

[54] **AMBULATORY TRACTION TREATMENT APPARATUS**

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[51] Int. Cl.² **A61H 1/02**
[58] Field of Search **128/75, 78, 83, 84, 85, 128/87**

[56] **References Cited**

UNITED STATES PATENTS

30,601 11/1860 Wright 128/78

1,089,305	3/1914	Baughman	128/85
1,650,650	11/1927	Pieper	128/78
2,835,247	5/1958	Stabholz	128/78
3,548,817	12/1970	Mittasch	128/75

Primary Examiner—Richard A. Gaudet

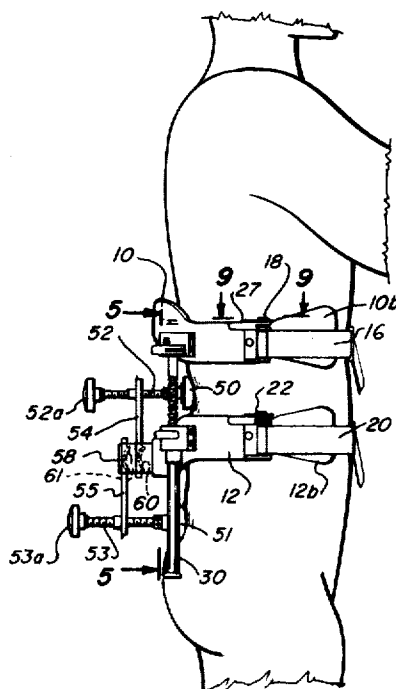
Assistant Examiner—J. Yasko

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[57] **ABSTRACT**

A surgical brace device for ambulatory treatment of the lower back of a patient includes a pair of spaced apart torso belt members joined together with jack screw connecting means for applying traction to the user between the pair of belts, and a pair of adjustably spaced lordosis pads mounted on the lower belt applies forward pressure on spaced apart back vertebrae.

