and still more specifically to an apparatus for applying intermittent traction to alleviate intervertebral tension.

It is known that physio-therapeutic benefits may be secured by intermittent traction, either in cervical, lumbar or limb afflictions. Apparatus for applying traction under the trained supervision of orthopedists, neurologists and physio-therapists as heretofore known to be supplied at clinics or surgeons' offices has made such apparatus expensive to the patient due to the cumbersome nature of the apparatus, and has, in a large measure, limited the extent and frequency of treatment which may be found desirable.

In accordance with the present invention, it is contemplated as an object thereof to provide apparatus for applying traction adaptable for cervical, lumbar, or limb treatment which is simple in operation, compact in construction and which may be transported for installation in the home of the patient, with universal adaptation for treatment of the patient in the seated or recumbent position.

Thus, in accordance with this invention, a readily portable apparatus is provided, adaptable to meet the requirements of treatment in providing constant or intermittent traction for the physio-therapeutic treatment of ailments of the cervical, lumbar or limb regions, where the desired frequency of treatment may be assured, with great convenience to the patient while retaining the accepted technique in the application of these desirable therapeutic forces, thereby avoiding the necessity for hospitalizing the patient, or frequent clinical visits to obtain such treatment.

In accordance with this invention, it is an object thereof to provide a combination of a traction device which is portable, with components comprising motorized, intermittent resilient traction developing means, and a guiding support or standard with which the motorized means exercises its traction force, and a coupling means to direct the traction influence to the patient, all formed of component elements which are compact, yet efficient in operation and adaptable for installation to meet the requirements of treatment for a variety of conditions of support of the patient to be treated, so that a patient to be treated may be in the seated or recumbent position employing the same apparatus, thus providing adaptability to a wide variety of required treatments in the use of the beneficial traction component.

Still more particularly it is an object of this invention to provide a readily portable, low cost assembly for providing traction in the physio-therapeutic treatment of patients requiring this force, including apparatus permitting installation thereof in the home of the patient or in a variety of locations, at the clinic or hospital and when not in use may be stored compactly.

To attain these objects and such further objects as

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may appear herein or be hereinafter pointed out, reference is made to the accompanying drawing forming a part hereof, in which:

Figure 1 is a perspective view showing the carriers for the apparatus;

Figure 2 is a perspective view exposing the contents of the carriers shown in Figure 1;

Figure 3 is a perspective view illustrating the apparatus set up for the provision of cervical traction, with the patient in the seated position;

Figure 4 is a perspective view showing the apparatus for lumbar traction of a recumbent patient;

Figure 5 is a perspective view showing the apparatus set up for cervical traction of a recumbent patient;

Figure 6 is a magnified plan view of the motorized unit and support;

Figure 7 is a further magnified section taken on the line 7—7 of Figure 6;

Figure 8 is a plan view of Figure 7;

Figure 9 is a magnified plan view taken in the direction of lines 9—9 of Figure 7.

Making reference to the drawings, in carrying out an object of this invention by readily portable carriers, there is illustrated in Figure 1 a base carrier 10 and a powerized unit carrier 11, details whereof will appear as this description proceeds. The carriers 10 and 11 are fitted with known transporting handles whereby the units may be manually handled and carried conveniently.

Referring now to Figure 2, the carrier 10 consists of a base 12 of rectilinear outline, having a bottom wall 13, to which are rigidly affixed side walls 14, 14 and end walls 15 and 16. The open end of the base 12 has a cover member 17 forming a standard, as will appear as this description proceeds, joined to the end wall 16 by the hinge 18. Props 19, 19 may be angularly extended rigidly to dispose the cover member 17 in relation to the base 12. Removable coupling, such as 20, may be provided to opposite ends of the props 19, in the form of wing nuts and bolts, in a manner which will readily be understood, for removably coupling the props 19 at their respective ends to the base 12 and standard 17 respectively.

Mounted on the bottom wall 13 are parallel guide tracks 21, running normal to the end wall 16 in the direction of the end wall 15. The tracks are arranged to receive the carrier 11. The carrier 11 has its bottom wall 22 formed with castors or gliders 23, spaced apart to engage the guide tracks 21, slidably to support the carrier 11.

In this position slidable adjustability of the powerized carrier unit 11 may be effected, and for this purpose the powerized end wall 24 of the powerized carrier unit is formed with a channel 25, having an open-ended slot 26, to which may be coupled the feed screw means 27, one end 28 of which is headed to engage the channel, the other end 29 of which is formed with a crank 30.

