

Oct. 1, 1963

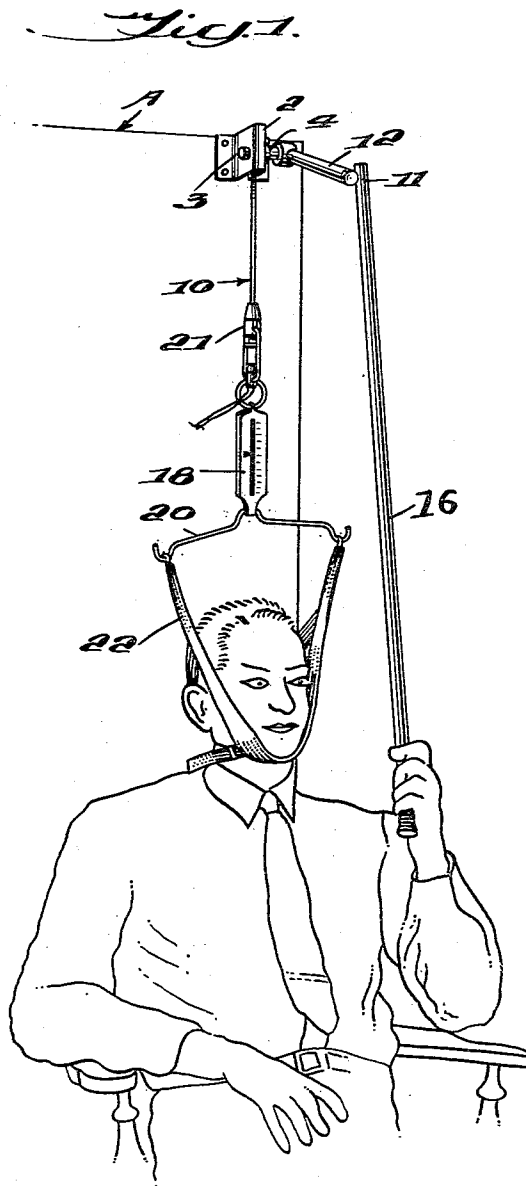
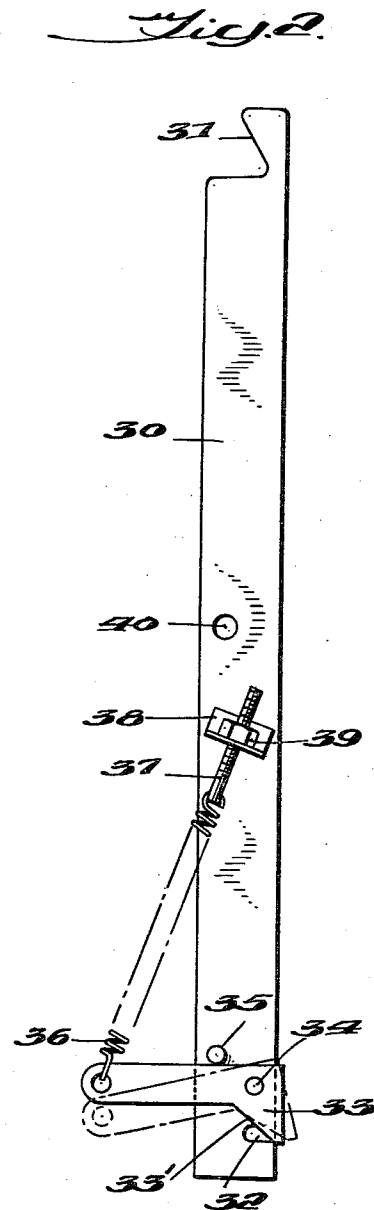
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3,105,489

MANUAL TRACTION DEVICE

Filed May 24, 1962

2 Sheets-Sheet 1



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3,105,489

MANUAL TRACTION DEVICE

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Filed May 24, 1962, Ser. No. 197,377

5 Claims. (Cl. 128—75)

This invention relates to orthopedic apparatus more particularly to a traction device suitable for neck and spine traction.

The conventional orthopedic apparatus for neck traction consists of a head harness suspended by a rope over a pulley. One end of the rope is connected to the head harness usually, though not necessarily, through spring scales to calibrated counterbalance weights.

The difficulty of setting up such apparatus for neck traction is well known. It requires an attendant and the full cooperation of the patient to put the neck or spine of the patient in traction. For neck traction, or upper spine traction, the head of the patient must be placed in a harness and in the usual design, a spreader bar must be installed over the head of the patient to which each end of the head harness is attached. It is usual to request a patient to hold either the spreader bar or rope while the attendant assembles the prescribed calibrated weights of from 5 to 20 pounds or more on the end of a rope over the pulley system. Great care must be taken to ease the load onto the rope to ensure gradual application of the load to the neck or spine of the patient.