3 Claims, 10 Drawing Figures



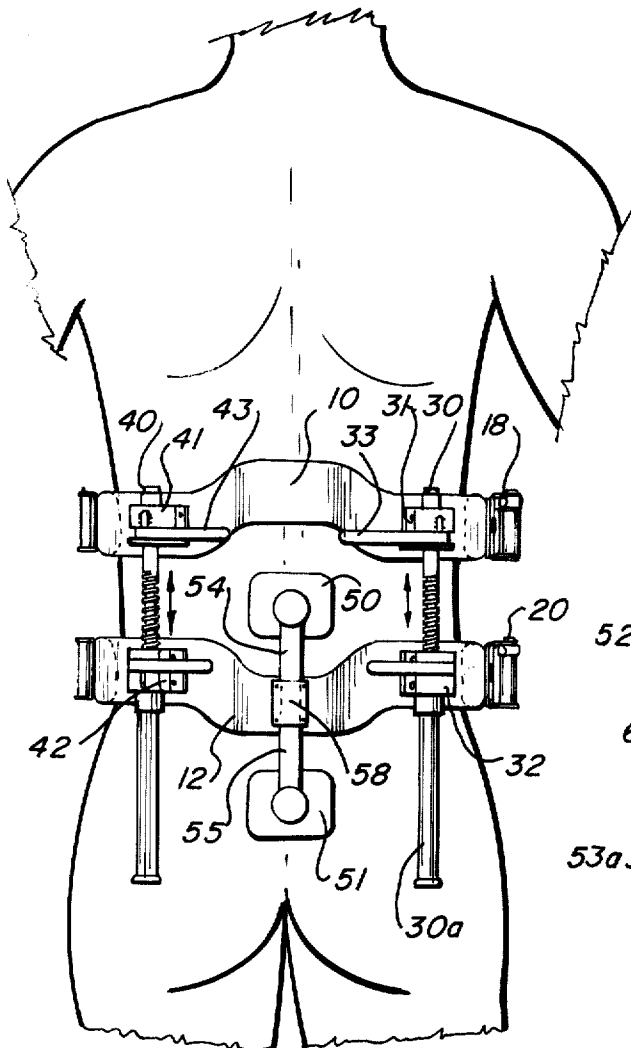


Fig. 1

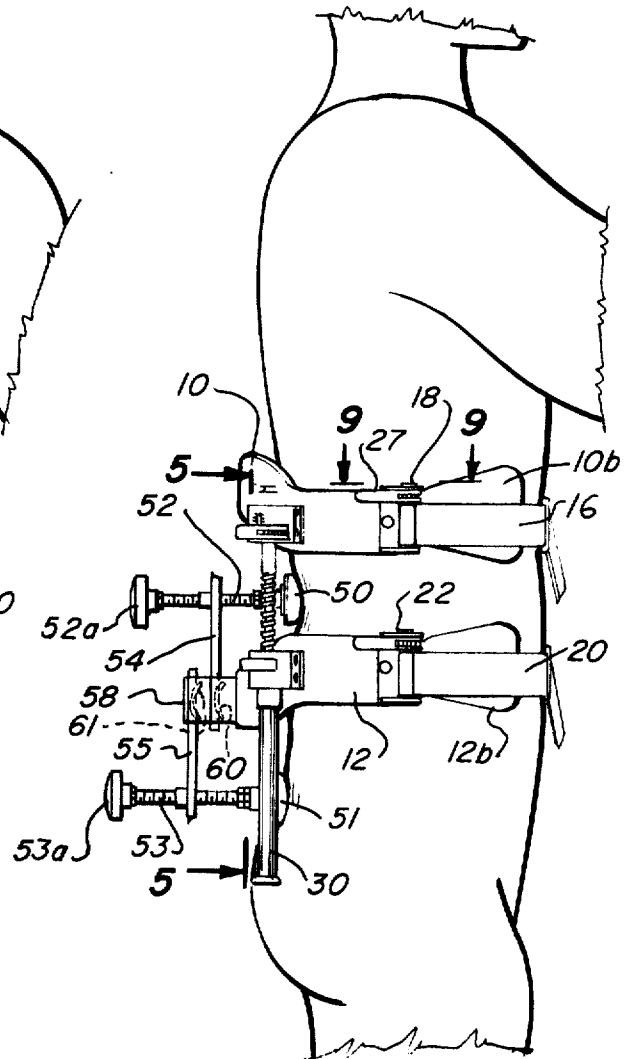


Fig. 2

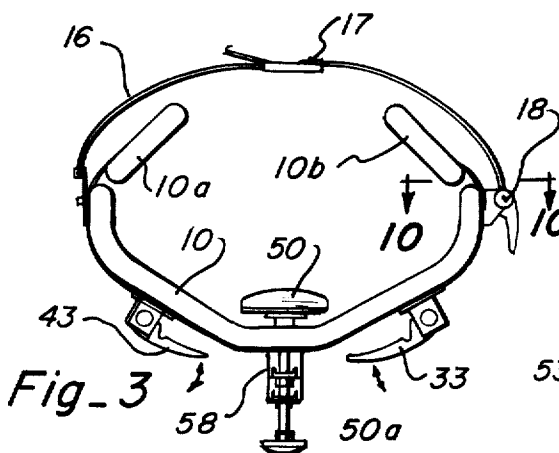


Fig. 3

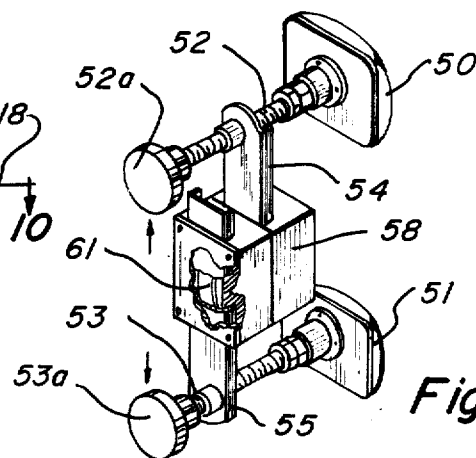


Fig. 4

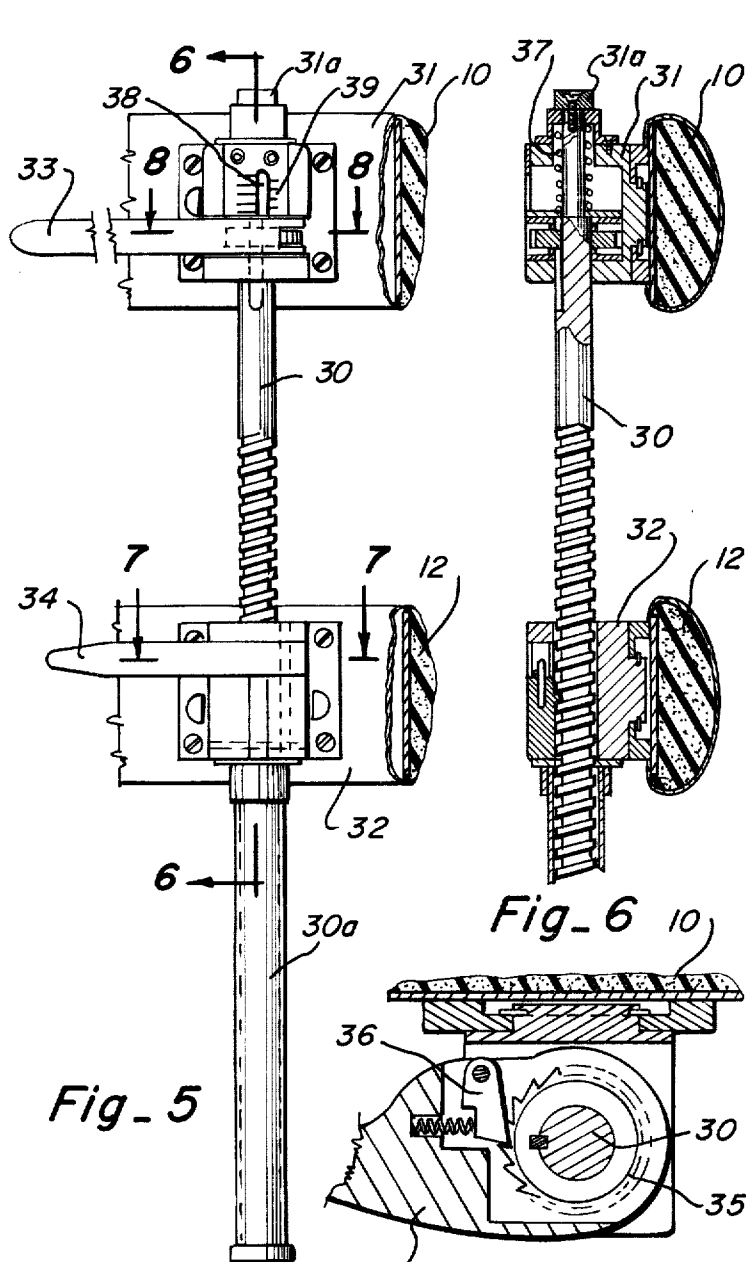


Fig-5

Fig-6

Fig-8

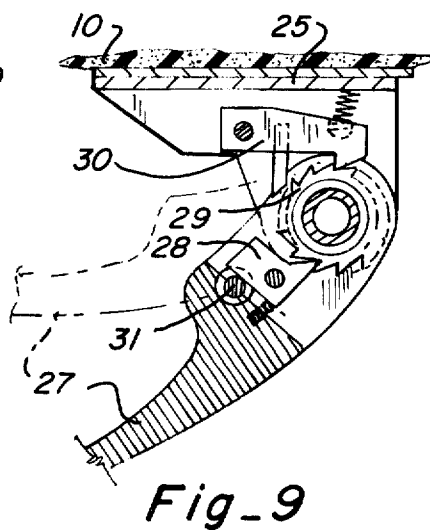


Fig-9

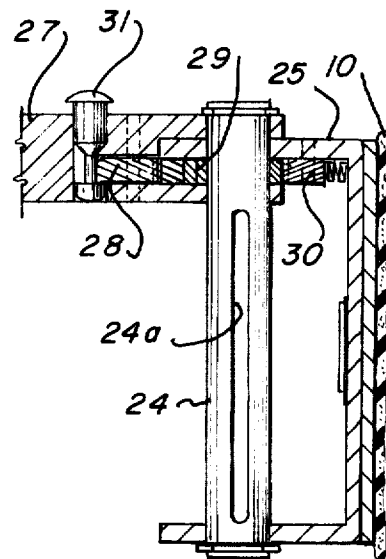


Fig-10

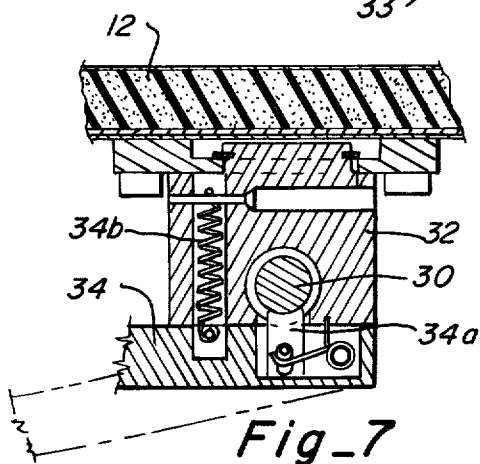


Fig-7

AMBULATORY TRACTION TREATMENT APPARATUS

Treatment of the lower spine of a patient has been accomplished in several ways in the past. One method of treatment of the lower lumbar region is shown in U.S. Pat. No. 2,835,247. This device includes a pair of spaced apart belts adjustably joined so as to be able to apply traction to the patient's spine between the two belts. Also, included is a single lordosis pad for applying forward pressure to vertebrae between the two belts thereby providing treatment, for example, of a posterior abnormal positioning of the vertebrae.

The present invention provides an improvement over such a device in providing accurate belt fastening and tightening means around the torso of the user, along with a pair of spaced apart lordosis pressure pads which are easily adjustable to fit the particular user. The device provides a pair of spaced apart adjustable waist belts arranged to produce secure and accurate tightening of the belts on the user, so as to provide