Along the length of the feed screw means 27 there is mounted a bar 31 which is screw threaded to receive the threaded bar 27, adjacent one end thereof. The bar 31 may slidably be mounted in a channel 32 affixed to the interior face of the end wall 15. It will be evident that rotation of the crank 30 may serve to slide the motorized unit case 11 to and from the end wall 16.

Referring now to Figures 6 to 9, it will be noted that mounted within the motorized carrier case 11 is a motor 33, whose drive shaft 34 carries a pulley 35. Rotation from the pulley 35 is transmitted to the speed changing assembly 36 which comprises a driven pulley 37 to receive the drive belt 38. The driven pulley 37 has mounted on the shaft 39 a slidable sheave 40 which, in relation to the corresponding face on the driven pulley

37, may adjustably receive the belt 41. A control handle 42 is pivoted at 43, at one end thereof, and extends through the closure 44 through a slot 45, to provide a manual control 46. The control handle 42, at its intermediate portion, is guided in a quadrant slot 47, to limit its movement. An extension finger 48, coupled with the control handle 42, is arranged to cam the sheave to widen or narrow the slot for receiving the belt 41. The belt 41 is coupled with the pulley 49 of a magnitude to obtain a speed reduction. Further speed reduction is achieved by the control handle 42, it being understood that more distantly spacing the sheave 40 from the driven pulley 37 will serve to reduce the rotation of the driven pulley 49, whereas a closer coupling will increase the speed of rotation.

The pulley 49 is mounted on a shaft 50, extending into the transmission casing 51 for operating the power take-off shaft 52. The shaft 52 carries a crank arm 53, terminating in a crank pin 54. The crank pin 54 has anchored to it one end 55 of a cable 56. The cable 56 is guided over the guide pulley 57 anchored to the wall 24 to direct the terminal end 58 substantially in parallelism with the closure 44.

The terminal end 58 of the cable is connected to a pin 59 which extends through the ear 60 of a spring balance scale 61. The free end 62 of the pin 59 is connected to the tension spring 63, affixed at its opposite end to the anchoring hook 64 from the end wall 65, thereby maintaining the cable 56 under constant tension. The spring scale 61 is guided on spaced tracks 66 affixed to walls 24 and 65. The scale 61 has its movable ear 67 hooked to the traction link 68.

Reference will now be made to an installation for treatment of a patient in the seated position for a cervical applied traction.

In Figure 3 the cover member 17 forming the standard is rigidly propped to the vertical position with the powerized carrier unit 11 positioned as previously described. Thereupon there is attached to the traction link 68 a cable or other flexible link 69 which is guided over the guide pulley 70 to one end 71 of a rocker arm 72, pivoted at an intermediate point 73 to the extensible frame 74 which comprises an inverted tubular frame having spaced branches 75, 75, and joined by the intermediate sections 76 upon which the pivot 73 is formed.

The pivot 73 comprises spaced tongues adapted to receive a pin 77, which is held captive for ready use on a chain 78. A conforming aperture in the rocker bar 72 may hold the rocker bar tiltably on the intermediate sections 76 of the frame. Eyes or like guides 79 may adjustably guide the frame 74 initially to hold it in the retracted position for compact packaging, as shown in Figure 2, or to elevate it, as shown in Figure 3. Wing nut control rings 80 sleeved on the frame serve as abutments or stops to hold the frame 74 in predetermined position, either elevated or retracted.

The rocker arm 72, at its free end 81, is provided with a yoke 82 having hooked ends 83 from which ends an occipital harness 84 is supported for receiving the head of the patient to be treated.

The standard 17, at its exterior face, is provided with a bracket 85. A seat 86 has one edge thereof formed with a channel 87 for complementary attachment to the bracket 85. Pivotal legs 88 adjacent the front of the seat and suitably braced by foldable struts, convert the seat 86 and the standard 17 into a seat for the patient, as shown.

