United States Patent [19]

Powers

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[45] **Jan. 9, 1973**

[54] INTERMITTENT TRACTION DEVICE

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[73] Assignee: **Pulsar Corporation,** Dallas, Tex.

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[52] **U.S. Cl.** **128/75**

[51] **Int. Cl.** **A61h 1/02**

[58] **Field of Search** 128/75

[56] **References Cited**

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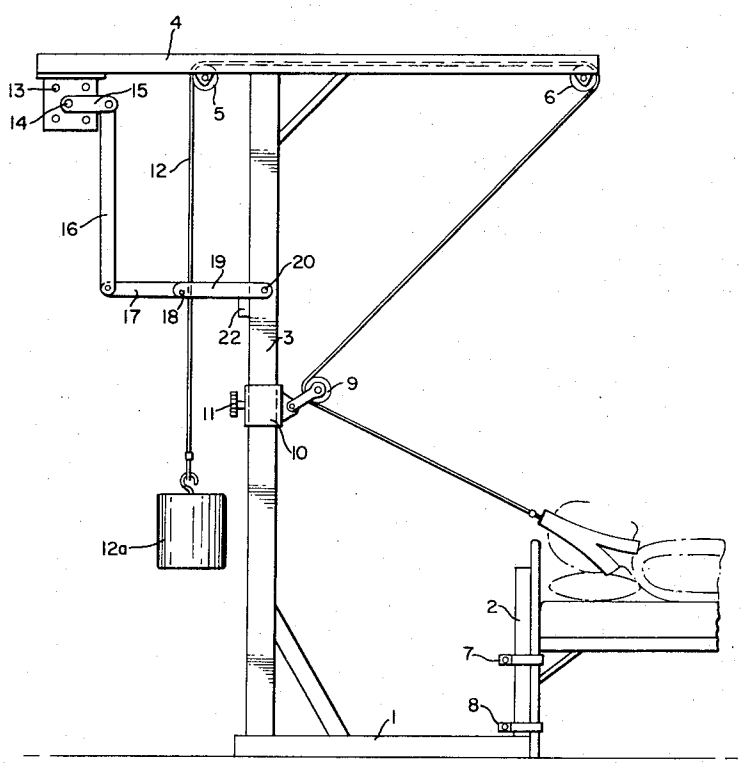
[57] **ABSTRACT**

A device is provided for applying intermittent traction to a patient wherein a cable and weight assembly are mounted on a frame and a motor having a linkage mounted on the output shaft engages the cable to lift the weight and relieve the tension in the cable during one half a revolution of the motor and during the the other half revolution of the motor the weight is released to apply traction to the patient.