accurate and controllable tensioning of the patient's spine between the two belts. The lordosis pads are adjustably mounted on the lower belt to accurately press against one or two of the desired vertebrae or discs of the user.

It is, therefore, included among the objects and advantages of the present invention to provide a lower spine treatment apparatus providing longitudinal traction of the user's spine and accurately positioned lordosis pads to provide forward pressure to specified vertebrae or discs of the user.

Another object of the invention is to provide a lower spine traction device having improved belt tightening means around the waist of the user.

Yet another object of the invention is to provide an easy and fast belt tightening means and providing padding means for the belt to prevent injury to the torso of the user.

Still another object of the invention is to provide an accurate tensioning means for applying accurate tension to the lower vertebrae of the user.

These and other objects of the invention may be readily ascertained by referring to the following illustrations and description in which:

FIG. 1 is a rear view of a lower spine traction device, according to the invention, showing its mounting on a human torso;

FIG. 2 is a side elevational view of a device of FIG. 1;

FIG. 3 is a top plan view of the lower spine tensioning apparatus, according to the invention;

FIG. 4 is a front quarter perspective of the device, showing in detail the lordosis pads and mounting thereof on the apparatus of the invention;

FIG. 5 is an enlarged detail view of a tensioning means of the lower spine tensioning apparatus according to the invention;

FIG. 6 is an enlarged, detail, cut-away view of the device of FIG. 5 taken along lines 6-6;

FIG. 7 is an enlarged, detail, cut-away view of the lower tensioning lock device of the mechanism of FIG. 5 taken along lines 7-7;

FIG. 8 is an enlarged detail cut-away view of the upper tensioning lock of a device of FIG. 5 taken along lines 8-8;

FIG. 9 is an enlarged, cut-away detail view of the belt tensioning device of FIG. 2 taken along section lines 9-9, and

FIG. 10 is an enlarged detail view of the belt tensioning mechanism of FIG. 3 taken along lines 10-10.

Generally, in the device illustrated in the drawings, the lower spine tensioning means includes an upper belt, a lower belt with means for forcing the two apart to apply tension to the spine of the user therebetween, and a pair of pressure (lordosis) pads (one mounted between the belts and one below the lower belt) which are adjustable to apply forward pressure against a portion of the spine (or one or two vertebrae) within the adjustability of the pressure pads. To be able to apply pressure or tensioning between the upper and lower belts (or body bands), the belts are provided with tightening means so as to secure the belts to the torso of the user.

