J. LA ROCK.

STRETCHING MACHINE.

APPLICATION FILED JULY 17, 1916.

1,239,522.

Patented Sept. 11, 1917.

5 SHEETS—SHEET 1.

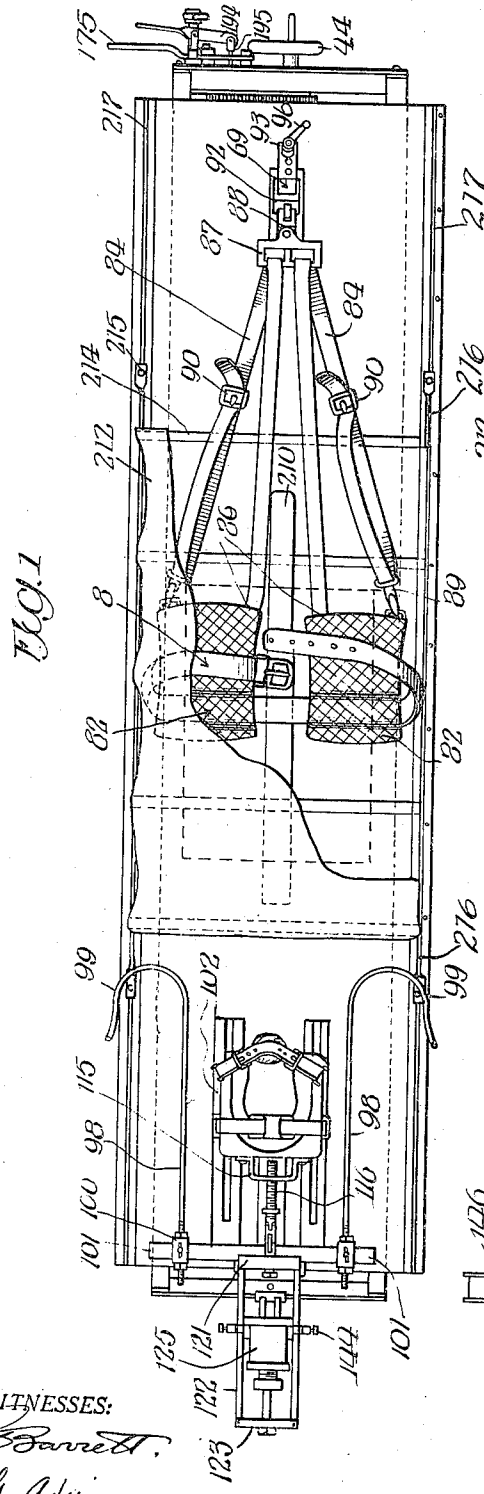


FIG. 1

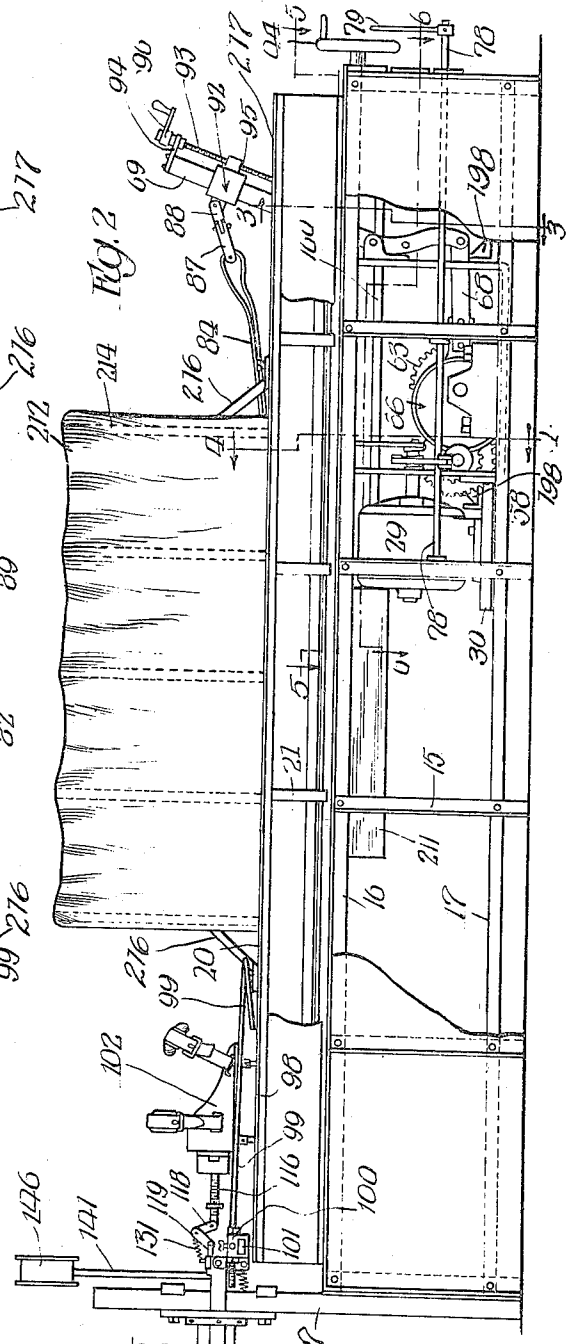


FIG. 2

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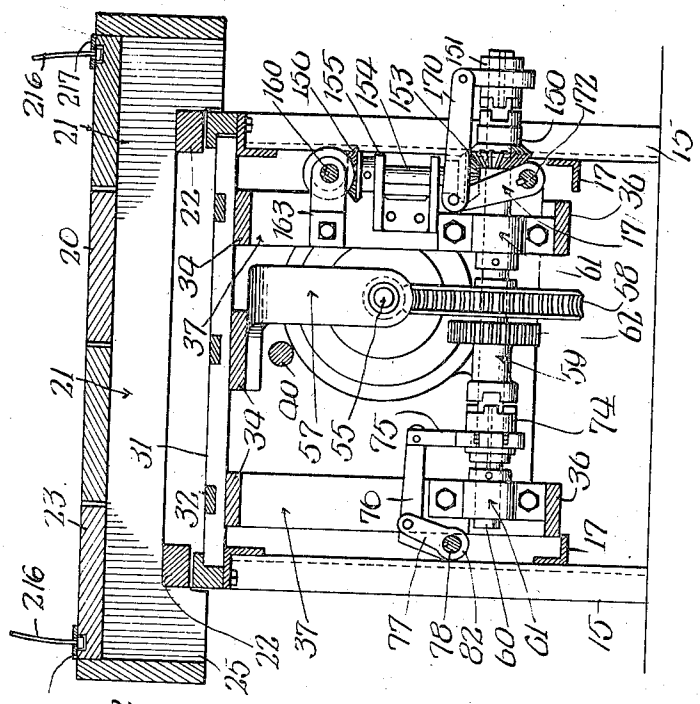


FIG. 2.

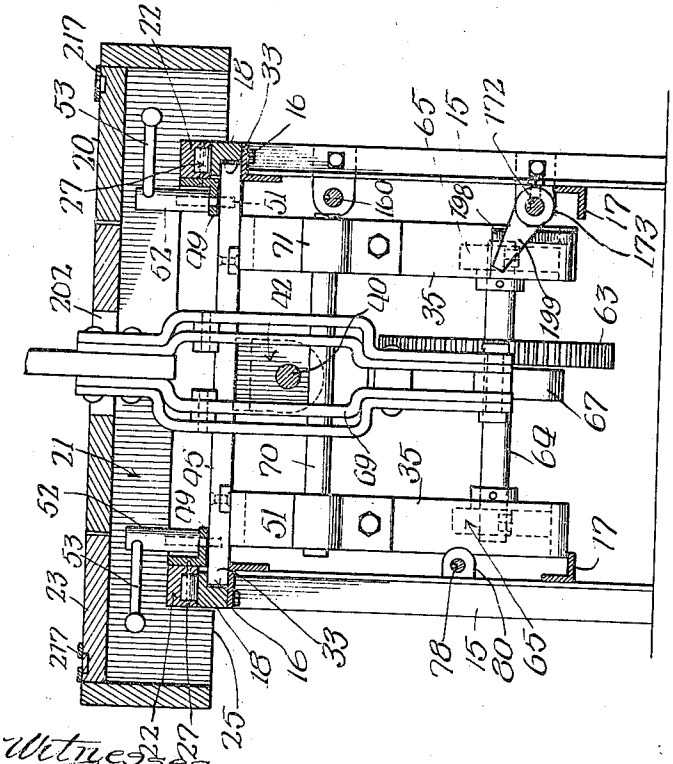


FIG. 3.

