

Jan. 21, 1964

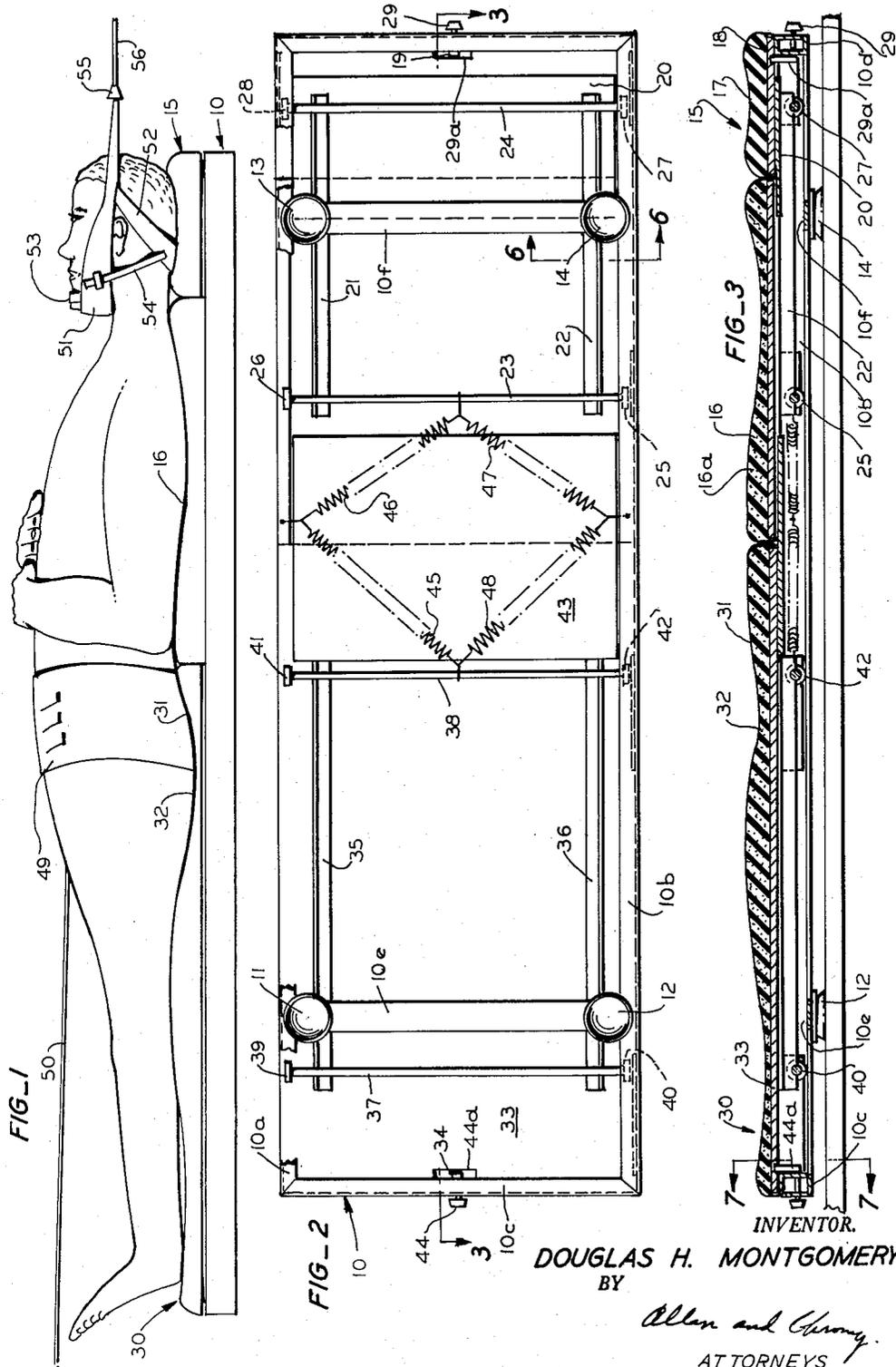
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3,118,442

