Feb. 3, 1959 W. C. DEMAREST ET AL 2,871,853

PORTABLE TRACTION DEVICE

Filed Nov. 7, 1957

Fig. 1.

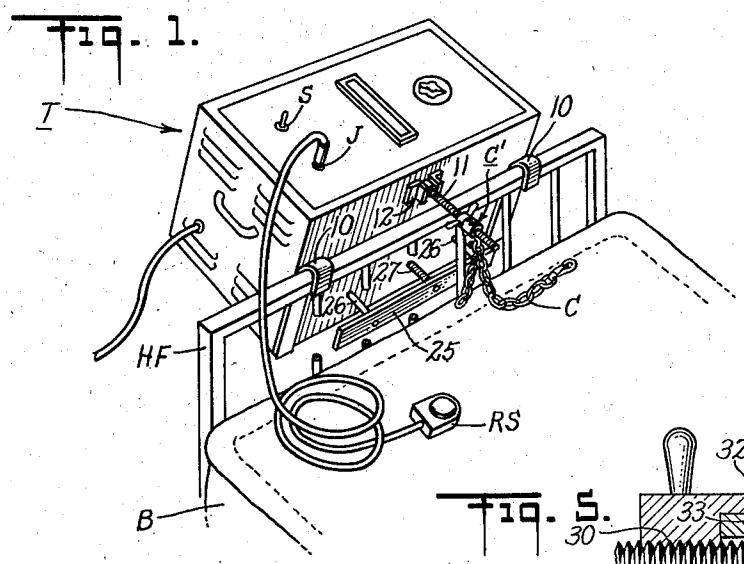


Fig. 5.

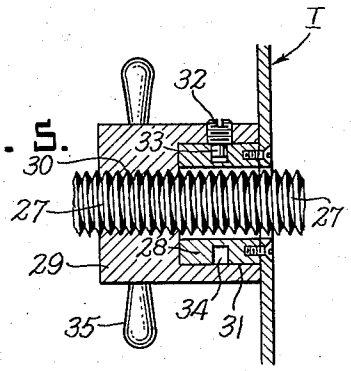


Fig. 2.

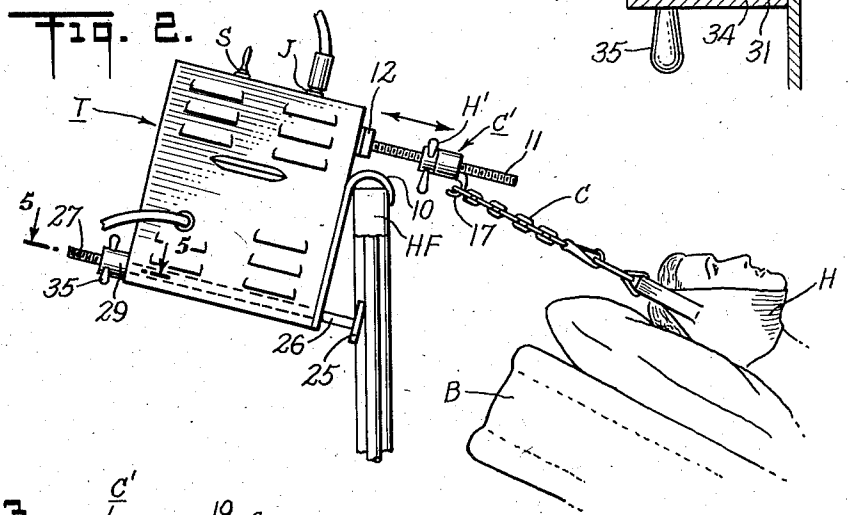


Fig. 3.

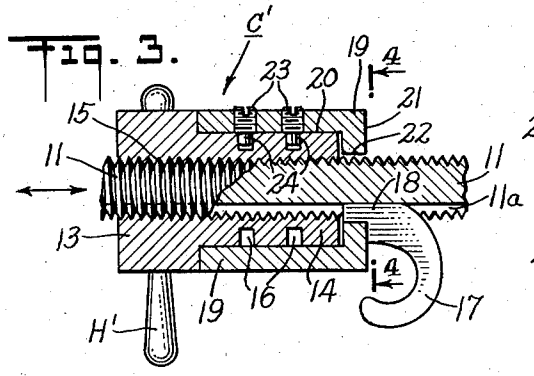
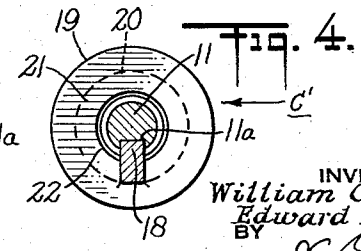


Fig. 4.



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PORTABLE TRACTION DEVICE

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Application November 7, 1957, Serial No. 695,007

6 Claims. (Cl. 128—84)

This invention relates to a physio-therapeutic device, and more particularly to an apparatus for developing and applying, through the medium of a harness applied to the body of the patient, an intermittent tractive force.

