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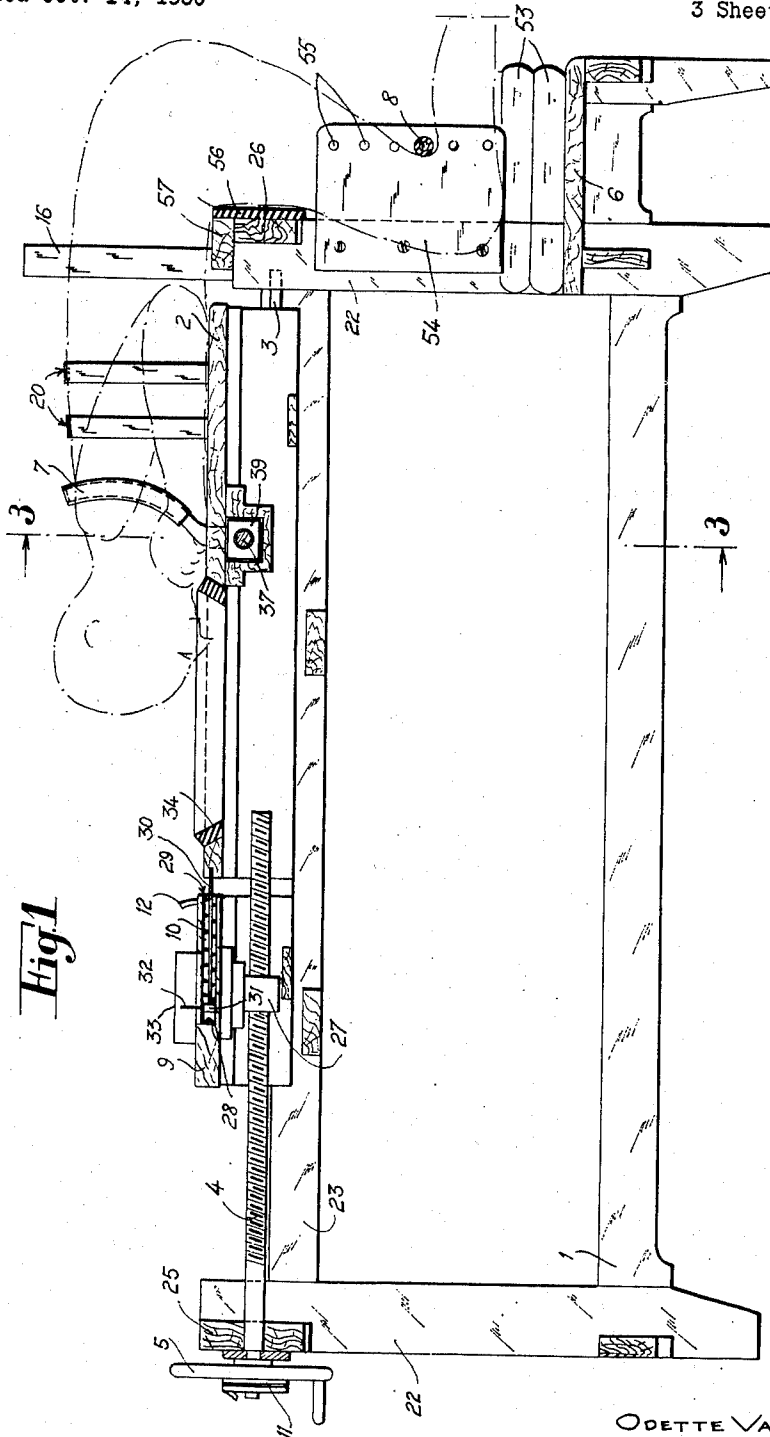
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TABLE FOR THE ELONGATION OF THE VERTEBRAL COLUMN