THERAPEUTIC TRACTION APPARATUS

Filed April 3, 1961

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

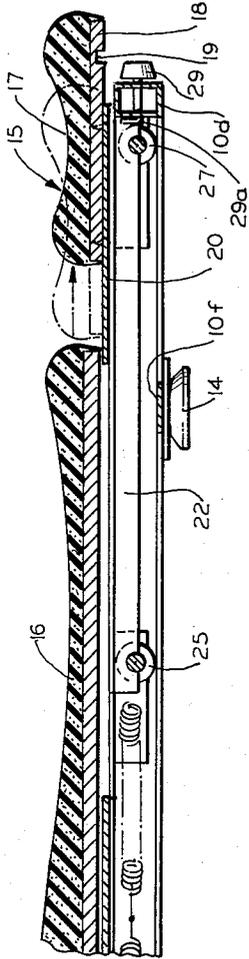


FIG-4

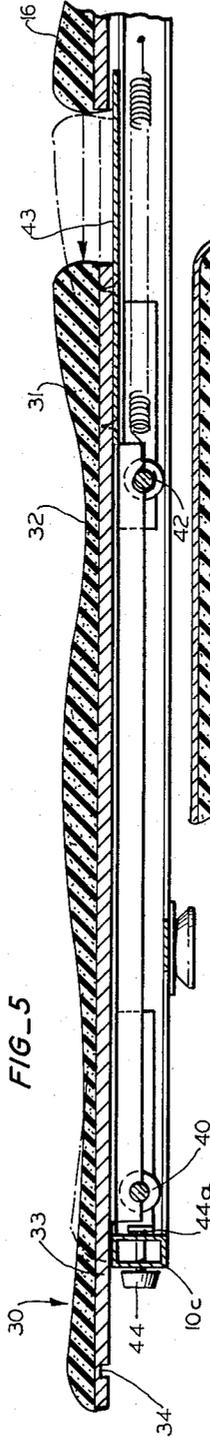


FIG-5

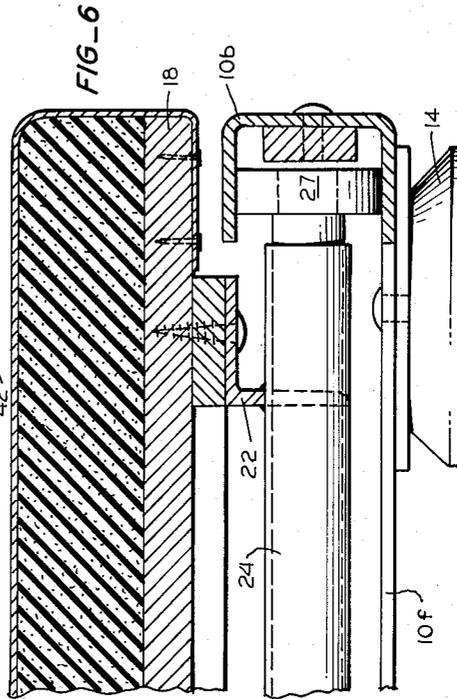


FIG-6

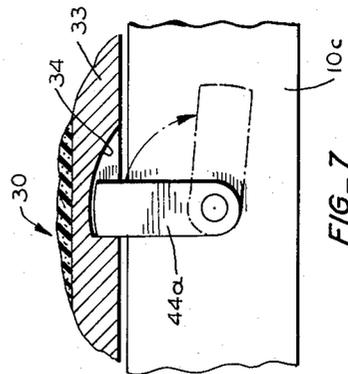


FIG-7

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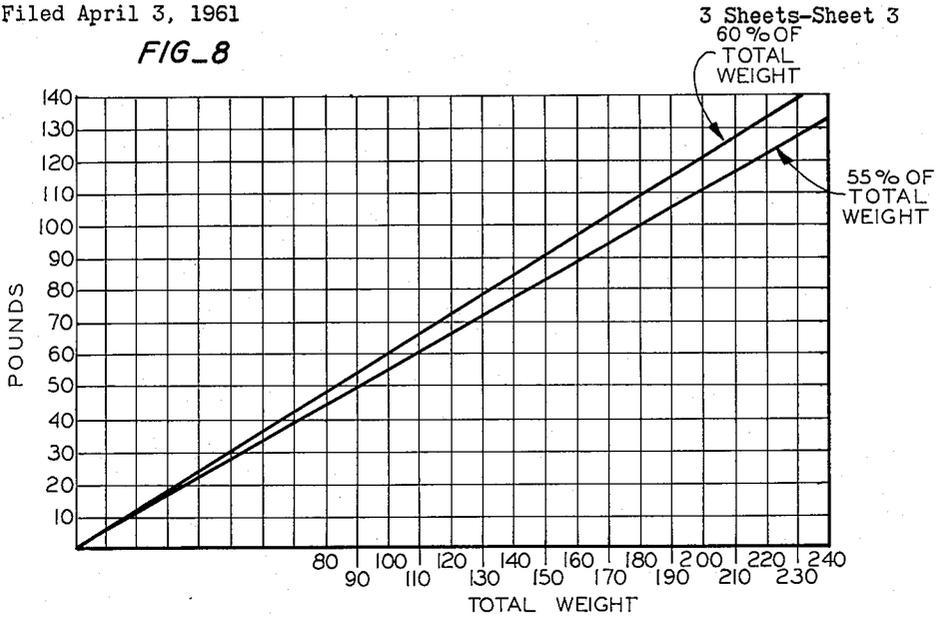
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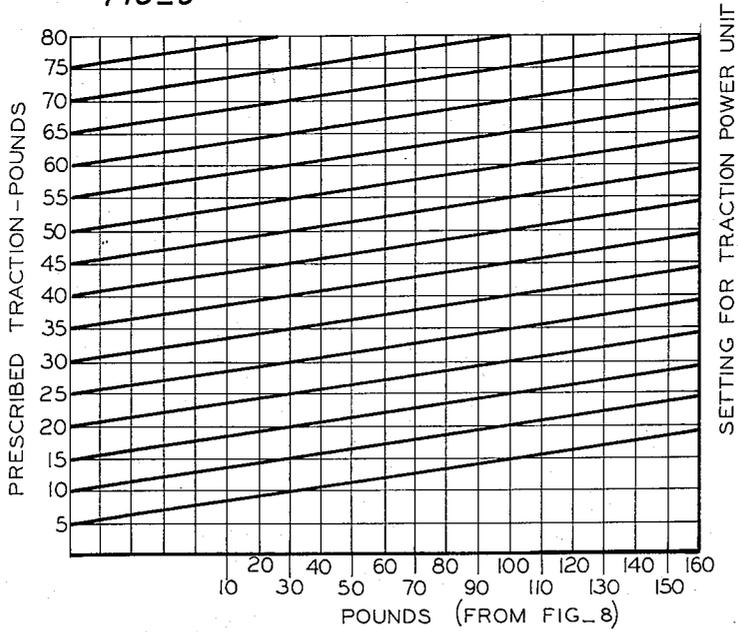
THERAPEUTIC TRACTION APPARATUS

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FIG_8



FIG_9



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THERAPEUTIC TRACTION APPARATUS
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This invention relates to therapeutic traction equipment in general. More particularly this invention relates to therapeutic traction equipment constructed so that the prescribing physician or treating therapist knows how much therapeutic traction is actually being delivered to the patient being treated.

An object of this invention is to provide an improved therapeutic traction apparatus.

Another object of this invention is to provide an improved therapeutic traction apparatus with which the physician or treating therapist can predetermine exactly how many pounds of pull he can deliver to the lumbar or cervical spine of the patient.

Another object of this invention is to provide an improved therapeutic traction apparatus with which the physician or treating therapist can accurately determine the actual pounds of pull delivered to a given area of the patient being treated, said apparatus being provided with a forward and a rear carriage which are adapted to be movable with respect to each other and either one of which may be locked to the frame of the apparatus to prevent movement, said carriages being joined by spring means so that when the patient's muscles have been stretched by the traction apparatus, spring tension assists the stretched muscles to contract back to their normal length whereby when the patient has completed his treatment and gets on his feet from the apparatus he is not tired nor are his muscles fatigued. Thus the treatment is more effective and the patient is undisturbed.