With the present invention the apparatus is in such form that it can be assembled and maintained ready for use. The patient's head is placed in the head harness and the length of rope, from the head harness assembly to the support, adjusted. The load can then be applied by the patient in small increments until the prescribed load is reached. If the load is uncomfortable, it can be easily relieved by the patient. It may be increased by the patient as desired. It can be applied continuously or intermittently under the control of the patient throughout the treatment.

It is an object, therefore, to provide a traction device which can be stored, completely assembled and easily put into operation without the assembly of many parts.

It is another object of the invention to provide a traction device whereby traction may be applied as a steady or intermittent load.

It is an object of the invention to provide a traction device whereby practically any force can be applied such as normally used in orthopedic work without the use of heavy weights.

It is an object of this invention to provide a traction device that can be installed and operated by the patient without the need for constant attendance or assistance.

Further and other objects will become apparent from the description of the accompanying drawings in which like numerals refer to like parts.

In the drawings:

FIGURE 1 illustrates a traction device installed on a patient for neck traction.

FIGURE 2 shows a predetermined tension release spreader bar.

FIGURES 3 and 4 are elevation and plan views of the assembled apparatus.

FIGURES 5 and 6 are end and side views of a typical clutch mechanism.

FIGURES 7 and 8 are plan and side views of the loading arm.

Apparatus in accordance with this invention is shown in use in FIGURE 1. This figure shows the apparatus secured near or at the top edge of a door A, consisting of a mounting bracket 1 (shown in FIGURE 3) support-

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ing a frame member 2 extending outwardly from the door A. A shaft means 3 extends through the two sides of frame member 2 for mounting parts of the traction apparatus for movement with respect to said frame member. A clutch mechanism 4 is mounted on one side of the frame member and secured by means of screws, bolts or rivets through flanged housing 5. A portion of clutch mechanism 4 extending between the sides of the frame member has an enlarged collar portion 6 mounted on shaft means 3. The other portion of shaft means 3' extends through the other side of frame member 2 for support. A traction arm 7 is mounted between the sides of frame member 2 having a collar 8 formed on one end which is secured to the enlarged portion 6. Collar 8 can be secured in any one of several ways such as by a key or set screw 17. The other end of the traction arm 7 has a hole 9 formed therein to support one end of traction cable 10 which may be, for example, nylon braided rope. The outer end of shaft 3 through the two way clutch member 4 has a loading arm 12 removably secured thereon such as by a clamp ring 13 extending around shaft 3 to which loading arm 12 is secured. Clamp ring 13 may have a thumb screw 14 for removability or it may be permanently secured in place by any type of fastening means. A key 15 is provided between clamp ring 13 and shaft 3 to prevent slippage and index the handle with respect to the shaft. A loading handle 16 is pivoted at 11 at the outer end of loading arm 12.

An indicating scale 18 is suspended from cable 10. The harness 22 is supported by the spreader bar 20. An adjustable cable fastening means 21 is shown intermediate the spreader bar 20 and cable 10. Clamp 21 can be any one of several well-known devices such as a non-reversible clamp for rope or cable.

The apparatus may be permanently secured to a wall through mounting holes in the flange of frame member 2 or it can be secured over the top of a door in any suitable way such as by a metal bracket 1 and clamp screw 1'.

Loading handle 16 is assisted to the "up" position by spring 19 thus moving the loading arm 12 into the "up" position and the traction arm 7 to the "down" position as shown in FIGURE 3. The patient is then seated in a chair and the harness 22 is put in place in the conventional manner under the chin and back of the head of the patient, cable clamp 21 having previously been released to lower the spreader bar. After the installation of head harness 22 over the head of the patient, cable 10 is pulled through clamp 21 to raise the assembly. The patient is usually seated in front of a mirror so that the scale 18 can be read. It is not necessary to actually read the numerals on the scale but a marker may be placed beside the prescribed load on the fixed part of the scale and a patient merely has to bring the needle of the scale into coincidence with the marker for the prescribed load. When the apparatus has been installed on the patient's head, the patient then pulls the loading handle 16 until the assembly is firm. The patient can then continue to pull the loading handle 16 into any position of load as indicated by the scale. This is accomplished by the loading handle 16 moving the loading arm 12 which rotates the shaft 3 and traction arm 7, thus moving traction cable 10. If the patient releases loading handle 16, the load will be maintained as set by reason of the two way clutch 4. Clutch 4 will hold shaft 3 in any position at which the loading arm 12 is left when the loading handle 16 is free. It is not necessary to continuously hold the loading handle 16 to maintain the position of the loading arm 12.

Since clutch 4 maintains shaft 3 in any position left by the loading arm 12 the traction arm 7 will be left in the same position thereby maintaining the prescribed tension

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in cable 10. If the patient should change his position and it is noted that the scales 18 indicate less than the prescribed traction, it is merely necessary to pull the loading handle 16 down, thus moving the loading arm 7 a few degrees of rotation about shaft 3 to effect the desired load.