Witnesses
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5 SHEETS—SHEET 3.

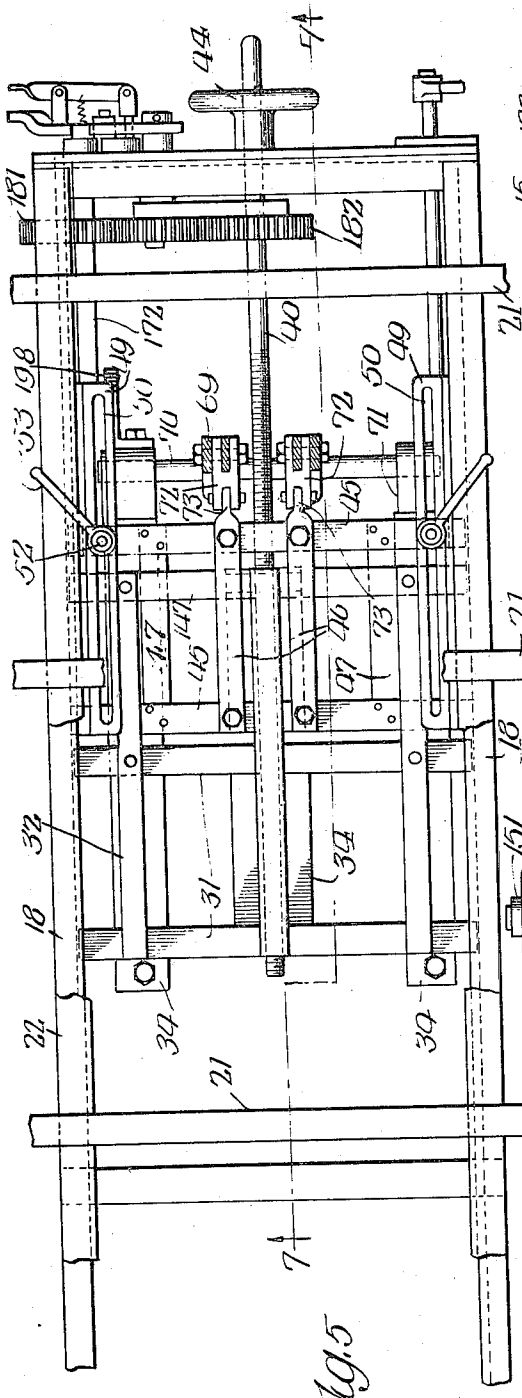


FIG. 5

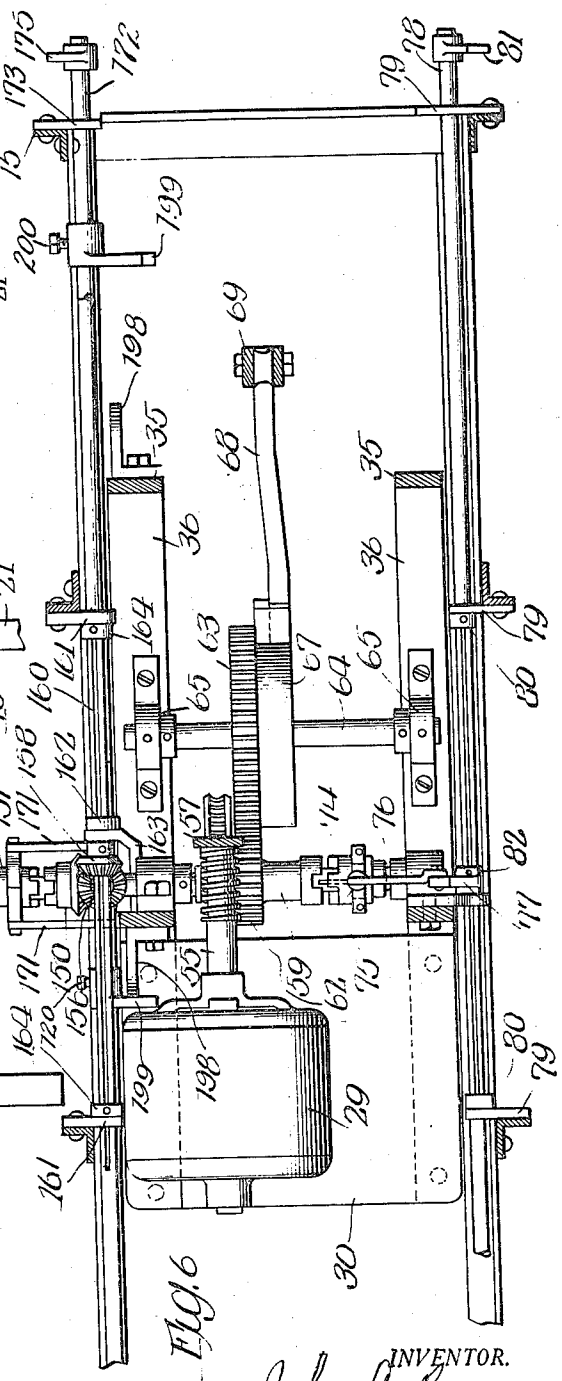


FIG. 6

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5 SHEETS—SHEET 4.