Filed Oct. 14, 1950

3 Sheets-Sheet 1



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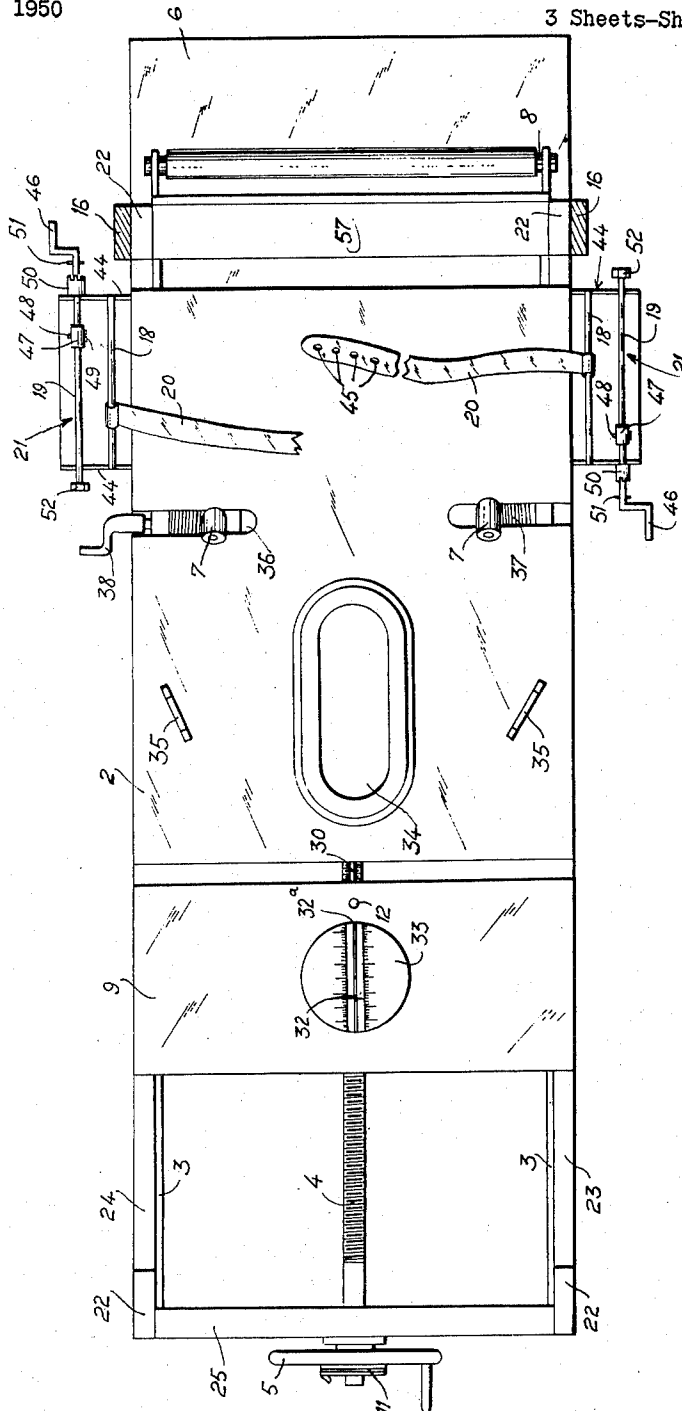
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TABLE FOR THE ELONGATION OF THE VERTEBRAL COLUMN.