10 Claims, 5 Drawing Figures



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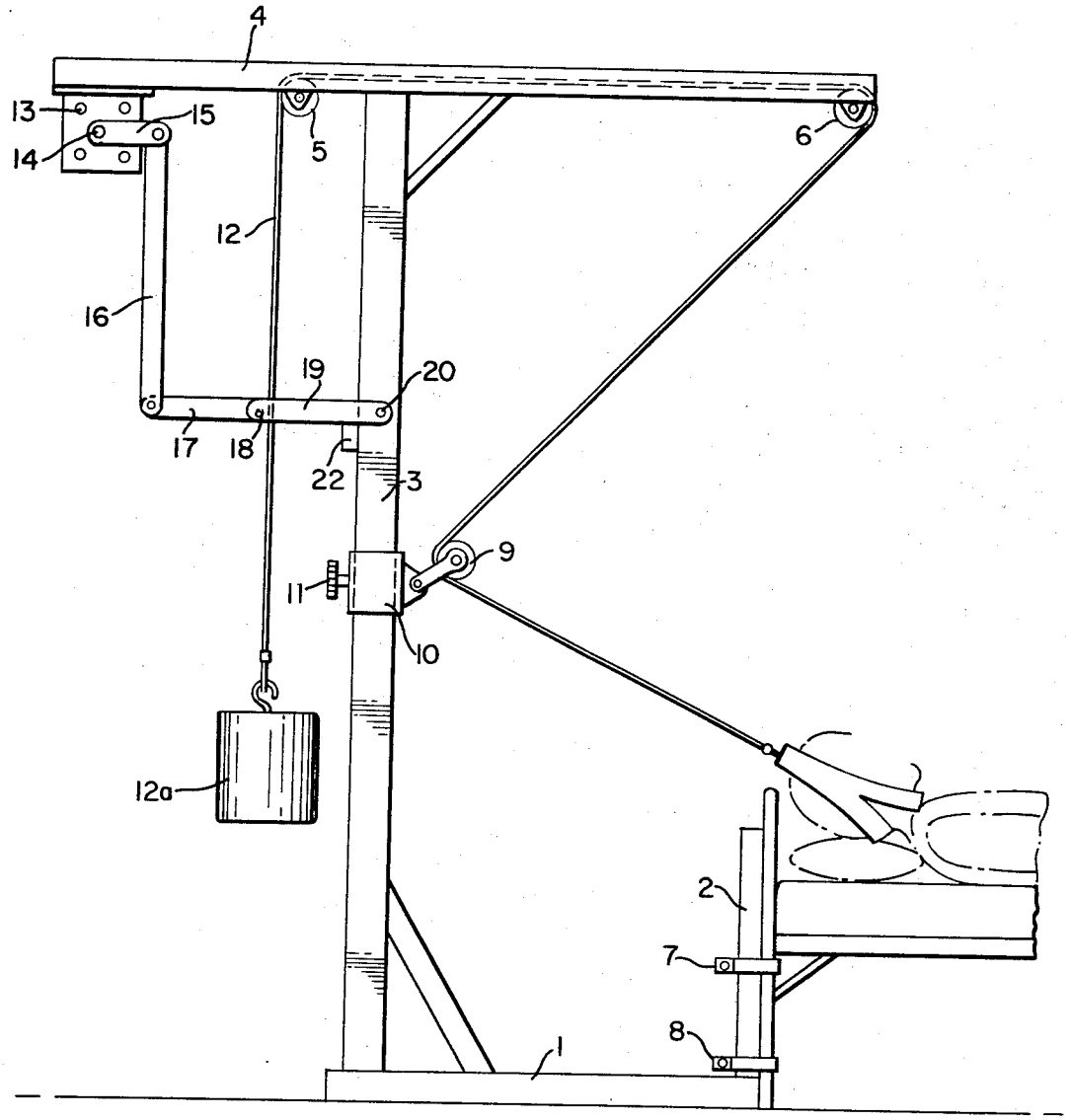