Specifically, as shown in the illustrations, the device of the invention includes an upper belt or band 10 and a lower belt or band 12. These bands include back portions which are arcuate members arranged to fit about the back half of the torso of a person, and are semi-rigid, as made of spring steel or the like, terminating at about the sides of the torso of the person. These are padded to prevent injury to the back of the person. As shown in FIG. 3, a pair of pads 10a and 10b are mounted on the ends of the upper back portion, and in a similar manner the lower belt portion 12 includes the attached pads 12a and 12b, 12b being shown in FIG. 2. These pads prevent injury to the patient as the belts are tightened about the torso. A web belt 16 is attached to the ends of the back portion of top band 10 and it includes a buckle 17 for fastening the two free ends of the belt together. The belt passes over the pads, 10a and 10b, and bears thereagainst. A ratchet type take-up 18 is mounted on the end of the belt back portion 10. The belt end is attached to the tightener and it provides means for tightening the belt 16 around the torso of the user. In a similar manner, a belt 20 is attached to a tightening ratchet means 22 attached on the lower rigid belt member 12. The belt tensioning or tightening means is shown in FIGS. 9 and 10, and the tightening mechanism 18 and 22 are equivalent. Therefore, a description of one suffices for the other.

The belt take-up mechanism includes a take-up shaft 24 mounted in a U-shaped yoke 25 which is secured to the end of the rigid part of the belt portion 10. The shaft 24 is rotatable in the yoke. The shaft includes a slot 24a extending completely through the shaft for entrance of the belt end, so that the belt may be wound around the shaft 24. A handle 27 is mounted on the yoke 25, and a drive pawl 28 is pivoted to it so as to rotate a ratchet wheel 29 attached to the shaft 24. By movement of the handle 27, in the direction of the arrow, the ratchet wheel is pushed by the pawl to rotate the shaft 24. The spring loaded pawl permits reverse movement of the handle. A lock 30 prevents the shaft from unwinding as the handle is returned and also provides a lock for the shaft. A detend button 31 mounted in the handle 27 provides means for releasing the lock 30 when the tension of the belt is desired to be released by releasing the lock 30 when the handle is in closed position. A similar arrangement is provided for the belt portion 20 including the belt take-up shaft and the ratchet mechanism.

To secure the two belt portions together and to also provide means for forcing the belts apart to produce tension on the spine of the user, a pair of jack screws are provided therebetween by attaching the same to the back belt portions by a limited swivel connection. This swivel connection permits the belts to move slightly to accommodate persons that are deformed. The connection and tensioning means includes a jack screw, and a screw thread lock means mounted on each of the lower back belt portions. Thus by rotating each jack screw through the upper ratchet means, the screw may be rotated against the lock means on the lower belt and thereby force the two belts apart.

A right hand side jack screw 30 is secured to the upper belt 10 by a limited pivotal mount 31 and to the lower belt 12 by a limited pivotal mount 32. In a similar manner, a jack screw 40 is mounted by pivotal mount 41 to the upper belt 10 and to a limited pivotal mount 42 to the lower belt 12. A handle 33 and spring pawl 36 on the mount 31 provides a ratchet rotation means for the jack screw 30, and a handle 43 provides the same rotation, in the opposite direction, to the jack screw 40 on the other connection. A handle 34 mounted on the lower attachment mount 32 provides means for a thread tooth to engage the threads of the jack screw 32 permitting the movement of the mount 32 away from the mount 31. As shown in FIG. 8, the jack screw 30 is provided with an attached ratchet wheel 35, and the spring loaded pawl 36 mounted on the handle 33 provides means for counter-clockwise rotating the ratchet wheel 35 and attached shaft 30 (which is keyed to the ratchet wheel 35). In a similar manner, the handle 43 with a drive pawl turns the ratchet wheel and the jack screw 40 in the opposite or clockwise direction. This permits an attendant to pull both handles 43 and 33 outwardly at the same time to conjointly rotate the shafts 40 and 30, so as to conjointly move the two belts uniformly apart. This provides uniform tension thereon. The shaft 30 is reciprocally mounted in the mount 31, and a compression spring 37 is mounted between the top of shaft 30 and the mount 31a, so that as tension is exerted between the belts, the handle 33 moves longitudinally along a slot 38, with the spring 37 being compressed. The distance of movement indicates a pressure of the tension as shown on the scale 39 on the mount. Both upper mounts includes the springs, slots and scale. This provides means for determining the tension between the two belts, and individually on both jack screws. The scales show the tension to be exerted on both sides of the spine of the user. In one size, it has been found highly usable to provide a scale marked for every 8.1 pounds of tension.