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3 Sheets-Sheet 3

Fig. 4

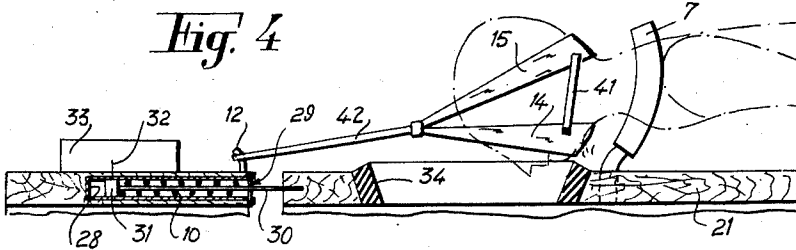


Fig. 3

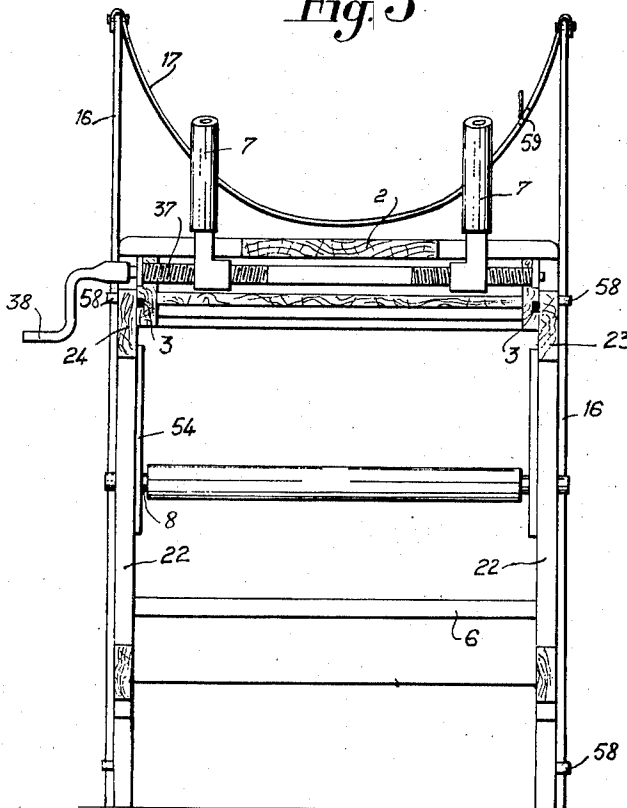
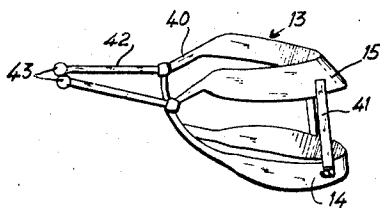


Fig. 5



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UNITED STATES PATENT OFFICE

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TABLE FOR THE ELONGATION OF THE VERTEBRAL COLUMN

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7 Claims. (Cl. 128—75)

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The present invention relates to a table for elongating the vertebral column, this table being so designed as to exercise a stretch on the vertebral column of a patient in order to pull apart the vertebrae and to relieve from compression the roots of the nerves extending from the spinal cord, and also to combine, if necessary, the elongation treatment with a straightening and a massage of the vertebral column.

Elongation tables are already known, on which the patient rests on the back, and which belong essentially to two classes, viz.,

(a) those in which the pulling stress is transmitted to the vertebral column through the medium of the legs and the arms, or of the legs and the neck. In these apparatus the pulling stress is not confined to the vertebral column, but is also exercised on the joints of the arms and the legs whereby the efficiency of the pulling stress in stretching the vertebral column is uncontrollable.

(b) Those in which the pulling stress is applied to the trunk of the patient by the aid of straps passing about the trunk in two transverse planes between which the zone of elongation is localized. In these apparatus the tightening of the straps about the chest is usually ill-borne by the patient. This causes, in particular, muscular contractures, which may have fatal results.

The known tables also possess the following disadvantages:

As the patient rests on the back, it is impossible for the operator, during the elongation treatment, to carry out a dorsal massage, which very frequently advantageously completes the beneficial effect of the elongation proper.

On the other hand, although the pulling stress can usually be measured with the aid of a dynamometer, no efficient safety means are available, which enable the pull to be limited automatically; whenever the operator's attention relaxes or the measuring apparatus has a breakdown, serious accidents may occur.

Finally, the position of a patient resting on the back is such that the vertebral column assumes its normal curvature, so that the pull exerted, before it causes an effective elongation of the vertebral column, has first the effect of straightening the column, and this straightening action cannot be efficiently controlled so as to rectify permanent deformations of the vertebral column.