Still more particularly, this invention relates to a readily portable apparatus for the application of intermittent traction, which apparatus includes novel mounting and adjusting features, thereby rendering such apparatus adaptable for use in a wide variety of situations in which the patient may be positioned.

The benefits of intermittent traction as well as the advantages of providing a portable, intermittent traction device, have been fully set forth in the copending joint application of William C. Demarest and Edward Malmstrom, Serial No. 611,253, filed September 21, 1956.

While the unit described and claimed in the above mentioned copending application in a measure satisfies the requirements of flexibility of operation and portability, it has been found desirable to provide a portable intermittent traction device adapted particularly for use in connection with hospital type beds, and other patient supporting surfaces which are capable of maintaining the patient in a canted, partially reclining, tilted, recumbent or prone position.

It is desirable that a tractive force in treatments outlined be applied as nearly as possible in parallelism with the direction in which the affected portion of the body is sought to be articulated, and in the most comfortable position of the patient, to avoid conflicting stresses.

While such parallel intermittent traction has been achieved through the use of traction generators integrated within cumbersome and expensive supporting surfaces, portable apparatus particularly adapted to apply parallel intermittent traction to a patient lying in a hospital bed or like tiltable surface has not heretofore been believed feasible.

In accordance with the present invention, it is contemplated as an object thereof to provide a portable intermittent traction apparatus adapted for use with a wide variety of hospital beds or like supporting surfaces. A further object of this invention is to provide a portable traction apparatus of the type described of a high degree of flexibility, to permit the application of traction in a parallel direction to the supporting surface, notwithstanding the canted or tilted nature of the said surface, whereby cervical as well as lumbar traction may be imposed with available hospital beds.

A further object of this invention is to provide a traction device of the type described which may be quickly and easily mounted on a hospital bed or the like, even by persons of limited strength, such as nurses.

A still further object of this invention is to provide an assembly of the type described with novel traction transmitting means whereby twisting and rotation of the harness, often found in intermittent traction devices, is eliminated and the forces which may be desired can be imposed free from detrimental components.

In order more fully to describe the invention and

illustrate its use, reference is made to the accompanying drawing in which—

Figure 1 is a perspective view of the device as mounted on a bed, with parts of the bed frame broken away to show details;

Figure 2 is a side elevation of the device mounted in operating position on a canted hospital type bed, parts of the device being broken away to show details;

Figure 3 is a magnified cross sectional view of a traction harness hitch in accordance with the invention;

Figure 4 is a section taken on the line 4—4 of Figure 3;

Figure 5 is a magnified section taken on the line 5—5 of Figure 2.

Describing the invention in detail, there is provided an intermittent traction generator referred to generally as T, which has a pair of extending hook-like hanger supports **10**, bolted or otherwise rigidly affixed to the front of the case of the generator T. The traction generating mechanism, which is not a feature of the invention, may be of any of a number of types, the mechanism used in the aforementioned pending application serving as an example of means to supply intermittent traction controlled so far as amplitude, frequency and force of the traction stroke are concerned.

A threaded pull rod **11**, which is operatively connected to the source of intermittent traction, is centrally spaced between the hanger supports **10** and extends outwardly from the generator T. The rod **11**, which is provided with an axially aligned keyway **11***a*, is slidably guided by the external support sleeve **12** and, upon activation of the traction source, reciprocates inwardly and outwardly through the sleeve **12**, as indicated by the arrows (see Figure 2).

The rod **11** is adjustably coupled to a patient-applied harness H through the medium of a cable or chain C, having an end fastened to the harness H and a portion spaced from the said end removably attachable to a carriage C', adjustably supported on the rod **11**.

A boss **13**, having a handle portion H' and an extended shank portion **14**, is internally threaded as at **15**, to receive the rod **11**. The shank **14** of the boss **13** has a pair of spaced annular recesses **16** formed in the outer wall thereof.

A cable or chain receiving hook **17**, with an inwardly projecting lug **18**, is formed integrally with cup **19**. The said cup has an internal bore **20** of a dimension to be closely sleeved over the shank **14** of the boss **13**. The end **21** of the cup **19** is provided with an inwardly extending shoulder **22** of a diameter clearing but closely embracing the threaded rod **11**. The cup **19** is also provided, through radially tapped holes in the wall thereof, with a pair of threaded, spaced-apart set screws **23** having unthreaded extending stud portions **24**.

The cup **19** and hook **17** are joined to the boss **13**, threaded over the rod **11**, by sleeveing the bore **20** of the cup **19** over the shank portion **14**, with the lug **18** of the hook **17** positioned within the keyway **11***a* of the rod **11**. In this position, the studs **24** are meshed with the annular recesses **16** in the shank **14** of the boss **13** by inwardly threading the set screws **23**.