Other and further objects of this invention will be apparent to those skilled in the art to which it relates from the following specification, claims and drawings in which briefly:

FIG. 1 is a side view of this apparatus showing a patient positioned thereon;

FIG. 2 is a bottom view of this apparatus partially broken away;

FIG. 3 is a sectional view taken along the line 3-3 of FIG. 2;

FIG. 4 is a sectional view of the upper portion of this apparatus showing the cervical carriage in extended position;

FIG. 5 is a sectional view similar to FIG. 4 showing the lower carriage in extended position;

FIG. 6 is a sectional view taken along the line 6-6 of FIG. 2 showing details of construction of a part of the cervical carriage support;

FIG. 7 is a sectional view taken along the line 7-7 of FIG. 3 showing one of the carriage locks; and FIGS. 8 and 9 are graphs which may be used for determining the relation between the setting of the power traction unit and the pounds pull to be applied to the patient for different patient weights.

Referring to the drawings in detail, the frame 10 which is preferably made of channel iron comprises the side members 10a and 10b, the lower member 10c and the upper member 10d. This frame is of generally rectangular shape and it is provided with cross members 10e and 10f, the ends of which may be welded or otherwise attached to the side members 10a and 10b. Rubber or similar cup shaped pads 11, 12, 13 and 14 are attached to these cross members and comprise the supports for this apparatus which engage the top of the table on which this apparatus is adapted to be positioned. These pads

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11-14 should engage the table securely so that the apparatus does not shift its position on the table top during use.

A forward or cervical carriage 15 and a rear carriage 30 which are separated by an intermediate fixed deck portion 16 are mounted on the frame 10. The cervical carriage 15 comprises a deck 18 to which the rails 21 and 22 are securely attached. These rails are also welded or otherwise attached to the axles 23 and 24. The end portions of the axle 23 are provided with roller members 25 and 26 which are positioned inside of the channel frame members 10b and 10a respectively and similarly the end portions of axle 24 are provided with roller members 27 and 28 which are positioned in the channel frame members 10b and 10a respectively. A pad 17 having a body of foam rubber or the like which is provided with a cavity or depression that is adapted to fit the back of the patient's head, as shown in FIG. 1, is attached with cement or the like to the top of the deck 18. Also the underside of the deck 18 is provided with a notch or recess 19 which is adapted to receive the latch or lock member 29a that is rotatably supported on the frame member 10d and is adapted to be controlled by the knob 29 so that it may be inserted into the recess 19 when it is desired to lock the upper carriage 15 to prevent movement thereof as will be described hereinafter.

The stationary deck 16 is fixedly attached by screws or the like (not shown) to the upper part of the frame members 10a and 10b so that it is positioned between the cervical carriage 15 and the lower carriage 30. The cervical carriage 15 is also provided with a board 20 which is attached to the bottom of the carriage deck 18 and extends underneath the stationary deck 16 so that when the cervical carriage 15 is moved away from the stationary deck 16 during use of this apparatus with a patient positioned thereon the space between the carriage 15 and the deck 16 is closed by the board 20.

The rear carriage 30 is provided with a deck 33 to which are attached rails 35 and 36 which are similar to rails 21 and 22 of the cervical carriage. The end portions of these rails have attached thereto axles 37 and 38. Rollers 39 and 40 are attached to the end portions of the axle 37 and these rollers are positioned in the channels of side members 10a and 10b. Similarly, rollers 41 and 42 are attached to the end portions of the axle 38 and these rollers also are positioned in the channels of side members 10a and 10b. The assembly of the rails 21, 22, 35 and 36 and axles 23, 24, 37 and 38 and associated rollers is such as is illustrated in FIG. 6 which is a sectional view showing the axle 24 attached by welding to the rail 22 and having a roller 27 positioned thereon, said roller being movable in the channel of frame member 10b.

A cushion 31 of foam rubber or the like is provided to the top of the carriage deck 33 and this cushion is cemented or otherwise attached to the top of this deck. This cushion is provided with a cavity 32 for receiving the gluteal prominence of the patient.

A guard panel 43 is attached to the underside of the carriage deck 33 and this panel normally extends under the stationary deck 16 as shown in FIG. 3. However, when the rear carriage 30 is moved downward, this panel effectively closes the opening between the upper end of the carriage 30 and the lower end of the stationary deck 16. The lower end of the carriage deck 33 is provided with a notch or recess 34 which is adapted to receive the lock or latch member 44a that is supported on the end frame member 10c. A knob 44 is provided for the purpose of rotating the lock or latch member 44a so that it is adapted to be lodged in the recess 34 when it is desired to lock the carriage 30 to prevent movement thereof

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with respect to the frame. Both recesses 19 and 34 are shaped as shown in FIG. 7 which is a sectional view showing the latch 44a lodged in recess 34 in full lines and showing the latch 44a retracted from the recess in broken lines.