The present invention has for its object to overcome these disadvantages, and to provide an elongation table which is so designed that

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the patient, kneeling down at one end of the table and resting thereon face downwards, whilst pressing against the edge of the table with the inner part of the thighs, is disposed in a suitable position for dorsal massage, stretching being exerted on the shoulders for the purpose of dorsal and lumbar elongation or on the head for elongation of the cervical vertebrae. The apparatus may furthermore be fitted with means for rectifying deformations, as in lordosis (excessive curvature of the lumbar region), cyphosis (arched back) or scoliosis (lateral curvature of the vertebral column).

The elongation table according to the invention comprises essentially a horizontal frame on which is slidably mounted a supporting carriage adapted to support the chest of a patient and comprising two vertical arms adapted to fit below the armpits of the patient occupying a kneeling position, the table being further supplied with means for supporting and anchoring the thighs in the kneeling position of the patient, and with means for actuating the carriage, causing the latter to be moved along the table.

In order to automatically limit the stretch applied, the actuating means for the carriage preferably include a stress limiting device, which causes an automatic disengagement of the drive when the pull has reached a predetermined limit.

Preferably, the apparatus includes a traction carriage, which is resiliently connected with the supporting carriage and is driven positively by the actuating means, the supporting carriage being driven by the traction carriage through the medium of said resilient connection, whilst at each instant the tension of the latter is measured by a dynamometer.

The positively driven traction carriage may with advantage be fitted with a traction yoke adapted to bear against the nape of the neck and the chin of the patient, in such a way as to afford an elongation of the entire vertebral column, including the cervical vertebrae, when the arms of the carriage engage below the armpits of the patient; when using the arms of the supporting carriage as an abutment for the shoulders of the patient, the elongation may be restricted to the cervical vertebrae.

Additional strap means may be provided in order to bring about, simultaneously with the elongation of the vertebral column, a rectification thereof in the case of lordosis, cyphosis or scoliosis.

Further features of the invention will become

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apparent from the following description, with reference to the accompanying drawing, which shows, by way of example, an embodiment of the invention, and in which:

Fig. 1 is a longitudinal section taken through a table according to the invention, the patient being represented diagrammatically by dash-dotted lines.

Fig. 2 is a corresponding plan view.

Fig. 3 is a cross-section taken along the line 3—3 in Fig. 1.

Fig. 4 shows diagrammatically the use of the apparatus for the elongation of cervical vertebrae.

Fig. 5 is a perspective view of the traction yoke for the head.

Referring to the drawing, it will be seen that the apparatus comprises a frame 1 which is generally in the form of a table, on which latter there is slidably mounted a supporting carriage 2 adapted to slide in slideways 3 of the table under the action of a screw 4 operated by a hand wheel 5. At one end of the table there is provided a lower cross-member 6 in the form of a stool, on which the patient is able to kneel with the front portion of his thighs pressing against a marginal cross-member 26 beneath the edge of the table 1, whilst his chest rests on the supporting carriage 2, the latter having vertical arms 7, which can be introduced below the armpits of the patient.

A backing cross-member 8 in the form of adjustable transverse bar engages in the hollow located between the calves and the thighs for the purpose of holding the patient in the desired position and constitutes a point of anchorage during the stretch exerted on the shoulders as a result of displacement of the carriage 2. It will be seen that the lower cross-member 6 or stool is located underneath the gap between said marginal cross-member 26 and backing cross-member or transverse bar 8, the relative positions of said cross-members being such that the thighs of a patient kneeling on said lower cross-member will bear by their front face against said marginal cross-member and by their rear face against said backing cross-member. The stretch is thus exercised in effective manner on the entire vertebral column between that part of the bone structure connected to the shoulders and the lumbar vertebrae connected to the pelvis, playing the part of fixed point.

In this position of kneeling, the vertebral column of a normal body is in a straightened condition and the whole pull is practically used for the elongation. Furthermore, the patient is made to assume as position which is extremely favourable for dorsal massage, which latter may be carried out during the stretching operation.