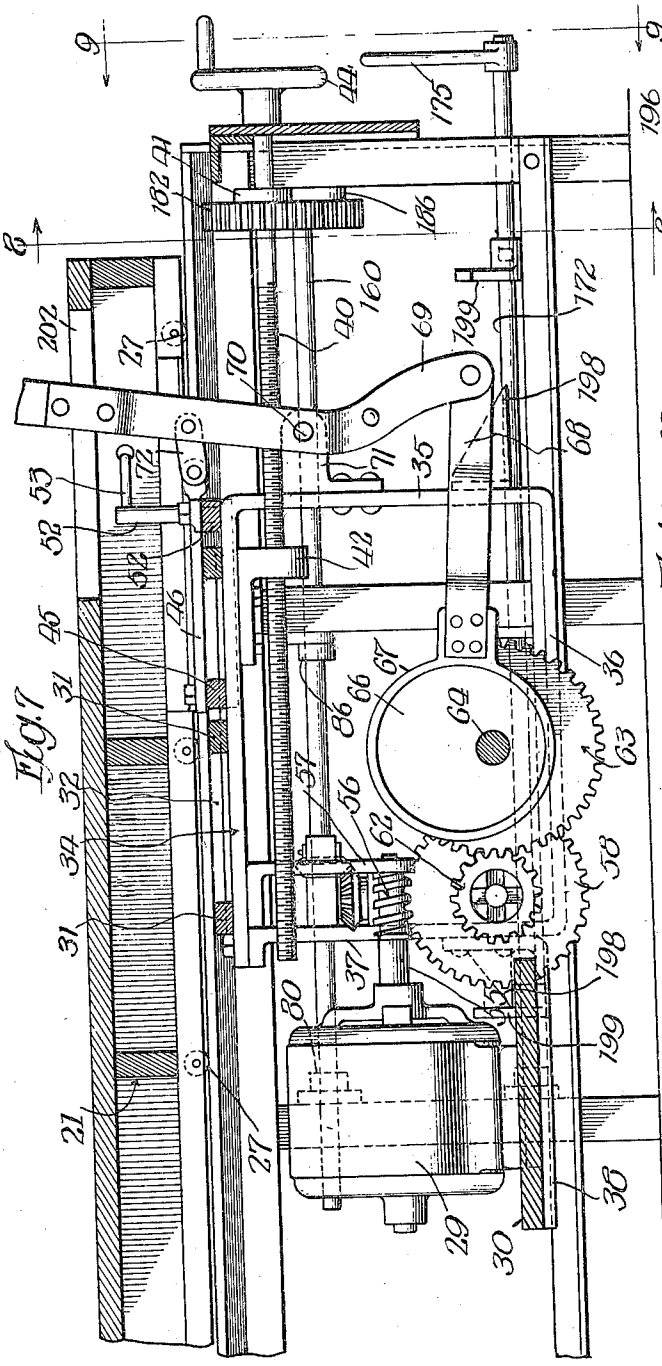


FIG. 7

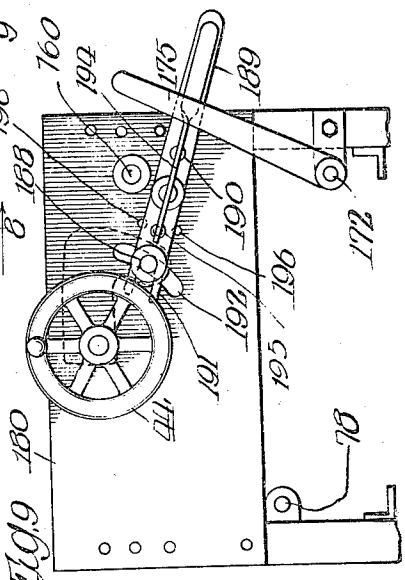


FIG. 9

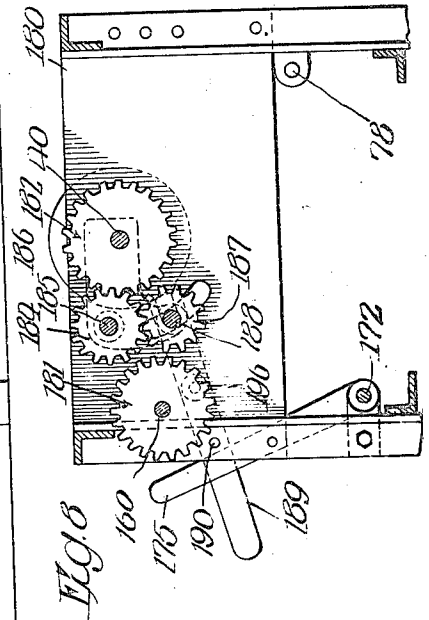


FIG. 6

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STRETCHING MACHINE.

APPLICATION FILED JULY 17, 1916.

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5 SHEETS—SHEET 5.

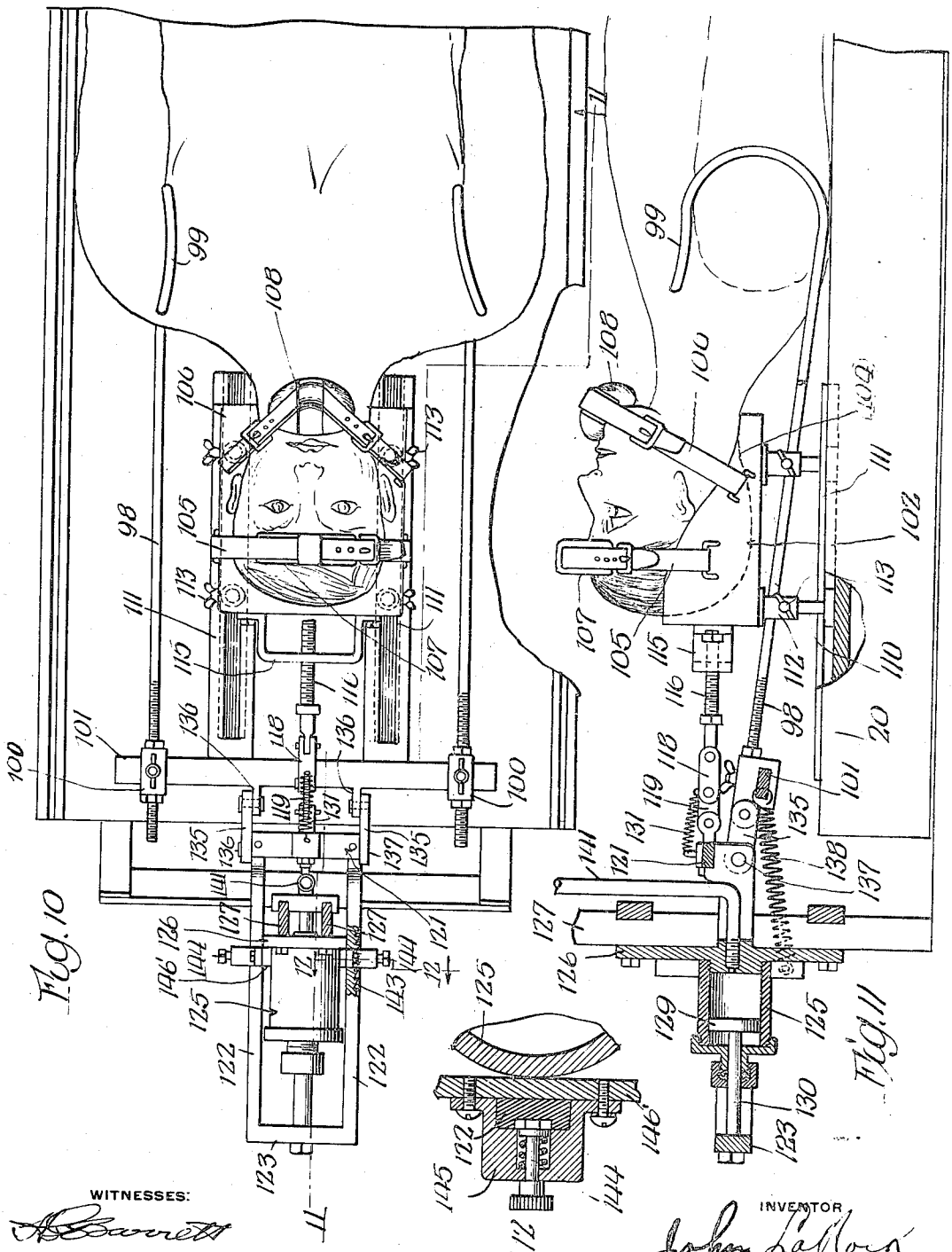


Fig. 10

Fig. 11

Fig. 12

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UNITED STATES PATENT OFFICE.

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STRETCHING-MACHINE.

1,239,522. Specification of Letters Patent. Patented Sept. 11, 1917.

Application filed July 17, 1916. Serial No. 109,680.

To all whom it may concern:

Be it known that I, JOHN LA ROCK, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Stretching-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to machines for treating the human body, and refers more specifically to a machine for stretching or elongating the body for correcting certain spinal ailments; for modifying or correcting certain defects of the joints of the human body and for imparting general stimulating or tonic effect thereto.

A machine embodying my invention embraces an elongated platform or table on which the patient reclines, combined with means for exerting a stretching pull on the patient, whose shoulders or head or both are yieldingly anchored to one end of the machine, together with means at the other end of the machine connected with the body in such manner as to effect a gentle intermittent pulling stress on the body in a manner to exert a stretching action on the spine and other joints of the body.