A plurality of springs 45, 46, 47 and 48 is connected between the axles 23 and 38 of the cervical and rear carriages 15 and 30, respectively, as shown in FIG. 2. Spring 45 extends between the middle of axle 38 and a suitable hole in frame member 10a and spring 46 extends between the middle of axle 23 of the cervical carriage. In similar fashion spring 48 extends between the middle of axle 38 and a suitable hole formed in the side frame member 10b and spring 47 extends between the central part of axle 23 and the hole formed in the frame 10b. Thus when the cervical carriage 15 is extended upward beyond the end of the frame, pull is exerted on springs 46, 47 between the axle 23 and the sides of the frame, that is, side members 10a and 10b tending to retract the carriage to its normal position on the frame. Likewise, when the rear carriage 30 is extended beyond the opposite end of the frame, pull is exerted by springs 45 and 48 tending to retract this carriage to its normal position.

Before the patient mounts the traction table of this invention, the physician or treating therapist must determine how many pounds of pull are required to deliver the actual number of pounds pull desired at a given area. This is done by the use of the charts shown in FIGS. 8 and 9 to which reference is now made.

In administering traction to the lumbar region of a patient's spine, the portion of the body below that region must be moved freely by traction means. On the average patient, that portion constitutes between 55% and 60% of the total body weight, according to most anatomists. The body weight is plotted on the abscissa of FIG. 8. Knowing the weight of the patient the approximate weight of the lower portion from the first lumbar vertebra, to and including approximately the first 8 inches of the thighs, is indicated at the intersection of the line corresponding thereto with the diagonal 55% and 60% lines of FIG. 8. From these intersection points the horizontal lines are followed to the left to obtain from the ordinate the figure in pounds representing 55% or 60% of the patient's total body weight. This figure is noted and the like figure is selected on the abscissa of FIG. 9. The vertical line corresponding to this figure is traced on FIG. 9 to the intersection thereof with the diagonal line corresponding to the pounds traction prescribed for the particular treatment by the physician. From this intersection point the corresponding horizontal line is followed to the ordinate from which the setting for the power traction unit is obtained. The difference between the final figure and that prescribed by the physician is attributed to the force necessary to set a given weight into motion and to move that weight a given distance for example, 5 inches, in a given length of time such as 7½ seconds. Additional force is required to overcome the weight of the carriage and its return spring tension. The pull required to move the weight load is approximately 5% of that load. The pull necessary to overcome carriage weight and spring tension is approximately 1 pound per inch of travel. The figures shown in FIGS. 8 and 9 are based on 5 inches of maximum travel of the carriage of this apparatus. As an example let us consider a 180 pound patient to receive treatment of 25 pounds at 3 inches of carriage travel. Referring to FIG. 8, 55% of 180 pounds is 100 pounds. On FIG 9, the 100 pound vertical line intersects the 25 pound diagonal line at the 35 pound horizontal line. The 3 inches of travel would require 2 pounds less pull than that indicated, so the power traction instrument would be set at 33 pounds.

For cervical traction on this apparatus, assuming the average head weight of 18 pounds, the power traction unit setting would be approximately 3 pounds above the prescribed traction for a maximum of 2 inches of movement.

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In use, this apparatus is positioned with the pads 11-14 thereof securely gripping the top of a table. These pads may be in the form of rubber suction cups and they may be clamped to the top surface of the table by atmospheric pressure. The carriage locks 29a and 44a are securely engaged in the recesses 19 and 34, respectively so that when the patient mounts this apparatus, the carriage thereof will not slip. The pelvic traction belt 49 is then placed on the patient's person for treatment of low back conditions. The patient is placed so that the most prominent portion of the gluteal curve is placed comfortably and firmly in the cavity 32 of the low back carriage 30. The pelvic belt 49 is then connected to the intermittent traction unit (not shown) by means of the rope 50 and the weight on the intermittent traction scale is adjusted as previously described. The lock 44a is then disengaged from the recess 34 in the carriage. The intermittent power traction unit is then activated and after the completion of the treating period the power unit is stopped at the bottom of the release stroke and the patient's pelvic belt is disengaged from the power unit. The carriage is then locked by placing lock 44a into recess 34 of the carriage.