In the embodiment illustrated, the supporting carriage 2 is not directly connected to the operating screw, but is connected to a traction carriage 9 through the medium of a resilient connection, for example a spring 10. In this way the pull is transmitted to the supporting carriage in a progressive and resilient manner. Furthermore, a stress-limiting device, for example a friction clutch 11, is interposed in the driving means, for example between the wheel 5 and the screw 4, so as to be capable of slipping when the stress exceeds a certain value (for example 50 kilograms).

This arrangement of a double carriage lends itself with advantage to elongation of the cervical vertebrae, which otherwise would not be effected by the stretching action. For this purpose, the traction carriage 9 carries a hook 12, to which

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there can be attached a traction yoke 13, such as that illustrated in Figs. 4 and 5, comprising a chin strap 14 and a neck strap 15, which are connected together by bracing means. When the head is inserted in the yoke 13 and the latter is slipped over the hook 12 on the traction carriage 9, displacement of the latter causes an elongation of the vertebral column from the first cervical vertebrae up to the final lumbar vertebrae.

If it is desired to localize the elongation solely to the cervical vertebrae, it is also possible to pass the arms 7 of the supporting carriage 2 in front of the shoulders of the patient and to immobilize the supporting carriage, as illustrated diagrammatically in Fig. 4.

To obtain at the same time an elongation treatment and also a rectifying treatment of the vertebral column, the table 1 may be made to include auxiliary means to this effect. In the embodiment illustrated, the supporting carriage 2 comprises two uprights 16 supporting a strap 17 (Fig. 3), adapted to receive the abdomen of the patient for reducing excessive curvature of the vertebral column (lordosis). Furthermore, the supporting carriage 2 carries on each side two rods 18 and 19 parallel with the longitudinal axis; on each of said rods are slidably arranged on the one hand one end of a strap 20 and on the other hand a tightening device 21, adapted to ensure tensioning of the same strap or of the straps connected to the opposite rod. By stretching a strap about the trunk of the patient transversely with respect to the table, it is possible to remedy excessive convexity of the vertebral column (cyphosis). On the other hand, by forming with one of the straps a loop about the patient's body and by drawing on this loop laterally, it is possible to exert a lateral pull on the vertebral column for bringing about a rectification of the column in the case of lateral deformation (scoliosis).

If desired, one of the straps may be formed into a loop to exert a pull from one side, and the other strap may be formed into a loop to exert a pull in the opposite direction.

Obviously the details of construction in the practical embodiment of this apparatus may be modified within wide limits.

In the constructional arrangement illustrated in the drawings, table 1 comprises four legs 22 connected at their upper ends by two longitudinal members 23, 24 and two cross members 25, 26. The longitudinal members 23, 24 are provided on their inner face with two horizontal slideways 3 on which carriages 2 and 9 are slidable.

Endless screw 4, which is mounted for rotation at one end in a bearing in the cross member 25, engages a nut 27 secured to the lower face of traction carriage 9, which is thus moved positively upon rotation of screw 4, under the action of wheel 5, through the medium of the stress or torque-limiting friction clutch 11.

The resilient connection between traction carriage 9 and supporting carriage 2 consists of a dynamometric device comprising a metallic sheath 28 secured to carriage 9 by a screwed plate 29 having a central aperture, a metallic rod 30 secured at one end to supporting carriage 2 and sliding within said sheath, the opposite end of said rod having a piston 31, adapted to compress a coil spring 10 within the sheath. A vertical pointer 32, secured to piston 31 moves along a longitudinal slot 32a formed in the sheath and in the carriage 9, in front of a dynamometric scale 33, secured to the upper part of traction carriage 9.

Supporting carriage 2 comprises an oval recess 34 adapted to accommodate the head of the patient (Figs. 1 and 5) and two handles 35 to assist the patient in adjusting himself on the table.