Among the objects of the invention is to provide a machine of this character whereby the pulling or stretching action of the machine may be delicately adjusted to exert a predetermined gentle pulling stress on the body and to avoid unexpected or dangerous over-stresses such as would injure the patient.

Another object of the invention is to provide a machine of this character which may be adjusted to adapt itself to patients of widely varying heights so that the machine may be used equally well for persons of large stature as well as for children.

A further object of the invention is to provide a novel connection between the patient-supporting platform or table and the reciprocating frame by which an exact and predetermined pulling tension may be assured, and which avoids sliding of the patient's body on the table during the stretching pulls.

A further object of the invention is to provide a novel means of supporting the power plant for giving intermittent reciprocation to the table.

A further object of the invention is to provide an improved head rest and anchor on which the head of the patient rests and to which it is attached during the treating operation.

A further object of the invention is to provide a novel shoulder anchor or means to yieldingly connect the patient at the arm pits to the machine.

Another object of the invention is to provide a novel yielding resistant element against which the pull of the machine is exerted and to which the head rest and shoulder anchors are connected, so arranged as to produce a uniform and steady pull, as distinguished from an abrupt and irregular pulling action, and which is constructed and arranged to absorb any irregular action in the intermittently actuated stretching mechanism.

A further object of the invention is to provide a novel gage device by which the pull exerted on the patient may be at all times under accurate observation.

Other objects of the invention are to improve and simplify body-treatment machines of the general character referred to, and the invention consists in the combination and arrangement of the parts shown in the drawings, described in the specifications and is pointed out in the appended claims.

In the drawings:—

Figure 1 is a plan view, with parts broken away, of a machine embodying my invention.

Fig. 2 is a side elevation thereof with parts broken away.

Figs. 3 and 4 are enlarged transverse vertical sections on the lines 3—3 and 4—4, respectively, of Fig. 2.

Figs. 5 and 6 are enlarged horizontal sections on the lines 5—5 and 6—6, respectively, of Fig. 2.

Fig. 7 is a vertical detail section on the line 7—7 of Fig. 5.

Fig. 8 is a transverse vertical section on the line 8—8 of Fig. 7.

Fig. 9 is an end view of the machine as seen from the line 9—9 on Fig. 7.

Fig. 10 is a partial plan view of the head end of the machine, with parts in horizontal section.

Fig. 11 is a partial side elevation and partial vertical section of the parts shown in Fig. 10.

Fig. 12 is a detail section on the line 12—12 of Fig. 10.

The frame of the machine consists of vertical posts 15, 15 connected by upper and lower frame members 16, 17, respectively, to constitute a hollow elongated frame structure. 18, 18 designate metal rails which lie longitudinally over and along the upper frame members 16 and are bolted or otherwise rigidly secured thereto. The upper faces of said rails constitute horizontal tracks on which an elongated table, designated as a whole by 20, is supported in a manner to reciprocate longitudinally thereon. Preferably, as herein shown, the table structure comprises transverse members 21 that extend across and are supported on longitudinal bars 22, 22 which overlie the rails 18, and supported on said members 21 are boards 23 which constitute the supporting surface of the table. Preferably the cross members 21 are formed with downwardly extending guide portions 25 which coöperate with the rails 18 in a manner to prevent lateral movement of the table structure on the frame. The said table structure is shown as supported on the rails 18 through the medium of anti-friction rollers 27 which are mounted in suitable notches in the bars 22 and rollingly engage the upper faces of the rails 18.

The table structure thus described is made shorter than the frame and is adapted to reciprocate longitudinally thereon to a limited extent, as will hereinafter more fully appear. 29 designates an operating motor for the machine which is supported on a shelf or bracket 30 that is carried by a shiftable support which is carried on main frame of the machine beneath the table in a manner to shift longitudinally thereof. Said shiftable frame comprises a horizontal frame consisting of upper cross bars 31, 31 and longitudinal members 32, 32, the ends of which members are supported on the upper frame members 16 and slide in guide grooves 33 formed in the inner sides of the rails 18. The motor and transmission support embrace upper side and intermediate longitudinal members 34, front vertical members 35, bottom longitudinal members 36 and rear vertical members 37 which are attached at their upper ends to the rear ends of the upper longitudinal members 34, the whole constituting an open frame to serve as supports for the various elements of the transmission mechanism. A bracket 38 extending rearwardly from the frame supports the motor shelf 31.

The frame is shifted longitudinally of the machine by means of a rotative screw shaft 40 which is rotatively mounted at 41 in suitable bearings in the machine frame whereby the shaft is free to rotate but is endwise immovable. Said screw shaft engages between its ends a nut 42 which is attached to and depends from the upper side of the frame, as best shown in Figs. 3 and 7. The forward end of the shaft is provided with a hand wheel 44, by which it may be rotated. The construction described provides means for adjusting the machine by hand. Means are also provided, hereinafter to be described, for rotating the adjusting screw from the motor to produce a more rapid travel of the carrying frame when desired.

Mounted to reciprocate on the upper members of the carrying frame is a reciprocating frame comprising cross members 45, 45, and upper and lower longitudinally extending connecting members 46, 47 (Figs. 3, 5 and 7), the former extending across the tops of the cross members 45 near their centers and the latter extending across the bottoms of said members near their ends. The ends of said cross members 45 slide in the grooves 33 of the rails 18, and are therefore in the same plane as the cross members 31 of the motor and transmission carrying frame. The said reciprocating frame is confined between the members 32 and 34 of the shiftable carrying frame.

The reciprocating frame described is adapted to be adjustably connected to the frame of the table by the following means: 49 49 designate angle bars which are attached to the inner faces of the rails 18 abreast of the reciprocating frame. The horizontal members of said angle bars are provided with slots 50, upwardly through which extend studs 51 that are anchored in the front cross member 45 of the reciprocating frame. The said horizontal members of the angle bars lie upon the cross members 45 and are adapted to be clamped thereto by clamping nuts 52, 52 which engage the upper screw-threaded ends of the studs 51, said nuts being provided with hand pieces 53 by which they may be turned. When said nuts are turned down on the angle bars 49 to clamp them on the reciprocating frame, the table is locked to the reciprocating frame so as to partake of the motion of the latter when said frame is reciprocated through its connection with the motor, as hereinafter described.

The operative connections between said motor and reciprocating frame by which to actuate the latter is herein shown as made as follows:

The shaft 55 of the motor 30 is provided with a worm 56 and has rotative bearing beyond said worm in a bracket 57. The worm meshes with a worm gear 58 that is fixed to a transverse horizontal shaft 60, which is mounted at its ends in bearings 61 carried by the motor-carrying frame.

Loosely mounted on said shaft is a sleeve 59, and fixed to said sleeve is a spur pinion 62 that meshes with a large spur wheel 63 which is fixed to a shaft 64 that is rotatively mounted at its ends in suitable bearings 65 on the motor-carrying frame. Fixed also to said shaft 64 is an eccentric 66, the strap 67 of which is connected by a link 68 to the lower end of a swinging lever 69. Said lever 69 is pivoted to a shaft 70 that is supported in brackets 71 on the carrying frame. The said lever is preferably made in the form shown in Fig. 3, and is loosely connected above its pivot, as by means of links 72 with lugs 73, herein shown as formed integral with the central longitudinal members 46 of the reciprocating frame.

The said motor is adapted to be connected to and disconnected from the sleeve 59, so as to connect power to and disconnect it from the table, by means of a suitable clutch 74 slidable on and splined to the shaft 60, and provided with teeth to mesh with mating teeth on the end of said sleeve. 75 designates a clutch shifter which is connected by a link 76 with the crank arm 77 of a longitudinally arranged rock shaft 78, which is mounted in suitable bearings 79 at the left hand side of the machine frame, and is held from endwise displacement by collars 80. The said rock shaft is provided at its forward end with a hand lever 81, by which it may be turned or rocked in its bearings so as to throw the clutch into and out of clutching position. The hub 82 of said crank arm 77 is adapted to slide endwise on the shaft 79, but is non-rotatively fixed thereto, the shaft being for this purpose grooved to engage a suitable spline in said hub. The arrangement described permits the clutch controlling mechanism to slide with the motor and transmission carrier, while maintaining operative connection with the rock shaft.