FIG. 1

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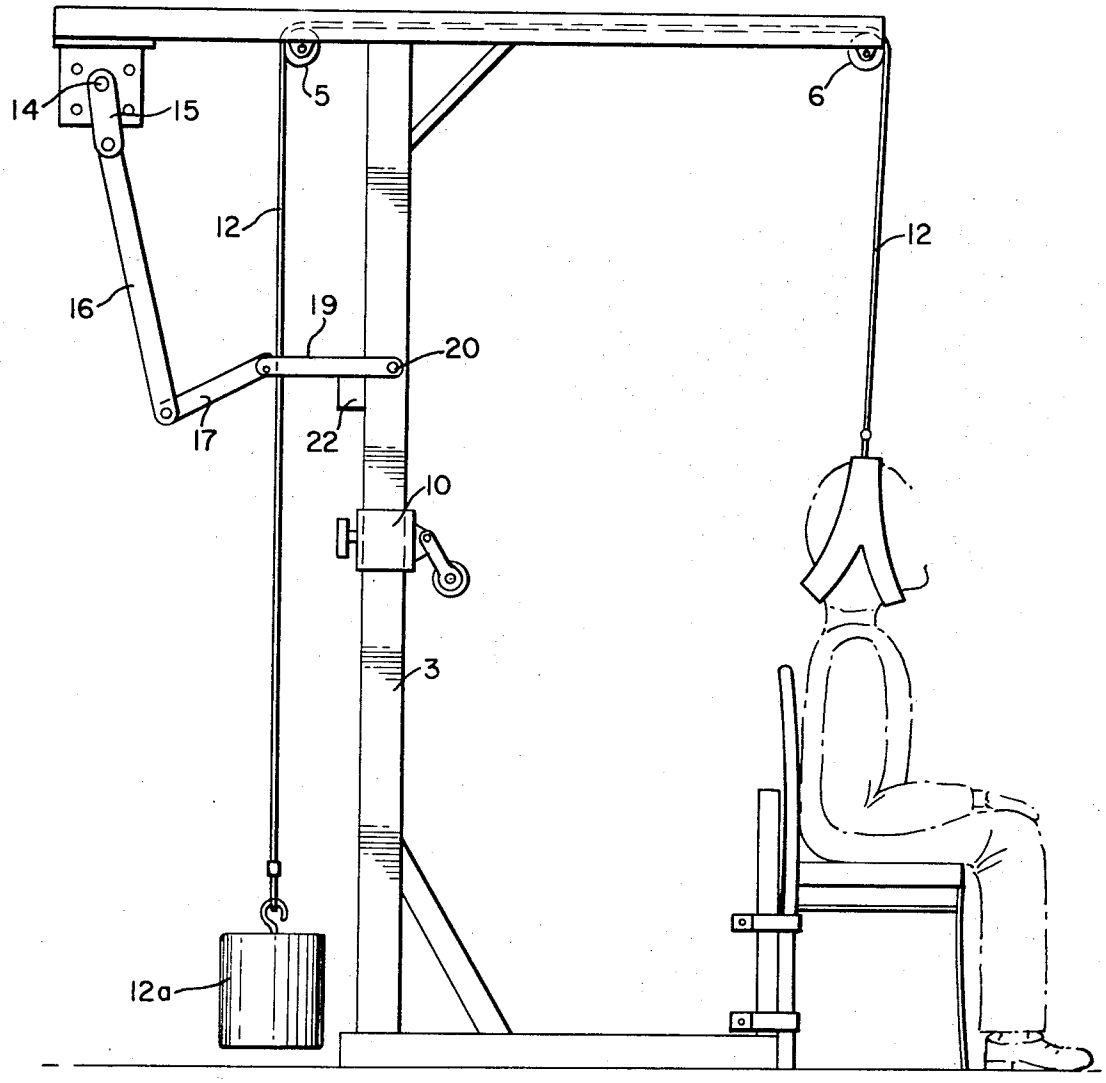