In treating the cervical spine of the patient the halter shown in FIG. 1 is placed on the patient's head by detaching the strap 54 from the band 51. This halter comprises the band 51 passing under the patient's chin, the band 52 passing around the back of the patient's head, the band 53 joined to the band 51 and arching over the front of the patient's chin and a pair of straps, such as the strap 54, which are positioned on the sides of the patient's head. The two ends of the band 51 are joined together at 55 and attached to the traction cable 56 of the traction power unit (not shown).

In positioning the patient for cervical traction, the occiput should be placed in the concavity 17 of the cervical carriage 15 provided for this purpose. The patient should be instructed to keep his chin down and not allow it to ride upwards with the pull of the power unit. This procedure of keeping the chin down will avoid irritation of the temporal mandibular joint. Keeping the chin down will also allow equal pull to be exerted on both the chin band 51 and occipital band 52 of the head halter. The pound settings for the cervical spine are worked out using the average weight of the adult head at 18 pounds at the base line.

This apparatus is equipped with return spring power in both the low back carriage 30 and the cervical carriage 15. This return spring pressure is provided so that, when the patient's muscles have been stretched by the traction apparatus, their normal physiology being for them to contract back to their normal length, they do not have to do this unassisted. The smooth movement of the carriage with its return spring assistance helps do this for the patient. As a result when the patient has completed his treatment and gets up on his feet he is not tired nor are his muscles fatigued. As a result the treatment is more effective and the patient undisturbed.

While I have shown a preferred embodiment of the invention, it will be understood that the invention is capable of variation and modification from the form shown so that its scope should be limited only by the scope of the claims appended hereto.

What I claim is:

1. In traction apparatus for the application of predetermined amounts of therapeutic traction to the patient's lumbar and cervical spine, the combination of a frame comprising a pair of elongated parallel side members joined by a pair of end members, a cervical carriage having a deck attached thereto, said deck having a pad with a cavity for receiving the patient's occiput, said carriage also having a first pair of frame members positioned substantially parallel to and resting on said frame side members, a first pair of axles fixedly attached to said frame members near the ends thereof, roller means positioned on the end portions of said axles rotatably engaging said

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side members whereby said cervical carriage is movable on the side members of said frame, a rear carriage having a deck attached thereto, said last mentioned deck having a cavity for receiving the gluteal prominence of the patient, said rear carriage also having a pair of frame members positioned substantially parallel to and resting on said frame side members, the deck of said rear carriage having a length approximating half the length of said frame, a second pair of axles fixedly attached to the frame members of said rear carriage near the ends thereof, additional roller means positioned on the end portions of said last mentioned pair of axles rotatably engaging said side members whereby said rear carriage is movable on said frame, a stationary deck fixedly attached to said frame and positioned between said cervical carriage and said rear carriage, spring means attached to said frame and to said carriages whereby spring tension is applied to said carriages selectively when they are moved on said roller means to extend beyond said frame during the application of therapeutic traction to the patient's lumbar or cervical spine, and locking means for each of said carriages for selectively locking said carriages against movement on said frame so that either one of said carriages may be locked when not in active use for the application of traction to the patient, means connecting one of said locking means to one of the end members of said frame and additional means connecting the other of said locking means to the other end member of said frame.

2. In traction apparatus for the application of predetermined amounts of therapeutic traction to the patient's lumbar and cervical spine, the combination of a frame comprising a pair of elongated parallel side members joined by a pair of end members, a cervical carriage having a deck attached thereto, said deck having a cavity for receiving the patient's occiput, said carriage also having a pair of frame members positioned substantially parallel to and resting on said frame side members, a first pair of axles fixedly attached to said frame members near the ends thereof, roller means positioned on the end portions of said axles rotatably engaging said side members whereby said cervical carriage is movable on said frame, a rear carriage having a deck attached thereto, said last mentioned deck having a cavity for receiving the gluteal prominence of the patient, said rear carriage also having a pair of frame members positioned substantially parallel to and resting on said frame side members, the deck of said rear carriage having a length approximating half the length of said frame, a second pair of axles fixedly attached to the frame members of said rear carriage near the ends thereof, additional roller means positioned on the end portions of said last mentioned pair of axles rotatably engaging said side members whereby said rear carriage is movable on said frame, a stationary deck fixedly attached to said frame and positioned between said cervical carriage and said rear carriage, said first pair of frame members of said cervical carriage extending under said stationary deck, spring means attached to said frame and to said carriages whereby spring tension is applied to said carriages selectively when they are moved on said roller means to extend beyond said frame during the application of therapeutic traction to the patient's lumbar or cervical spine, and locking means for each of said carriages for selectively locking said carriages against movement on said frame so that either one of said carriages may be locked when not in active use for the application of traction to the patient, means connecting one of said locking means to one of the end members of said frame and additional means connecting the other of said locking means to the other end member of said frame.