With the construction described, it will be noted that when the clutch 75 is shifted inwardly to lock the sleeve 59 to the shaft 60, the countershaft 64 is driven by the motor at a speed determined by the ratio of the worm drive and the ratio of the pinion 62 to the gear wheel 63. Rotation of the countershaft 64 acts, through the eccentric 66, to impart a to-and-fro swinging movement to the lever 69 during each rotation of said countershaft and the connection of said lever to the reciprocating frame, and therethrough to the table, serves to impart longitudinal reciprocating movement to the table on the frame. The load of the table is carried by the antifriction rollers 27 before referred to. By reason of the adjustable connection of the reciprocating frame with the table, afforded by the screw-threaded nuts 52 and studs 51 and the slots in the bars 49 through which said studs extend, the said motor and transmission carrier frame may be adjusted relatively to the table so as to transmit the initial pulling stress on the patient, and also to adjust the machine for patients of different heights, as will hereinafter more fully appear.

To the upper end of said lever 69 is attached a suitable harness that is adapted to be fastened to the body of the patient at any suitable point. As herein shown, the harness is fashioned to encircle the patient just above the hips. The said harness comprises in the present instance two pads 82 (Fig. 1) which are shaped to fit about the waist above the hips, and an encircling strap 83 having at one end a buckle to coöperate with holes in the other end of the strap by which the pads are bound around the body. The harness comprises additionally two straps 84, 84 which are connected to said pads and to the lever 69. As herein shown, each strap 84 is a continuous strap, it being attached at one end at 86 to the inner side of one pad, threaded through a looped fitting 87 that is loosely connected, as by means of a swivel link 88 to the lever 69; thence threaded backwardly through the loop of a snap hook 89 which is connected to the pad 82 on the side thereof remote from the point of attachment 86, the free end of said strap being turned back upon itself and engaged with a buckle 90 which is fixed to the intermediate portion of the strap. The said swivel fitting 88 is herein shown as pivotally connected to a block 92 that is slidably mounted on the upper end of the lever 69, whereby it may be adjusted endwise of said lever to vary the effective length of swing of the lever. The means shown for so adjusting the block on the lever consists of a screw-threaded shaft 93 which is rotatively mounted at 94 in a bracket carried by the upper end of the lever and engages a nut 95 fixed to said block. Said screw shaft is provided at its upper end with a hand lever 96 by which to operate the same.

As herein shown, the stretching pull of the lever 69 is resisted at two points of the patient's body above the harness,—to wit, at the shoulders and at the head, the said head and shoulders being adapted to be held or anchored by means which are yieldingly connected to the frame independently of the bed.

The means for so holding the shoulders consists of two rods 98 which are provided at their forward ends with hooks 99 which engage under the arm pits of the patient in the manner best shown in Figs. 10 and 11. Said hooks are attached through the medium of fittings 100 to a transverse bar 101 which extends horizontally over the rear end of the table, the hook rods being screw-threaded to the fittings so as to provide adjustment of the hooks longitudinally of the machine.

The head of the patient is supported in a head rest 102 arranged above the table between the rods 98. Said head rest comprises a box-shaped support that is closed at its bottom, sides and rear end and is open at its top and at its front end. Its bottom wall is shaped to receive the head and the neck of the patient. For this purpose, the bottom wall is lowest at a point between the front and rear ends of the box-like rest and inclines upwardly toward the open front end thereof to constitute an oblique shoulder-like surface 104, against which the head and neck portion are held by straps 105, 106 suitably fastened to the side walls of the casing. The strap 105 passes around the forehead of the patient and presses a pad 107 thereagainst, while the strap 106 passes about a pad 108 fitted to the chin of the patient. The strap 106 is attached to the head rest wall in rear of the position of the chin pad so as to exert a tension on said pad which will be maintained tight at all times.

The head rest is movably supported on the table 20 so as to permit relative movement of the table and head piece in the direction of the longitudinal axis of the table. This is effected, as herein shown, by supporting the head piece on headed or T-shaped bolts 110, the headed ends of which pass through slotted bars 111 which are attached to the table over suitably grooved portions thereof occupied by the heads of the bolts, as best shown in Figs. 10 and 11. The said bolts 110 telescopically fit at their upper ends in short tubes 112 which are fastened to and depend from the head rest, and said bolts and tubular members are adapted to be adjustably locked together by means of set screws 113, whereby the height of the head rest may be varied.

115 designates a horizontally arranged bail which is attached to the rear wall of the head piece and is centrally screw threaded to receive a screw-threaded rod 116. Said rod is connected by a loose or toggle joint, consisting of pivotally connected links 118, 119, to a cross head 121 arranged over the rear end of the frame. Fixedly attached to said cross head are a pair of bars 122 which extend rearwardly from the machine frame and are connected at their rear ends by a cross piece 123. 125 designates a cylinder that is fixedly attached at its forward end to a plate 126, herein shown as constituting one head of the cylinder, and which is bolted or otherwise rigidly secured to upright members 127 of the frame. Within said cylinder is a piston 129, the stem 130 of which extends through a stuffing box in the rear head of the cylinder and is attached to said cross member 123. A spring 131 extends between the cross head 121 and the link 118 to prevent the toggle joint from collapsing downwardly when no stretching pull is exerted on the device, and which spring causes the toggle joint to collapse upwardly in the manner shown in Fig. 2 when the head piece is at the rearward limit of its movement.

The arm hooks 99 are in a generally similar manner connected to the cross head 121 by means made as follows:

135 designates links which are pivoted at their forward ends to studs 136 on the bar 101, and are pivoted at 137 to the ends of the cross head 121, whereby pulling stress exerted on the shoulder hooks acts through said cross head to force the piston 129 forwardly in the cylinder 125. Springs 138 extending between said cross bar 101 and the cylinder attaching plate 126, serve, by reason of their attachment to said bar and plate below the pivots 137 of the links 135, to draw the rear ends of the hook bars downwardly when pulling stress is released on the hooks and thereby maintain the hooks snugly engaged with the arm pits.

The cylinder 125 is filled with a body of oil or like non-compressible material, and the piston 129 is fitted with a fluid-tight joint therein, so that the body of liquid is forced from the cylinder, when pulling stress of the machine is exerted on the patient, against the yielding resistance of a spring, a body of air or the like, which latter, when pulling stress of the machine is released, restores the piston and the parts connected thereto. Preferably there is provided a suitable gage connected to the fluid space of the cylinder in such manner as to indicate in pounds the pulling stress exerted by the machine.

For this purpose, I may provide any suitable form of gage 146 (Fig. 2) which is connected by a pipe 141 to the forward end of the cylinder. With this construction, the forward movement of the piston drives the fluid upwardly into the pipe and against a body of air imprisoned therein to actuate the mechanism of the gage, so that said gage may register in pounds, or other selected unit, the value of the pulling stress of the machine. When the pulling stress is released, the weight of the body of oil in the pipe, the compressed air column and the spring of the gage, if a spring be employed, acts to return the fluid back into the cylinder and to thereby restore the piston and the parts connected therewith to their rearmost positions, as indicated in Figs. 1 and 2. In Figs. 10 and 11, it may be assumed that sufficient pulling stress has been exerted on the head rest and shoulder hooks to straighten the link connections between the said parts and the piston, but not sufficient to show any substantial pressure on the gage.