If the load should become uncomfortable on the neck of the patient or if it is desired to apply the load and then relieve the load in intermittent traction, the patient can move the loading handle 16 upwardly and by virtue of the two way clutch 4, shaft 3 will be rotated in the opposite direction and the load relieved as much as it is desired.

The two way clutch 4 is any device that can be built to have a portion 6 driven by the shaft 3 in either of two directions but which will stay in the position in which it is left by shaft 3, until the shaft 3 is again rotated. Such a device is shown in Patent No. 1,657,561 which is in effect a friction clutch. The device is in effect a two-way clutch, that is, it may be rotated manually in either direction of rotation and it will lock in the last position in which it is left by the shaft and by reversing the direction of the shaft, overrides the locking effect and rotates the portion driven by the shaft in the opposite direction or to a new position in the same or opposite direction where it will again lock.

As a precaution, it may be desirable to employ a spreader bar 30 as shown in FIGURE 2 in which the spreader bar 30 is formed with a hook 31 on one end to engage one end of head harness 22 and the other end of head harness 22 is secured in a downwardly directed slot 32 by latch 33 which is in the form of a bellcrank pivoted at 34. A stop 35 restrains the latch in one direction and a spring 36, the tension of which can be varied by bolt 37 through bracket 38, secured to spreader bar 30, and nut 39. A hole 40 in the middle of spreader bar 30 affords a support for the suspension of the spreader bar and head harness assembly.

The tension in spring 36 can readily be adjusted so that if a predetermined load is exceeded by the tension in the assembly attached to spreader bar 30 at hole 40, the cam surface 33' of latch 33 will release one side of the head harness and thereby the whole tension force exerted on the patient.

It should be apparent from the above that the load at all times is under the direct control of the patient and should there be any discomfort in the application of traction, it can be immediately relieved and readjusted to a more comfortable level of load.

Instances where it is difficult to read the calibration on the spring scale, a marker and pointer may be used or one fixed and movable electrical contacts may be installed on the scales to give a light signal when the prescribed point has been reached on the scale indicating the proper traction.

The foregoing description relates to vertical traction as is usual for neck or spine traction. It is contemplated, however, that the device may be used for various other applications of traction such as being mounted on a bed for horizontal applications of traction. The same advantages as described above pertain, that the traction can be adjusted and left at a prescribed, predetermined value that can be relieved by the patient in the case of discomfort.

It should be understood that certain changes, alterations, modifications and substitutions can be made in this

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apparatus without departing from the spirit and scope of the appended claims.

What is claimed is:

1. An orthopedic traction apparatus comprising a support frame and a harness assembly, means to secure said support frame remote from said harness assembly, shaft means mounted on said support frame transversely of the axis of the direction of traction on said harness assembly, clutch means mounted on said shaft means having a portion adapted to be moved in either direction of rotation with the rotation of said shaft means, means to lock the position of said portion in the instant position with respect to said shaft means when rotation of said shaft means stops, a traction arm mounted perpendicular to said shaft means on said portion to move therewith, a loading arm secured to said shaft means to rotate said shaft in either direction, a loading handle secured to said loading arm to move said loading arm in either direction, means interconnecting the outer end of said traction arm and said harness, whereby a traction load may be applied to said harness through said loading handle and said loading arm in one direction, and the traction load removed by motion of said loading handle in the opposite direction.

2. The apparatus as claimed in claim 1, in which a bracket means is provided to secure said support frame to the top of a door.

3. The apparatus as claimed in claim 1, in which is provided interconnecting means between said support frame and said harness comprising traction cable means having one end secured to the movable end of said traction arm, and the other end secured to a scale which is secured to said harness assembly and means to clamp said support cable in any selected position with respect to said harness.

4. The apparatus as claimed in claim 1, in which predetermined release load means is provided between said support frame and said harness.

5. An orthopedic traction apparatus comprising a support frame and a harness assembly, means to secure said support frame above said head harness, a shaft means mounted on said support frame transversely of the axis which would correspond to the axis of the neck of a patient on which the apparatus is used, a clutch means mounted on said shaft means having a collar portion surrounding said shaft means to be moved in either direction of rotation with the rotation of said shaft means, means to lock the position of said collar portion in the instant position with respect to said shaft means when rotation of said shaft means stops, a traction arm mounted perpendicular to said shaft means on said collar portion to move therewith, a loading arm secured to said shaft means to rotate said shaft means in either direction, a loading handle secured to said loading arm to move said loading arm in either direction, means interconnecting the outer end of said traction arm and said harness, to apply to said harness a traction load by means of said loading handle and said loading arm being moved in one direction and the traction load removed by motion of said loading handle in the opposite direction.

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