With the installation as described, the powerized unit 11 is adjustable by sliding along the carrier base 10 and this is effected by rotating the feed screw 27 to apply the minimum tension to the linking cable 69 and, in turn, to the yoke 82, affixed to the patient, the powerized unit being set so that the traction link 68 is in the fully extended position at this point at the time when initial adjustments are made. The minimum point of traction

will be evident by inspecting the spring scale reading 61. Should it be desired to have the minimum tension above zero, the unit 11 may be drawn along the tracks 21 until the reading on the spring scale 61 indicates the desired minimum tension. To activate the motor 33, manually controlled alternate switching means 89, 89' may be provided, the former 89, for manual operation by the attendant who first sets up the device, and the latter 89', by providing a remote control switch at the end of the cable 90 accessible to the patient. The actuation of the motor cyclically applies tension to the cable 56 and, through it, transmits the tension to the traction link 68 leading to the patient. The number of cycles per unit of time may be varied by the actuation of the control lever 42, to accelerate or retard the number of traction impulses as the orthopedist may find desirable. During each impulse of traction, the spring scale needle will show the low and the high so that the kind of tension as well as the periodicity of the impulses may be determined. Operation under these conditions permits the prescription of the cyclical treatment as well as the tension, and likewise permits, during such treatment, of an adjustment to be made to vary the tension from the minimum, the eccentricity of the crank pin 54 determining the maximum pull which will be effected, as it will be readily understood that the displacement has a relationship to the tension which is applied. Once the device is in operation, the patient may be left untended and may discontinue the treatment by operation of the remote control switch for shutting off the power to the motor.

The mobility of the motorized unit 11 to the carrier base 10 provides an adaptability for installation in a minimum amount of space, without sacrificing the requirement for adjustment. At the same time the installation makes for a highly compact assembly so that it may be transported from one location to the other, and is even suitable for transportation by home servicing visiting nurses.

It will be observed that by the use of the base as a carrier to support the motorized unit during use, that a novel and convenient assembly is provided, without necessitating heavy and cumbersome units or the anchoring of the unit into a position where the traction device is to be operated, as the motorized unit which is guided on the tracks formed in the carrier provides adequate anchoring resistance to the motivating force against the patient.

By the relationship of the motorized unit 11 to the carrier and the standard 17, an adequate balance is furnished to provide portability without extraneous anchoring attachments to exert traction action on the patient as the position of the assembled elements 10 and 11 and their location are sufficient to provide the necessary relative immobility and versatility to the tractile forces in a variety of desired positions of the patient.

These features, as briefly indicated, will be appreciated by reference to Figures 4 and 5 wherein the identical assembly may be used for intermittent lumbar traction or intermittent cervical traction of a patient in the recumbent position.

Referring now to Figure 4, the assembly as set up in Figure 3 has removed therefrom the frame 74 by sliding the same from the ring guides. The standard 17 is also formed with a medially positioned longitudinal slot 91, along which a guide pulley 92, supported on a bracket 93, may be adjustably positioned in accordance with the height or position of the patient. The cable 69 leading to the motorized traction unit is guided over the pulley 92, extending through the slot 91 in the direction of the patient on the supporting bed B. In the illustration, the cable extends to a lumbar harness 94, while the patient is in the recumbent position. The electrical system cable 90 for manipulating the control switch may be likewise extended over the bed within grasp of the patient, for controlling the motorized traction unit.

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Similarly, as shown in Figure 5, the traction cable 69 may have affixed thereto a cervical harness of the character shown in the embodiment illustrated in Figure 3, while the patient is in the recumbent position, with the head extended adjacent the traction installation.

Likewise, while the device has been shown for intermittent lumbar traction, for cervical traction in the recumbent or seated position, the device may be used for applying traction to the limbs of a patient, if such may be found desirable, as will be readily understood. Ankle, shoulder and arm traction, sacral traction, as well as various other forms of traction may be suitably applied. The traction forces which are applicable in no way require costly installation to correlate the supporting expedient, whether it be a chair or a bed, efficiently to provide the traction force.

It will also be observed that by the relative adjustability of the motorized unit 11 to the guide 10, a wide variety of traction forces may be exerted, depending upon that portion of the body which must be treated, it being understood that each portion of the body may require or be subjected to various traction forces. These forces may be determined directly as the slack in the cable is taken up between the patient and the traction link 68 by the relative movement of the motorized unit 11 on the carrier 10 during adjustment of the screw member 27.

Having thus described the invention and illustrated its use, what is claimed as new and is desired to be secured by Letters Patent is:

1. A physio-therapeutic apparatus for supplying controlled traction to a harness coupled to a portion of a body of a patient to be treated for tensioning the portion and body relatively to each other comprising a carrier casing base member having substantially horizontal guiding means on its bottom wall, a standard connected with said base member vertically extendable therefrom, an assembly comprising intermittent traction developing means, said assembly being slidably mounted on said guiding means on said bottom wall, tensional linking means extending from said traction developing means to said standard, said linking means being arranged to be connected to said harness for applying traction to said patient, said traction developing means being variably positionable on said guiding means for varying the extent of said tension, means engaging a side wall for moving said guiding means and traction means relatively to each other, thereby to vary the tension of said traction on said harness.