FIG. 2

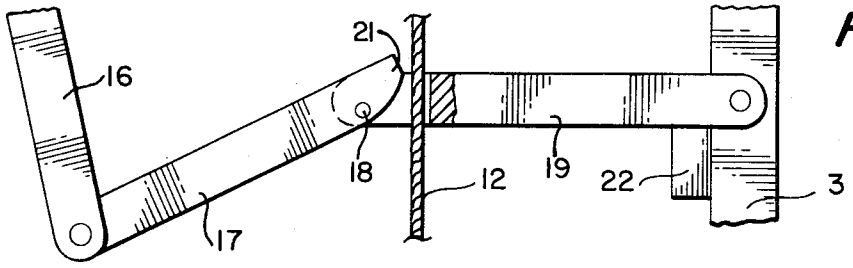

FIG. 5

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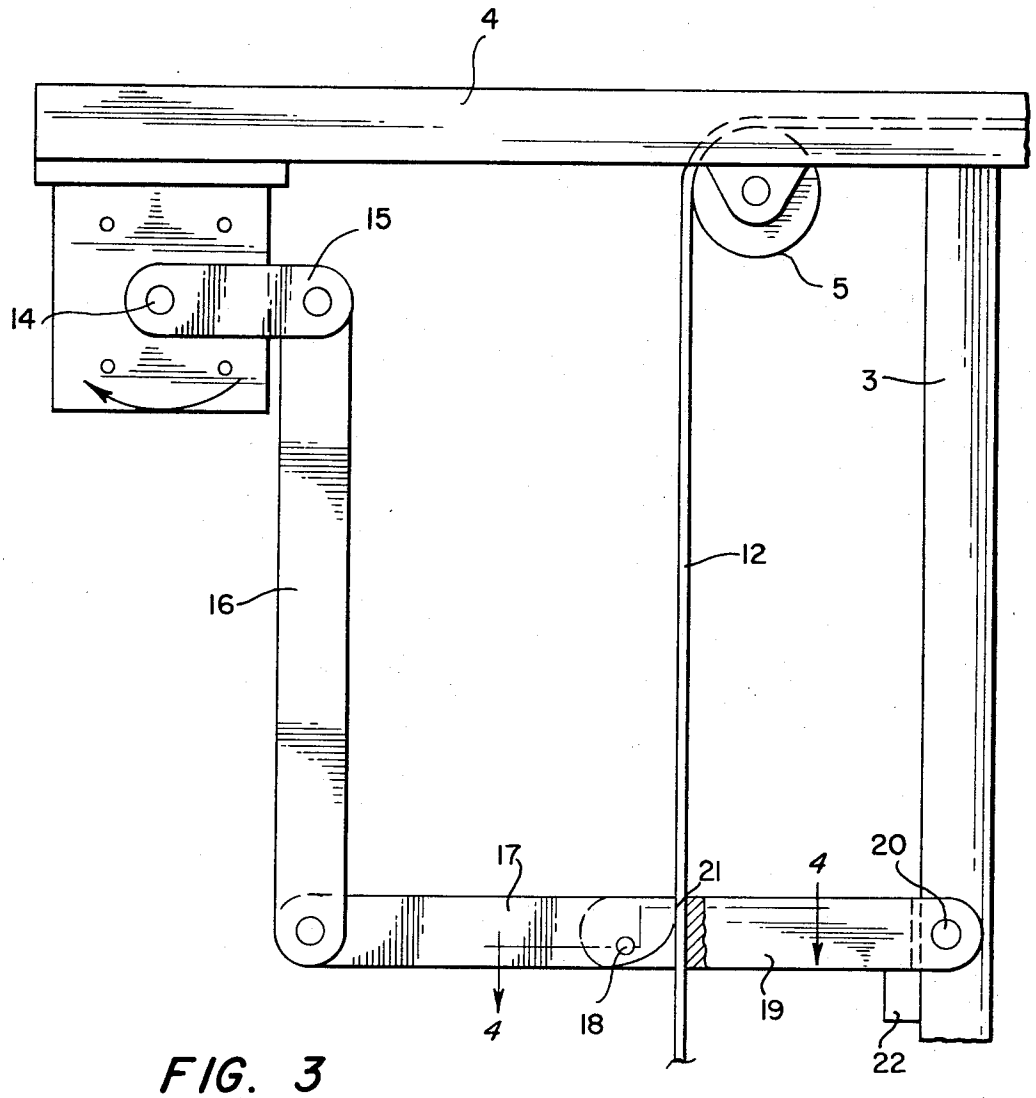

FIG. 3

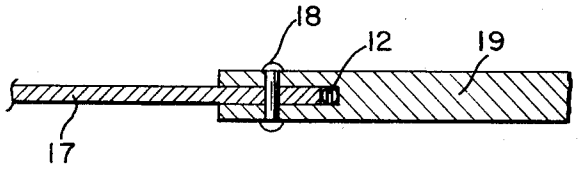

FIG. 4

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INTERMITTENT TRACTION DEVICE

This invention relates to a traction device and more particularly to an apparatus which is adapted to apply intermittent traction to a body part of a patient.

There have been a number of devices developed in the past for applying intermittent traction to a patient's body while the patient is either seated or lying down in bed. These devices for the most part are relatively complex, expensive and are generally adapted to be set up only in hospitals. Furthermore, such devices generally reguire that the patient remain in the same position in order for the device to apply the same degree of tractive force.

According to the present invention there is provided a traction device which is economical, of relatively simple construction and may be set up in the hospital or at home and which is of such a construction that the patient may shift his position without adversely affecting the amount of traction applied to the body. There is provided a frame with a cable and weight means movable on pulleys on the frame. A motor is mounted on the frame and this motor has a linkage arrangement operatively connected to the output shaft, the linkage being such that the cable is gripped by the linkage during one half of the revolution of the motor so as to raise the weight and relieve the traction force from the patient. During the other half of revolution of the motor the cable is released so that the weight is applied as a traction force to the patient . The patient may move without affecting the operation of the intermittent traction device since the weight will apply a constant traction irrespective of the position of the patient and the linkage is arranged so that it may grip the cable at any point along its length and raise the weight to relieve the traction force on the patient.