If desired, I may provide a pawl-and-

ratchet mechanism connected to the bars 122 and to the cylinder, so arranged as to lock the piston in any given forwardmost position to which it may have been moved, so that when a given pressure is shown on the gage the gage reading will be maintained throughout the treatment of the patient unless and until a heavier pulling stress is exerted upon the patient, whereupon the gage will register the maximum pulling stress so exerted and maintain it until a further increased pulling stress is exerted on the patient. This result may be obtained by providing the outer faces of the bars 122 with ratchet teeth 143 which are adapted to be engaged by pawls carried by the inner ends of spring-held plungers 144 that are mounted in yokes 145 which are attached to rearwardly directed flanges 146′ of the cylinder end plate 126. This construction avoids the pulsating action of the gage to correspond with the intermittent pulling action of the machine. When treatment of the patient has been completed, the pawl rods or stems 144 are withdrawn against the action of their springs from the ratchets to permit the piston and the parts associated therewith to be restored to normal positions.

In some instances, it may be desirable to shift the motor-carrying frame to adjust the machine to patients of different heights more rapidly and conveniently than may be effected through the operation of the hand wheel 44. I have herein shown means for shifting the said frame by mechanism operated from the motor and which is made as follows:

150 designates a beveled pinion loosely mounted on the shaft 60 at the right hand side of the machine, and said pinion is adapted to be clutched to the shaft to rotate therewith by a splined clutch member 151 slidable on the shaft. The said pinion 150 meshes with a beveled pinion 153 which is fixed to the lower end of a short upright shaft 154 that is mounted in suitable bearings 155 carried by the motor frame. The shaft 154 carries at its upper end a beveled pinion 156 that meshes with a pinion 158 that is splined to a grooved shaft 160 which is arranged longitudinally of the machine frame and is mounted in suitable bearings 161 carried by the fixed part of the machine frame and in a third bearing 162 attached by a bracket 163 to the motor and transmission carrying frame. The said shaft is held from endwise movement by collars 164 thereon which engage the bearings 161. The beveled pinion 158 is splined to the grooved shaft 160 so that it may slide endwise of said shaft and be always in position to be turned or rotated thereby. The clutch 151 is movable into and out of engagement with a mating clutch member on the beveled pinion 150 by means of links 170 that are pivotally connected at their outer ends to lugs on said clutch and at their inner ends to crank shafts 171 fixed to a crank shaft 172 which is rockingly mounted in suitable bearings 173 on the machine frame. The forward end of said rock shaft is provided with a hand lever 175 by which it may be rocked in its bearings to actuate or control the clutch 151.

The said shaft 160 is operatively connected to the screw shaft 40 to rotate the same, and to thereby shift the motor and transmission carrier frame on the fixed frame through gear mechanism made as follows:

Fixed to the forward end of the shaft 160, just inside of the end plate 180 of the machine frame, is a spur gear 181. 182 designates a spur gear that is fixed to the screw shaft 40. Said latter spur gear meshes with a pinion 184 which is rotatively mounted on a stub shaft 185 carried by an L-shaped plate 186 that is pivoted to the shaft 40, indicated in dotted lines in Figs. 8 and 9. 187 designates a second pinion which meshes with the pinion 184 and which is rotatively mounted on a stub shaft 188, carried also by said L-shaped plate 186. 189 designates a lever that is pivoted at 190 to the end plate 180 of the machine frame and is formed with a bifurcated end 191 to engage over the stub shaft 188. Said stub shaft extends through an arcuate slot 192 in said end plate. The lever 189 is adapted to be locked in adjusted positions by means of a spring-held latch 194 that is pivoted to the lever 189 and is provided at its inner end with a locking pin 195 adapted to severally engage locking apertures 196 in the end plate 180. When the locking pin 195 is engaged with the central aperture 196, the pinions 184, 187 occupy the position shown in Fig. 8, which is a neutral position, and in which position the shaft 160 is out of operative connection with the screw shaft 40. If the lever be swung upwardly from the position shown in Figs. 8 and 9, it will bring the pinion 184 into mesh with the gear wheel 181 to afford a direct drive connection between the shafts 160 and 40 to drive the latter shaft in one direction. When the lever 189 is swung downwardly from the positions shown in said Figs. 8 and 9, the pinion 188 is brought into mesh with the gear wheel 181 so as to afford driving connection between the shafts 160 and 40 through both of the pinions 187 and 184, so as to drive said shaft 40 in the opposite direction.

Preferably, there are provided automatic throw-out devices which are operative at the limits of movement of the motor and transmission carrier frame in both directions. As herein shown, such disconnection may be effected by means of cam members 198 attached to the carrier frame that are adapted to engage arms 199 on the shaft 172

in a manner to rotate said shaft and to thereby disconnect the clutch 151 from the pinion 150. The said arms 199 may be adjustably fixed to the shaft 172 by set screws 200, whereby the arms may be shifted longitudinally of the shaft to vary the length of movement of the carrier frame.

In the operation of the machine, it will be understood that the patient lies upon the table with his head on the head rest 102, and the straps 105 and 106 are adjusted to the forehead and chin and the hooks 99 are adjusted to the arm pits. Thereafter the harness is adjusted to the waist of the patient or to any other part of the body to which the harness may be adapted. For instance, the machine may be made long enough to attach the harness to the feet of the patient. Thereafter the initial pulling stress may be exerted on the patient by turning the hand wheel 41 which acts through the screw shaft 40 to move the motor and transmission carrier frame and the lever 69 outwardly, this movement of the lever being permitted by reason of a slot 202 in the table upwardly through which said lever extends. After a given pulling stress has been exerted on the patient, which may be observed by reading the gage 140, the motor is connected to the transmission mechanism through the action of the clutch 74. The range of travel of the lever 69 is only sufficient to give the additional pulling stress which the patient requires or may withstand after a substantial pulling stress has been exerted through the action of the screw shaft 40 as before described. The range of effective movement of the lever may be varied by moving the block 92 up and down on the upper end of said lever, and the effective pulling stress may be also modified by adjustment of the straps 84 of the harness. It will be understood that when the table is locked to the reciprocating frame, said table is positively reciprocated longitudinally of the fixed frame by reason of its connection to said reciprocating frame and therethrough to the lever 69, so that the patient is not slid along or in contact with the table during the stretching operation, but the table moves with the patient as each intermittent pulling stress is exerted. By reason of the connection of the table to the lever near the pivot of the latter, the range of movement of the table need not be great; for if the full swing of the upper end of the lever 69 be in the neighborhood of six inches, the movement of the table may be in the neighborhood of one and one-half to two inches. The cross bars 31 of the carrier frame are located at such distance from the cross bars 45 of the reciprocating frame that when the frame is moved outwardly, through the action of the screw shaft 40, to exert an initial pulling stress on the patient, said bars will be brought into contact before any tendency occurs to shift the eccentric strap of the transmission mechanism relatively to the eccentric. It will also be observed that the motor and transmission carrier frame may be adjusted longitudinally of the main frame without stopping the operation of the machine, it only being necessary to release the table from the reciprocating frame. When so released the pulling stress will be exerted on the patient in the same manner as before, with the exception that the table will be moved along the main frame through the frictional action of the patient lying thereon, instead of through the positive connection to the lever 69.

The pulling stress on the patient is exerted against the resistance of the head piece and the shoulder hooks before described. This resistance is a yielding resistance by reason of the connection of said parts to the piston 129 operating in the cylinder 125. The gage 140 indicates the pulling stress exerted on the patient, and said gage and gravity operates in connection with the springs 131 and 138 to restore the piston and the parts connected therewith when the pulling stress is released. The screw-threaded connection of the rod 116 with the bail 115, and the screw-threaded connection of the shoulder rods 98 with the fittings 100 permits a substantial range of adjustment of the head piece and shoulder hooks to the patient to accurately and delicately adjust the machine to the exact requirements of each patient.