3. In traction apparatus which is adapted to be supported on the top of a table for the application of predetermined amounts of therapeutic traction to the patient's lumbar and cervical spine, the combination of a frame comprising a pair of elongated parallel side members

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joined by a pair of end members, a plurality of pads attached to the bottom of said frame at spaced points, said pads being adapted to engage the top of a table for supporting the traction apparatus, a cervical carriage having a deck attached thereto, said deck having a cavity for receiving the patient's occiput, said carriage also having a pair of frame members positioned substantially parallel to and resting on said frame side members, a first pair of axles fixedly attached to said frame members near the ends thereof, roller means positioned on the ends of said axles rotatably engaging said side members whereby said cervical carriage is movable on said frame, a rear carriage having a deck attached thereto, said last mentioned deck having a cavity for receiving the gluteal prominence of the patient, said rear carriage also having a pair of frame members positioned substantially parallel to and resting on said frame side members, the deck of said rear carriage having a length approximating half the length of said frame, a second pair of axles fixedly attached to the frame members of said rear carriage near the ends thereof, additional roller means positioned on the ends of said last mentioned pair of axles rotatably engaging said side members whereby said rear carriage is movable on said frame, a stationary deck fixedly attached to said frame and positioned between said cervical carriage and said rear carriage, spring means attached to said frame and to said carriages whereby spring tension is applied to said carriages selectively when they are moved on said roller means to extend beyond said frame during the application of therapeutic traction to the patient's lumbar or cervical spine, and locking means for each of said carriages for selectively locking said carriages against movement on said frame so that either one of said carriages may be locked when not in active use for the application of traction to the patient, means connecting one of said locking means to one of the end members of said frame and additional means connecting the other of said locking means to the other end member of said frame.

4. In traction apparatus which is adapted to be supported on the top of a table, for the application of predetermined amounts of therapeutic traction to the patient's lumbar and cervical spine, the combination of a frame comprising a pair of elongated parallel channel shaped side members joined by a pair of end members, a plurality of pads attached to the bottom of said frame at spaced points, said pads being adapted to engage the top of a table for supporting the traction apparatus, a cervical carriage having a deck attached thereto, said deck having a cavity for receiving the patient's occiput, said carriage having a pair of frame members positioned substantially parallel to and resting on said frame side members, a first pair of axles fixedly attached to said frame members near the ends thereof, roller means positioned on the ends of said axles extending into said channel shaped side members and rotatably engaging an inner surface thereof whereby said cervical carriage is movable on said frame, a rear carriage having a deck attached thereto, said last mentioned deck having a cavity for receiving the gluteal prominence of the patient, said rear carriage also having a pair of frame members positioned substantially parallel to and resting on said frame side members, the deck of said rear carriage having a length approximating half the length of said frame, a second pair of axles fixedly attached to the frame members of said rear carriage near the ends thereof, additional roller means positioned on the ends of said last mentioned pair of axles rotatably engaging said side members whereby said rear carriage is movable on said frame, a stationary deck fixedly attached to said frame and positioned between said cervical carriage and said rear carriage, spring means attached to said frame and to said carriages whereby spring tension is applied to said carriages selectively when they are moved on said roller means to extend beyond said frame during the application of therapeutic traction to the pa-

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tient's lumbar or cervical spine, and locking means for each of said carriages, said locking means each having a member extending between the respective carriage and said frame for selectively locking said carriages against movement on said frame so that either one of said carriages may be locked when not in active use for the application of traction to the patient, means connecting one of said locking means to one of the end members of said

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frame and additional means connecting the other of said locking means to the other end member of said frame.

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