The arms 7, which are of arcuate form, are adjustable laterally, being capable of displacement in two slots 36 in the supporting carriage by means of a rod 37 mounted on bearings below the carriage 2 and actuated by a handle 38, the rod 37 having two oppositely directed screw-threads co-operating respectively with two nuts 39 at the lower end of arms 7. This enables the adjustment of the spacing between the arms 7 to the size of each patient. Said arms 7 may be passed below the armpits of the patient (Fig. 1) in the case of elongation of the entire vertebral column, or may serve as an abutment for the shoulders when it is desired to limit the pulling action to the cervical vertebrae (Fig. 4).

In this case stretching is effected through the medium of the traction yoke 13, pulling on the head of the patient. This yoke (Fig. 5) comprising a leather harness looped back upon itself and consisting of an upper portion 15 forming a strap for the nape of the neck and a lower portion 14 forming a chin strap, these two portions being held apart at an adjustable distance by means of webs 41. Two traction straps 42, secured at one end to yoke 13, are supplied with rings 43 at their opposite end to be fitted over the hook 12 on carriage 9.

Supporting carriage 2 carries on each side the two rods 18, 19 fitting in two end pieces 44. On the first rod 18 is slidably mounted a strap 20 having eyelets 45. The second rod 19 is rotatably and slidably mounted in the end pieces 44, and terminates in a handle 46. On each rod 19 is slidably mounted a barrel 47 having a stud 48; a screw 49 engaging a groove (not shown) in rod 19, prevents rotation of barrel 47 relatively to said rod.

For the purpose of looping the straps 20, each strap and each collar 47 can be shifted along the respective rods 18 and 19 into the position necessitated by the figure of a particular patient. Barrel 47 is then blocked on rod 19 by screw 49, and stud 48 is engaged in an eyelet 45 of strap 20. Rotation of handle 46 will cause tightening of the strap. The strap may be held in the tightened condition by a locking means for rod 19. This locking means consists of a notched ring 50 secured to one of the end pieces 44, adjacent handle 46, which is supplied with a transverse pin 51. Strap 20 being tightened, rod 19 is moved to a locking position where pin 51 engages the notches of ring 50; release of the strap is effected very readily by sliding rod 19 into the loose position, the movement of said rod being limited by a nut 52 at the opposite end thereof.

Straps 20 may be used to treat scoliosis or cyphosis.

For reducing abnormal convexity of the vertebral column (cyphosis), one of straps 20 (or both) is passed over the patient's back and buckled to barrel 47 at the side opposite its point of attachment to the carriage, and this tends to flatten out the vertebral column.

In the case of scoliosis, i. e. in order to correct lateral deviations, the straps are looped on themselves, i. e., the barrel 48 which is used for tightening a strap is that which is located on the same side of the supporting carriage as the strap. By using the two straps 20 looped on themselves on opposite sides of the supporting carriage, a torque

is exercised on the vertebral column of the patient, tending to bring about correction.

At the end of the table opposite control wheel 5 is arranged the device for supporting the knees, the thighs and the pelvis of the patient. This device comprises a stool 6, secured to the legs 22 of table 1, which stool may be covered with a cushion or pad 53. Two metal plates 54 are screwed on the inner faces of the legs 22 of the table and are formed with vertical series of corresponding holes 55, in which may be adjustably threaded a retaining bar 8, adapted to be arranged in the hollow behind the knees of the patient. The cross member 26 connecting the legs 22 is covered with a sheet of rubber 56 and serves as a supporting and holding surface for the patient's thighs. A small board 57, at right angle with the transverse member 26, serves to support the pelvis.

In the case of lordosis, it is preferable that the pelvis of the patient should be supported in such a manner as to reduce the vertebral concavity. For this purpose the two removable uprights 16 are secured by sockets 58 to the legs of the table, and the strap 17, the curvature of which is adjustable by means of a buckle 59, is disposed between the two uprights to support the pelvis of the patient.

All parts of the apparatus in contact with the patient are preferably fitted with sponge rubber.