Rotation of the handle H' serves to advance the hook **17** along the rod **11** toward or away from the patient, relative rotation of the hook **17** and the rod **11** being prevented by the positive interfit between the lug **18** and the keyway **11***a*.

The angular direction of application of the tractive force is rendered variable in a vertical plane by the provision of an adjustably extendible frame abutting spacer or brace **25** spaced for a distance from the hanger supports **10** to secure greatest amount of leverage in adjustment,

without loss of the counter-balancing gravitational force to resist tilting.

The brace **25** is rigidly affixed to a pair of side struts **26** and to a centrally extended threaded strut **27**, the side struts being mounted to permit them to be telescoped into the generator T within suitable journals formed therethrough. The threaded strut **27** passes through the stationary boss **28** affixed by screws or welds to the rear face of the generator casing, and extends for a distance rearwardly thereof.

A capping nut **29**, having a central threaded passage **30**, is threaded over the stud **27**, the bore **31** of the nut **29** being of a dimension rotatively to receive the stationary boss **28**.

The wall of the nut **29** is radially tapped to receive set screw **32**, having an extended tip **33**. The said tip **33**, upon advancement of said set screw **32**, acts slidably to ride within the annular ring **34** formed about the boss **28** and thereby linking the cap nut **29** and boss **28** against relative lateral or axial movement. The nut **29** is likewise equipped with a projecting handle or turn knob to facilitate rotation.

It will be readily recognized that when the hooks **10** of the generator T are supported on a horizontal frame member HF of a hospital bed or the like, extension of the strut **27** by rotation of the capping nut **29** will force the brace **25** against frame members forming the end (either head board or foot board) of the bed B, thereby pivoting the generator T about the horizontal hanger member HF, acting as a trunnion. As a result of such pivoting, the angular relation of the pull rod **11** to the patient supporting surface is varied, thereby varying the direction of application of the tractive force as may be found effective.

When the spring of the hospital bed is inclined to the horizontal (see Figure 2), the brace **25** may be extended by manipulating the turn knob **35**, thereby to incline the rod **11**, thus assuring efficient parallel or near-parallel application of the tractive force.

Variations on the magnitude of tractive force to be applied are made by varying the position of the carriage assembly C' on the rod **11**, it being understood that movement toward the generator T will increase the tension and thereby increase the magnitude of forces, while conversely, movement away from the generator will decrease the said magnitude.

The assembly illustrated is equipped with optional novel switching means, providing the patient with a means of interrupting treatment in an emergency, without necessitating a change of position on the part of the patient.

The primary "on-off" switch S is located on the generator T. A jack J is adapted to receive a remote switch assembly RS, the said assembly acting, in the jack-inserted position thereof, to supplant the switch S as the primary means of control. The assembly RS may include a switch unit of the automatic release or "dead man" type wherein the switch is spring-urged to the "open" position. A "dead man" type of unit is desirably employed in situations where constant patient supervision is not feasible, or where the patient, by reason of a restricting harness or

paralysis, lacks full control and/or coordination. In such cases the "dead man" switch may be arranged so as to be held in the "closed" position by the body weight of the patient, rolling or other movement of the patient serving to break the circuit and thereby to suspend application of intermittent traction.

By the above-described construction, there is provided a highly portable traction unit which is capable of being speedily demounted from one location and applied to another. The unit is highly flexible in that it may be used in combination with a wide variety of hospital beds and the like, at the same time providing a simple means of adjustment to vary the magnitude and direction of application of intermittent traction.

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 portable intermittent traction device adapted to be adjustably mountable on the frames of a wide variety of hospital beds and the like comprising hanger support means adapted pivotally to suspend said device on a horizontal frame member of said bed, adjustably extendible tilting spacer means adapted to cooperate with portions of the frame of said bed to tilt said device about said horizontal member as a pivot, and intermittent traction transmitting means extending from said device, and adapted to be connected to a harness, the angular relation of said transmitting means to said bed frame being variable by varying the extension of said spacer means.

2. A portable device in accordance with claim 1 wherein said hanger support means comprise spaced hook members.

3. A portable device in accordance with claim 2 wherein said tilting means comprises at least one strut joined with the device to form a unitary structure therewith, extended between said device and a frame abutting member affixed to said strut, said strut being variably extendible toward and away from said device.

4. A portable device in accordance with claim 3 wherein said strut comprises a threaded rod arranged to be extendible toward and away from said device by a rotatable handle complementally threaded to said rod.

5. A device in accordance with claim 1 wherein said traction transmitting means comprises an extended rod having an axially aligned keyway, a cable engaging member longitudinally, slidably mounted on said rod, said last named member including a strut extending into said keyway, and adjustable fastening means on said rod arranged fixedly to position said cable engaging member at a selected point along the length of said rod.

6. A device in accordance with claim 5 wherein said rod is threaded and said fastener is rotatably mounted on said cable engaging means and comprises a collar surrounding and complementally threaded to said rod.

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