An object of the present invention is to provide a traction device which is adapted to apply intermittent traction to a patient which may be used with the patient in either a seated position or when lying down.

Another object of the present invention is to provide a traction device which is of relatively simple construction and is economical to manufacture and which can be used either at home or in a hospital as it requires no special skills to operate.

Still another object of the present invention is to provide an intermittent traction device which utilizes a cable and weight assembly to apply traction and which is provided with a linkage arrangement which grips the cable and raises the weight to relieve the traction, the assembly permitting the patient to move without affecting the traction force applied to the body.

Other objects and many of the attendant advantages of the present invention will become more readily apparent upon consideration of the following detailed specification when considered in connection with the accompanying drawings wherein:

FIG. 1 is an elevational view of the intermittent traction device as applied to a patient lying down,

FIG. 2 is an elevational view showing the device as applied to a seated patient,

FIG. 3 is a view showing the linkage gripping the cable,

FIG. 4 is a sectional view along the line 4—4 of FIG. 3 and

FIG. 5 is a view showing the linkage releasing the cable.

Referring now more specifically to the drawings wherein like numerals indicate like parts throughout the several views there is shown in FIG. 1 the intermittent traction device comprising a base portion 1 having an upturned clamping end portion 2 and upright 3 integral therewith. At the upper end of the upright 3 there is provided a cross bar 4 having pulleys 5 and 6 journaled thereon. The upstanding end portion 2 of the base is adapted to be clamped to the headboard of bed by any convenient clamping means such as shown at 7 and 8. A pulley 9 is mounted on a slidable bracket 10 which is adapted to be clamped in any desired position along upright 3 by means of clamping screw 11. A cable 12 extends from the harness fitted to the patient over pulleys 9, 6 and 5 and has a weight 12*a* fixed to the end thereof.

There is provided an electric motor 13 which is mounted on cross bar 4. This motor 13 has an output shaft 14 to which is fixedly attached an arm 15.

Pivotally mounted on the outer end of arm 15 is an elongated link 16 which extends downwardly and has link 17 pivoted to the lower end thereof. Link 17 is pivoted as shown at 18 to a link 19 which has the inner end thereof pivoted at 20 to the upright 3.

Referring to FIG. 4 it can be seen that the end portion of link 19 is bifurcated to provide a recess through which the cable 12 extends. The end portion of link 17 has a cammed end portion 21 as seen in FIG. 3 which serves to engage the cable 12 when the linkage is in the position shown in FIG. 3.

There is provided a fixed stop 22 mounted on the upright 3 and this stop serves to limit downward movement of link 19. Thus, it can be seen that as the motor 13 rotates shaft 14 the arm 15 will be lowered from the FIG. 3 position so as to lower the link 16 to the position shown in FIG. 5. Since the downward movement of link 19 is limited by stop 22 the link 17 pivots about point 18 as shown so that the end portion 21 of link 17 disengages the cable 12 thereby permitting the cable 12 to move with respect to the linkage. It can be seem that during approximately one half of the revolution of output shaft 14 of motor 13 the cable will be disengaged from the cammed portion 21 of link 17. During this half cycle the traction force of the weight 12*a* will be fully applied to the patient. During the other half cycle the cammed end portion 21 of link 17 will engage the cable 12 and raise the weight to relieve the patient from the traction force.

In FIG. 2 the device is shown as applied to a patient seated in a chair and it can be seen that the apparatus is identical shown in FIG. 1 with the exception that the cable is not passed through the pulley mounted on upright 3 but passes directly to pulley 6.

It can be seen that the apparatus is of simple construction and may be readily set up in operative position at home as well as in a hospital. One of the principal advantages of the presently disclosed intermittent traction device is that it permits a patient to move while traction is being applied without in any way altering the tractive force.