It will thus be seen that I have provided a machine which is very delicate in its action and adjustments, and is free from liability of abrupt movements likely to cause inconvenience or danger to the patient during the operation of the machine. I have also provided means whereby the stretching requirements may be exactly met and maintained.

If desired, I may provide the bed beneath the back of the patient with an elongated opening 210, beneath which opening is adapted to be located any suitable heating device 211, as a vaporizer, an electric heater or the like, whereby the back of the patient may be subjected to heat during the stretching operation. In order to confine the heated air about the patient and to thereby enhance this feature of the device, I may provide the machine with a suitable collapsible cover 212, of any desirable length, made of canvas or like flexible material, supported on bows 214. Said bows may be provided with braces 216 having at their lower ends headed or T-shaped bolts or studs 215 that slide in under-cut grooves formed in slotted plates 217 carried by the table at the sides thereof, as best shown in Figs. 1, 3 and 4. With this construction, the slots may be left open at one end so that the cover may be collapsed and removed

from the machine in a manner which will be obvious from the foregoing description.

It will be understood that so far as the broader phases of my invention are concerned, the structure may be considerably varied from that herein shown, and that the invention is not limited to such details except as the same are hereinafter made the subject of specific claims and as imposed by the prior art.

I claim as my invention:—

1. A stretching machine comprising a frame; to and fro stretching means and a patient-supporting table movable with and in the same direction as the stretching means during the stretching operation.

2. A stretching machine comprising a frame; reciprocating stretching means; a patient-supporting table and means to detachably connect the table with the stretching means whereby the table may or may not positively move with and in the same direction as the stretching means as desired.

3. A stretching machine comprising a frame; a patient-supporting table; shoulder anchors yieldingly connected to the frame and stretching means to resist said shoulder anchors.

4. A stretching machine comprising a frame; a patient-supporting table; a head support with means for fastening the head of the patient thereon; yielding connections between the head rest and frame and stretching means acting against said head support.

5. A stretching machine comprising a frame; a patient-supporting table; a head support mounted on the table by means permitting it to shift longitudinally thereof; means to fasten the head of the patient therein; yielding connections between the head support and the frame, and stretching means acting against said head support.

6. A stretching machine comprising a frame; a patient-supporting table; a head support with means for fastening the head of the patient therein; yielding connections between the head support and frame; means to raise and lower the head support relatively to the table, and stretching means acting against said head support.

7. In a stretching machine, a main frame; a body anchor; a table movable on said frame; a to-and-fro movable stretching member, with means to connect same to the patient's body, and connections between said stretching means and said table.

8. In a stretching machine, a main frame; a body anchor; a table movable on said frame; a swinging stretching lever; means to connect the free end of the lever to the body of the patient, and a connection between the table and the lever at a point thereon between its pivot axis and said free end.

9. A stretching machine comprising a main frame; a patient-supporting table movably mounted thereon; a reciprocating frame on said main frame; a pivoted stretching lever, with means to swing it; means to connect the reciprocating frame to said lever, and means to connect the reciprocating frame to said table.

10. A stretching machine comprising a main frame; a patient-supporting table movably mounted thereon; a reciprocating frame on said main frame; a pivoted stretching lever, with means to swing it; means to connect the reciprocating frame to said lever, and means to detachably connect the reciprocating frame to said table.

11. A stretching machine comprising a main frame; a patient-supporting table movably mounted thereon; a pivoted stretching lever, with means to swing it; detachable connections between said lever and the table to cause the table to move with and in the same direction as the lever; body anchor means and means to connect the patient's body to said lever.

12. A stretching machine comprising a main frame; a patient-supporting table movably mounted thereon; a pivoted stretching lever, with means to swing it; detachable connections between said lever and the table; body anchor means, and an adjustable harness connected to said lever and having means to attach it to the body of the patient at a point below said anchor.

13. A stretching machine comprising a main frame; a patient-supporting table movably mounted thereon; a pivoted stretching lever, with means to swing it; an anchor for the upper part of the patient's body; means to yieldingly connect the anchor to the main frame, and a harness connected to said lever.

14. A stretching machine comprising a main frame; a slotted patient-supporting table thereon; a pivoted stretching lever extending upwardly through said table, with means to swing it; a body anchor; a harness adapted to encircle the body of the patient, and means adjustable longitudinally of said lever for connecting said harness to the lever.

15. A stretching machine comprising a main frame; a slotted patient-supporting table thereon; a pivoted stretching lever extending upwardly through said table, with means to swing it; a body anchor; a harness adapted to encircle the body of the patient embracing a pad and a body-encircling strap; a fitting mounted on the swinging end of said lever and adjustable endwise of said lever; straps connecting said part to said fitting, and means to adjust said fitting along said lever and to lock it in adjusted position.

16. A stretching machine comprising a

main frame; a slotted patient-supporting table thereon; a pivoted stretching lever extending upwardly through said table, with means to swing it; a body anchor; a harness adapted to encircle the body of the patient, embracing a pad and a body-encircling strap; a fitting mounted on the swinging end of said lever; a nut carried thereby and a screw shaft rotatively mounted on said lever and engaging said nut.

17. A stretching machine comprising a main frame; a patient supporting table thereon; a head anchor thereabove connected to said frame; a motor and transmission mechanism beneath the table; a carrier frame therefor supported on and shiftable along said frame; stretching means carried also by said carrier frame and operated by said mechanism, and means to shift the carrier frame along the main frame.

18. A stretching machine comprising a main frame; a slotted patient supporting table thereover; a body anchor connected to said frame; a motor and transmission mechanism carrier frame beneath the table supported on and shiftable along said main frame; stretching means mounted on said carrier frame and extending through the slotted table, and shifting means for said carrier frame.

19. A stretching machine comprising a main frame; a slotted patient supporting table thereover and supported thereon; a body anchor connected to said frame; a motor and transmission carrier beneath the table and shiftable along said frame; stretching means mounted on said carrier and acting against said anchor, and a screw shaft mounted in said main frame for shifting said carrier.

20. A stretching machine comprising a main frame; a slotted patient supporting table thereover and supported thereon; a body anchor connected to said frame; a motor and transmission carrier beneath the table and shiftable along said frame; stretching means mounted on said carrier and acting against said anchor; a screw shaft mounted in said main frame for shifting said carrier, and motor-driven means for rotating said screw shaft.

21. A stretching machine comprising a main frame; a table supported on and slidable longitudinally along the main frame; a body anchor over the table connected to the main frame; a swinging stretching lever; a carrier frame shiftable longitudinally of the main frame to which said lever is pivoted; mechanism carried by the frame for swinging said lever, and means for shifting the carrier frame longitudinally of the main frame.

22. A stretching machine comprising a main frame; a table supported on and slidable longitudinally along the main frame; a body anchor over the table connected to the main frame; a swinging stretching lever; a carrier frame shiftable longitudinally of the main frame to which said lever is pivoted; mechanism carried by the frame for swinging said lever; a screw shaft rotatively mounted in the main frame and a nut on the carrier frame through which said screw shaft extends.

23. A stretching machine comprising a main frame; a table supported on the main frame; a body anchor over the table connected to the main frame; a swinging stretching lever; a carrier shiftable longitudinally of the main frame to which said lever is mounted; motor-driven mechanism supported on the carrier for swinging said lever; a screw shaft mounted in the main frame; a nut on the carrier through which said screw shaft extends, and operative connections between said motor-driven mechanism and the screw shaft for rotating the latter and for shifting the carrier.