It will be understood that the invention is not limited to the embodiment described and illustrated, which has been cited solely by way of example.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. A table for elongation of the vertebral column, comprising in combination a horizontal frame, a supporting carriage slidably mounted thereon for supporting the patient's chest, two vertical arms on said carriage adapted to fit in the armpits of the patient, means on said frame for positively actuating said carriage to shift same along the frame, a marginal cross member at the rear end of said frame and immediately under the horizontal plane of said supporting carriage, a backing cross member supported from the rear end of said frame parallel with and spaced from said marginal cross member and at a lower adjustable level than the latter, and a lower cross member supported from the rear end of said frame, parallel with said former cross member and at a lower level than the latter, underneath the gap between said marginal and backing cross members, the relative positions of said cross members being such that the thighs of a patient kneeling on said lower cross member will bear by their front face against said marginal cross member and by their rear face against said backing cross member.

2. A table for elongation of the vertebral column as claimed in claim 1 wherein said actuating means embodies a driving section, a driven section and a friction clutch operatively connecting said sections and adapted for complete slippage when the torque to be transmitted exceeds a predetermined limit.

3. A table for elongation of the vertebral column comprising in combination a horizontal frame, a supporting carriage slidably mounted thereon for supporting the patient's chest, two vertical arms on said carriage adapted to fit in the armpits of the patient, means on said frame for the support and anchorage of the thighs and the

knees of the patient occupying a kneeling position, means on said frame for actuating said supporting carriage to shift same along the frame, and a friction clutch operatively connecting said actuating means and said supporting carriage and adapted for complete slippage when the torque to be transmitted exceeds a predetermined limit.

4. A table for elongation of the vertebral column comprising in combination a horizontal frame, a supporting carriage slidably mounted thereon for supporting the patient's chest, two vertical arms on said carriage adapted to fit in the armpits of the patient, means on said frame for the support and anchorage of the thighs and the knees of the patient occupying a kneeling position, a traction carriage slidably mounted on said frame, actuating means on said frame positively connected to said traction carriage to shift same along the frame, a resilient connection between said traction carriage and said supporting carriage whereby the latter is actuated by said actuating means through said traction carriage and said resilient connection, and a dynamometer adapted to indicate at each instant the tension of said resilient connection.

5. A table for elongation of the vertebral column comprising in combination a horizontal frame, a supporting carriage slidably mounted thereon for supporting the patient's chest, two vertical arms on said carriage, means on said frame for the support and anchorage of the thighs and the knees of the patient occupying a kneeling position, a traction carriage slidably mounted on said frame, said traction carriage comprising a hook, actuating means on said frame positively connected to said traction carriage to shift same along the frame, a resilient connection between said traction carriage and said supporting carriage, and a traction yoke, removably attached to said hook and adapted to fit the head of the patient, whose shoulders bear against said vertical arms of the supporting carriage, a pull being exercised on the cer-

vical vertebrae of the patient through said yoke as the traction carriage is actuated by said actuating means.

6. A table for elongation of the vertebral column comprising in combination a horizontal frame, a supporting carriage slidably mounted thereon for supporting the patient's chest, two vertical arms on said carriage, adapted to fit in the armpits of the patient, means on said frame for positively actuating said carriage to shift same along the frame, a cross member at the rear end of said frame immediately under the horizontal plane of said supporting carriage, against which the front face of the patient's thighs are adapted to rest, a stool supported from the rear end of said frame at a lower level than said cross member for the patient's knees and a bar supported from the rear end of said frame at an adjustable level between the levels of said cross member and said stool and at such a lateral distance from them as to be adapted to engage the rear face of the patient's thighs.

7. A table for elongation of the vertebral column, as claimed in claim 1 further comprising means for tightening the patient's chest, said means comprising on each side of the table a transverse strap adjustably secured to the table and a strap tightening device, adjustable along the table, and adapted to cooperate, either with the free end of the opposite strap, stretched across the table, or with the free end of the adjacent strap, looped above the table.

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