To provide the threading arrangement of the lower mount with the jack screw 30, a thread tooth 34a is mounted on the handle 34, shown in FIG. 7, which is arranged to move in and out of engagement with the threads of the shaft 30 as it extends through the mount 32. A tension spring 34b secured between the mount and the handle 34 biases the handle in closed position so that the tooth 34a is normally in contact with the threads of the jack screw 30. A cover 30a, FIG. 5, extends downwardly from the lower mount 32 and provides a shield for the jack screws below lower mounts. Since the two belt arrangements hold the jack screws away from the body between the two belts no covering is necessary, but the body may contact the lower por-

tion of the jack screws and the covers prevent such contact.

As pointed out above, tension between the two belts is provided by rotating the jack screws with the thread teeth in contact with the jack screws so that the lower mounts move away from the upper mounts as the handles 33 and 43 ratchet on the ratchet wheels to conjointly turn the jack screws.

Tension between the two belts is generally determined by the scales as the jack screws bear against the springs in the upper mounts. The tension is easily relieved by pulling on the lower handles, which release thread teeth from the jack screws. The two belts are free to move together. Further, differential tension may be provided for the two jack screws, if such is indicated.

To provide lateral pressure on vertebrae and/or discs in the lower back region, a pair of lordosis pads 50 and 51 are mounted on screws 52 and 53 respectively which are threadably mounted in supports 54 and 55 respectively. The two mounts 54 and 55 are slidably mounted in a holder 58, which is secured to the belt portion 10. The slidable mounts 54 and 55 are frictionally held in position by means of flat springs 60 and 61 mounted in the passages in the fitting 58 to bear against mounts 54 and 55 to secure the mounts in predetermined position. Pressure of the lordosis pads against the back is provided by rotating the screws 52 and 53 by means of the manipulating handles 52a and 53a respectively. This provides means for moving one or both of the lordosis pads toward and away from the body of the user.

With the two belts properly tightened around the torso of the user, the desired tension is placed on the back by the jack screws between the two belts, to tension the spinal column of the user. The lordosis pads may be pressed in desired places on the vertebrae or discs of the spine. It is noted the upper lordosis pad 50 is arranged to contact an area between the two belts while the lower lordosis pad 51 is arranged to contact various parts of the sacroiliac or lower spine.

As generally explained, the apparatus is adjustable for various portions of the lower spine of the user, and the tension applied to the spine between the secured belts is easily determined by the scale on each of the upper mounts of the tensioning apparatus. Furthermore, the lordosis pads are readily adjusted to the particular individual, and the device provides a very easy and quick method of applying tension on the lower spine of a user and the later pressure against vertebrae and discs of the lower back.

We claim:

1. In an ambulatory traction treatment apparatus having a pair of spaced apart upper and lower torso belts tightenable on a torso by straps depending from each end of said belts, and a pair of spaced-apart tensioning jack screws therebetween for moving said belts apart, the improvement of a pair of mounting means for each said jack screw on the upper torso belt inclusive of ratchet means for rotating each said screw in opposite directions, a pair of mounting means on the lower torso belt inclusive of releasable tooth means for holding each said screw for tensioning and for immediate release of tension, and adjustable mount means on the lower belt holding a pair of spaced-apart lordosis pads, including means for applying forward pressure to said lordosis pads against vertebrae of a patient, said adjust-

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able mount means includes a pair of passage means, an elongated holder for each lordosis pad mounted in each said passage and spring bias means in each said passage of said mount means for frictionally holding each said elongated holder at a predetermined position for prepositioning said lordosis pads.

2. In the improvement of claim 1 wherein said torso

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belts are tightened on the torso of a patient by means of a ratchet take-up on the holding straps.

3. In the improvement of claim 2 wherein quick release means is provided on said ratchet means for releasing said ratchet take-up.

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