Obviously many modifications and variations of the present invention are possible in light of the above teachings.

I claim:

1. In a device of the class described for applying intermittent traction to a body part comprising, a frame,

a cable and weight means supported on said frame, one end of said cable adapted to be connected to the body part to be subjected to intermittent traction and gripping means operatively associated with the cable for intermittently supporting the weight to release the body part from traction , wherein said gripping means comprises, a motor, an arm fixedly mounted on the output shaft of said motor, a lever pivotally connected to the end of said arm, a first link having one end pivotally connected to the free end of said lever, a second link having one end pivotally mounted on said frame and the other end pivotally connected to said first link, a recess in said second link for receiving the cable, the end portion of the first link gripping and raising the cable during half a revolution of the motor output shaft and releasing the cable during the other half revolution of the motor shaft.

2. An apparatus for applying intermittent traction to a patient comprising a frame, means mounting a cable on said frame, a weight mounted on one end of said cable, the other end of said cable adapted to be attached to the patient, a motor mounted on said frame and linkage means connected to the output shaft of said motor and operatively associated with the weight for raising the weight during one half a revolution of the motor to release the patient from traction and for releasing the weight to apply traction to the patient during the other half revolution of the motor , wherein said linkage means includes a pair of interconnected links, one of said links having a cam shaped end portion for gripping the cable during one half the revolution of the motor and for releasing the cable during the other half revolution of the motor.

3. An apparatus according to claim 2 wherein the other of said pair of links is pivoted to the frame and further including stop means on said frame for limiting downward movement of said link.

4. An apparatus for applying intermittent traction to a patient comprising, in combination, a frame, pulleys on said frame a cable passing through said pulleys, a weight attached to one end of said cable, the other end of said cable adapted to be attached to the patient, a motor mounted on said frame, an arm fixedly mounted on the output shaft of said motor, a first link having one end thereof pivotally connected to the free end of said arm, a second link having one end thereof pivotally connected to the other end of said first link, the other end of said second link having a cam surface a third link having a recessed end portion pivotally connected to the other end of said second link, the other end portion of said third link pivotally mounted on said frame, a stop means on said frame limiting downward movement of said third link the cable fitting in the recessed end portion of said third link with the cam surface of said second link engaging and gripping the cable and during one half a revolution of the motor raising the weight to release traction on the patient, the second link pivoting with respect to the third link to cause the cam surface to release the cable and apply traction to the patient during the other half revolution of the motor.

5. A device for applying intermittent traction to a patient comprising: a frame, a connecting means mounted on said frame, said connecting means including a cable, one end of the connecting means including means for attaching that end to the patient, a force exerting means on the other end of the connecting means and connected thereto such that the traction force on the patient is derived from the force exerted by the force exerting means on the connecting means, a motor, and a power driven gripping means driven by the motor for automatically and intermittently gripping the cable intermediate its ends in response to continuous operation of the motor to oppose the said force exerted on the connecting means by the force exerting means to intermittently release the said traction force from the patient.

6. A device according to claim 5,said motor being a continuously operable rotary motor, said gripping means including a linkage operatively connected to said motor such that the gripping means grips, raises and releases the cable during each revolution of the motor.

7. A device according to claim 5, said force exerting means being a weight attached to the said other end of the connecting means, said gripping means being operable to raise the weight while gripping the cable.

8. A device according to claim 7, said connecting means being constituted entirely by said cable which extends from said one end of the connecting means to the said other end thereof.

9. A device according to claim 5, said gripping means comprising a first link pivotally connected to the frame for movement about an axis, a second link pivotally connected to the first link and operatively connected to the motor to be oscillated by the motor, wherein the gripping of the cable is performed by gripping surfaces operatively associated with both of said first and second links, the first and second links being arranged such that during one part of the said oscillation the said first and second links engage and move the cable to relieve the traction force as the first link pivots about said axis, and during another part of said oscillation the cable is released by the gripping surfaces.

10. A device according to claim 9, said force exerting means being a weight attached to the said other end of the connecting means, and said gripping means being operable to raise the weight while the gripping surfaces grip the cable.

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