2. A physio-therapeutic apparatus for applying controlled traction to a harness coupled to a portion of a body of a patient to be treated for tensioning the portion and body relatively to each other comprising a base member comprising a carrier case having upstanding side walls and having substantially horizontal guiding means on a bottom wall, a standard forming a closure for said case connected therewith, vertically extendable therefrom, prop means for rigidly holding said standard relatively to said case, an assembly comprising intermittent traction developing means slidably mounted on said guiding means within said case, spring loaded tensional linking means extending from said traction developing means to said standard, said linking means being arranged to be connected to said harness for applying traction to said patient, said traction developing means being variably positionable on said guiding means for varying the extent of said tension, means on a side wall of said case for moving said guiding means and traction means relatively to each other, thereby to vary the tension of said traction on said harness.

3. A physio-therapeutic apparatus for applying controlled traction to a harness coupled to a portion of a body of a patient to be treated for tensioning the portion and body relatively to each other comprising a base member comprising a carrier case having upstanding side walls and having substantially horizontal guiding means on a bottom wall, a standard forming a closure for said case

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in extending over the side walls connected therewith, vertically extendable therefrom, prop means extending from said standard to said case for rigidly holding said standard relatively to said case, an assembly comprising intermittent traction developing means slidably mounted on said guiding means, spring loaded tensional linking means extending from said assembly of traction developing means to said standard, said linking means being arranged to be connected to said harness for applying traction to said patient, said assembly of traction developing means being variably positionable on said guiding means for varying the extent of said tension, means engaging said assembly and case for moving said guiding means and traction means relatively to each other, thereby to vary the tension of said traction on said harness and variable guiding means for said linking means on said standard.

4. A physio-therapeutic apparatus for supplying controlled traction to a harness coupled to a portion of a body of a patient to be treated for tensioning the portion and body relatively to each other comprising a base member comprising a case with upstanding side walls, a bottom and having substantially horizontal guiding means on said bottom, a standard connected therewith vertically extendable therefrom, an assembly comprising an intermittent traction developing means slidably mounted on said guiding means, tensional linking means comprising a flexible cable extending from said traction developing means to said standard, said linking means being arranged to be connected to said harness for applying traction to said patient, said traction developing means being variably positionable on said guiding means for varying the extent of said tension, and manually adjustable means extending from a side wall of said case providing means for moving said guiding means and traction means relatively to each other, thereby to vary the tension of said traction on said harness.

5. A device in accordance with claim 4 wherein said manual means extend from a side wall in opposed position to said standard whereby when tension is increased as said traction developing means is moved away from said standard, such movement operating to increase resistance to tipping as the traction is increased.

6. A physio-therapeutic apparatus for supplying controlled traction to a harness coupled to a portion of a body of a patient to be treated for tensioning the portion and body relatively to each other comprising a base member comprising a case with upstanding side walls and a bottom and having substantially horizontal guiding means on said bottom, a standard connected therewith vertically extendable therefrom, an assembly unit comprising an intermittent traction developing means slidably mounted on said guiding means, tensional linking means comprising a flexible cable extending from said traction developing means to said standard, said linking means being arranged to be connected to said harness for applying traction to said patient, and including guiding means for said cable to extend tension on said harness, said traction developing means being variably positionable on said guiding means for varying the extent of said tension, means coupled to said case side walls and assembling for moving said last mentioned guiding means and traction means relatively to each other, thereby to vary the tension of said traction on said harness.

7. A device in accordance with claim 6 wherein said guiding means to extend tension vertically comprise a rocker arm, with a fulcrum, said fulcrum rigidly affixed to said standard and swingably supporting said rocker arm in the vertical plane.

8. A portable physio-therapy apparatus for applying intermittent traction to a harness coupled to a portion of the body of a patient comprising a base member consisting of a portable carrier case including side walls and a bottom, a rigid standard affixed to said base member on a side

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wall, a motorized, intermittent traction developing assembly mounted on and adjustable relatively to said base on said bottom wall, harness cable linking means actuated by said traction developing means and means on said standard variably to guide said cable linking means to said harness, means on said base extended from a side wall for adjustably positioning said assembly toward and away from said standard, said assembly in its adjustment on said base variably applying tension to said cable and providing single means for providing traction in the vertically or horizontally extended position of said cable linking means and resilient spring means interposed between said linking means and harness having indicia means for said tension.

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