24. A stretching machine comprising a main frame; a table supported on the main frame; a body anchor over the table connected to the main frame; a swinging stretching lever; a carrier shiftable longitudinally of the main frame to which said lever is mounted; motor driven mechanism supported on the carrier for swinging said lever; a screw shaft mounted in the main frame; a nut on the carrier through which said screw shaft extends, and operative connections between said motor driven mechanism and the screw shaft for rotating the latter and for shifting the carrier, said operative connections embracing reversing means constructed to rotate said screw shaft in opposite directions.

25. A stretching machine comprising a main frame; a table movably supported thereon; a carrier beneath the table and supported on and shiftable along the main frame; a stretching lever pivoted thereto and extending above the table for attachment to the patient's body; mechanism supported on the carrier for swinging said lever; a body anchor above the table connected to the main frame; a reciprocating frame on the carrier having means to detachably connect it to the table, and connections between said stretching lever and reciprocating frame.

26. A stretching machine comprising a main frame; a slotted table supported thereon; a body anchor connected to the main frame; a stretching lever extending through the table; a carrier supported on the frame below the table and shiftable endwise thereof to which said lever is pivoted, and lever swinging mechanism supported on the carrier comprising a motor; a shaft connected

to the motor by speed reducing gears; an eccentric on said shaft and a connection between the eccentric and said lever.

27. A stretching machine comprising a main frame; a slotted table supported thereon; a body anchor connected to the main frame; a stretching lever extending through the table; a carrier supported on the main frame below the table and shiftable endwise thereof to which said lever is pivoted; mechanism supported on the carrier for swinging said lever comprising a motor; a shaft connected to the motor by speed reducing gears; an eccentric on said shaft; a connection between the eccentric and said lever, and means for shifting said carrier frame and stretching lever longitudinally of the main frame and said table and for locking said parts in adjusted positions.

28. A stretching machine comprising a main frame; grooved guide rails thereon; a table supported on said rails; a carrier supported on the frame beneath the table, embracing transverse members which engage and are guided by the grooved guide rails; means to shift said carrier longitudinally of the main frame; a stretching lever pivoted to the carrier and extending above the table; stretching lever actuating mechanism supported in said carrier; and means to shift said carrier longitudinally of the main frame.

29. A stretching machine comprising a main frame; grooved guide rails thereon; a table movably supported on said rails; a carrier supported on said frame beneath the table, embracing transverse members which engage and are guided by the grooved guide rails; means to shift said carrier longitudinally of the main frame; a stretching lever pivoted to the carrier and extending above the table; a reciprocating frame supported also by the main frame, with means to connect it to said stretching lever, said frame embracing transverse members guidingly engaging said grooved rails; slotted bars carried by said rails; studs carried by the reciprocating frame and extending through said slots, and clamping nuts engaging the studs to lock the table to said reciprocating frame.

30. A stretching machine comprising a main frame; a table supported thereon; a body anchor connected to said frame; a stretching lever; a carrier frame to which said lever is pivoted, supported on and shiftable endwise of the frame; mechanism carried by the frame for operating the lever comprising a motor; a countershaft; worm gear mechanism between said shafts; a pinion loosely mounted on said countershaft; a clutch to lock said pinion to said countershaft; stretching lever-actuating means operated by said pinion, and a clutch-operating mechanism, embracing a rock shaft extending to the forward end of the machine and provided with a crank arm and connections between said crank arm and said clutch, said crank arm being slidable along said rock shaft.

31. A stretching machine comprising a frame; a table supported thereon; stretching means associated with one end of the table; anchor means associated with the other end of the table, and yielding connections between the anchor means and the frame.

32. A stretching machine comprising a frame; a table supported thereon; stretching means associated with one end of the table and anchor means associated with the other end of the table; a cylinder fixed to the main frame and adapted to contain a body of cushioning fluid; a piston therein, and connections between the piston and said anchor means.

33. A stretching machine comprising a frame; a table supported thereon; stretching means associated with one end of the table; anchor means associated with the other end of the table; a cylinder fixed to the main frame and adapted to contain a body of cushioning fluid; a piston therein; connections between the piston and said anchor means, and a gage connected to the fluid space of said cylinder.

34. A stretching machine comprising a frame; a table supported thereon; stretching means associated with one end of the table; anchor means associated with the other end of the table; a cylinder fixed to the main frame and adapted to contain a body of cushioning fluid; a piston therein; connections between the piston and said anchor means; a gage device connected to the fluid space of said cylinder, and pawl-and-ratchet mechanism to constitute a locking device for the piston.

35. In a stretching machine, the combination with a table and its supporting frame, of a head support over the table, with means to fasten the head of the patient therein, and cushioning means connecting the said head support with the frame.

36. In a stretching machine, the combination with a table and its supporting frame, of a head support over the table, with means to fasten the head of the patient therein; cushioning means connecting said head support to the frame, and adjustable connections between said cushioning means and said head support.

37. In a stretching machine, the combination with a main frame, a table supported thereon and a stretching device at one end of the table, of a head anchor and support at the other end of the table having means to fasten the head of the patient thereto;

cushioning means carried by the frame; a cross head connected to the cushioning means; a rod adjustably connected to the head anchor and support and a loose link connection between said cross head and rod embracing a spring constructed to break said loose connection upwardly when pulling stress on the head anchor and support is released.

38. In a stretching machine, the combination with a frame; a table supported thereon, and a stretching device at one end of the table, of shoulder anchors at the other end of the table embracing hooks adapted to engage under the arm pits; a cross bar over the table to which said hooks are adjustably connected and a cushioning device supported on the frame and operatively connected to the cross bar.

39. In a stretching machine, the combination with a frame; a table supported thereon, and a stretching device at one end of the table, of shoulder anchors at the other end of the table embracing hooks adapted to engage under the arm pits; a cross bar over the table to which said hooks are adjustably connected; a cross head in rear of said cross bar; links connecting said cross head to said bar, and a cushioning device supported on said frame and connected to said cross head.

40. In a stretching machine, the combination with a frame; a table supported thereon, and a stretching device at one end of the table, of shoulder anchors at the other end of the table embracing hooks adapted to engage under the arm pits; a cross bar over the table to which said hooks are adjustably connected; a cross head in rear of said cross bar; links connecting said cross head to said bar; a cushioning device supported on said frame and connected to said cross head, and a contractile spring extending between said frame and said cross bar and arranged below the pivotal connection of the bar with said cross head.

41. In a stretching machine, the combination with a frame; a table supported thereon and a stretching device at one end of the table; of a cushioning device supported on said frame; a cross head connected thereto; a shoulder anchor flexibly connected to said cross head and a head support and anchor also flexibly connected to said cross head.

42. In a stretching machine, the combination with a frame; a table supported thereon, and a stretching device at one end of the table, of shoulder anchors at the other end of the table embracing hooks adapted to engage under the arm pits; a cross bar over the table to which said hooks are adjustably connected; a cross head in rear of said cross bar; links connecting said cross head to said bar; a cushioning device supported on said frame and connected to said cross head; a head support and anchor movably supported on said table, and flexible connections between said anchor and support and said cross head.

43. A stretching machine comprising a frame; a table supported thereon; stretching means associated with one end of the frame; a head support and anchor at the other end of the frame; means to movably support it on said table; cushioning means carried by the frame; connecting means between the head support and anchor and the cushioning means, and means to vertically adjust the head support and anchor relatively to said table.

44. A stretching machine comprising a frame; a table supported thereon; and stretching means associated with one end of the frame; a head rest and anchor at the other end of the frame; cushioning means carried by the frame; connecting means between the head support and anchor and the cushioning means, and supporting means for the head support and anchor comprising slotted plates on the table; headed bolts extending upwardly therefrom; depending tubular members on the head support and anchor for telescopic engagement with said bolts, and locking means between said tubular members and bolts.

In testimony whereof, I have hereunto set my hand, at Chicago, Illinois, this 29th day of June, 1916.

JOHN LA ROCK.

Witnesses:
W. L. HALL,
M. G. ADY.