

[54] **TREATMENT TABLE**

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[22] Filed: **Apr. 2, 1973**

[21] Appl. No.: **346,897**

[52] U.S. Cl. **128/71, 128/24.3, 128/57**

[51] Int. Cl. **A61f 5/00**

[58] Field of Search **128/71, 75, 33, 51, 52,**
128/24.2, 24.3

[56] **References Cited**

UNITED STATES PATENTS

2,230,057	1/1941	Hill	128/57
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[57] **ABSTRACT**

A therapeutic table having a stationary support and a top mounted to the support for reciprocation longitudinally between limit positions cooperates with traction apparatus mounted to the support for periodically applying traction to a patient lying on the table. The table is reciprocated by a motor which is powered

through a timer switch capable of being preset to various time intervals. In one embodiment, a control circuit having a selector switch and a pair of limit switches cooperates with the timer to arrest motion of the table at one or the other of its limit positions at the completion of a time period so that the patient is not under traction at the completion of a period of treatment. In another embodiment, a pair of limit switches are connected to auxiliary timers which operate to arrest motion of the top for relatively short periods of time within a longer period as determined by a master timer so that the patient undergoes sustained traction and/or relaxation for short time intervals within the overall period of treatment. The table top has an elongated aperture through which a series of rollers protrude for engaging the patient to effect a therapeutic action as the table reciprocates. The therapeutic action is augmented by a heating element which is mounted below the rollers for applying heat through the aperture and to the patient. In addition, there is provided means to vibrate the top as it reciprocates. An elongated filler block is provided for insertion in the aperture to convert the top into a manipulating surface. A pair of brackets are mounted on opposite sides of the support, and each bracket has a series of sockets for receiving leg roller stanchions so that the position of the leg rollers may be adjusted longitudinally of the table.

15 Claims, 9 Drawing Figures

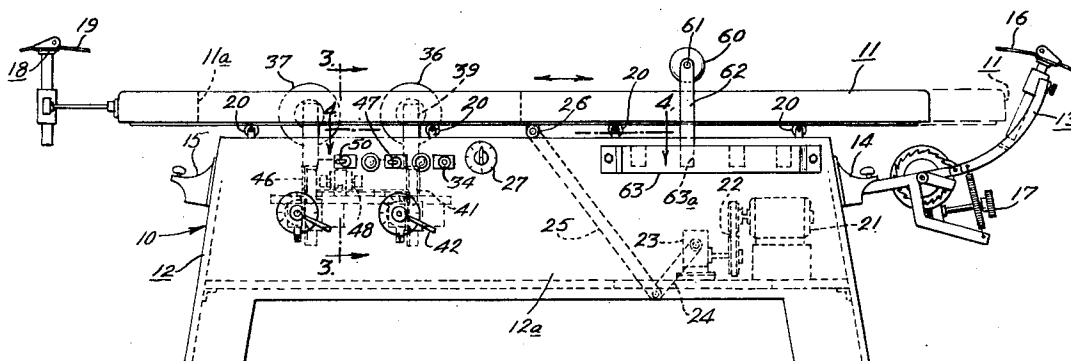


FIG. 3.

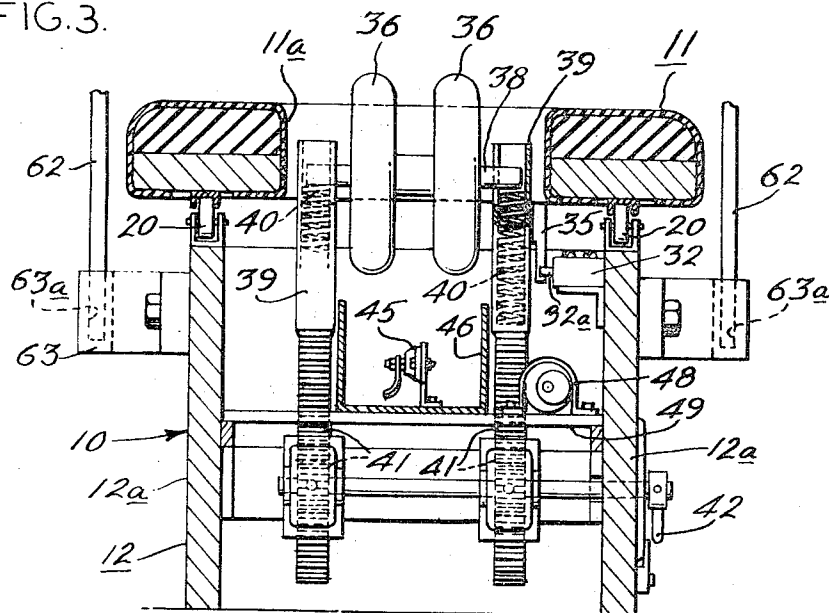


FIG. 4.

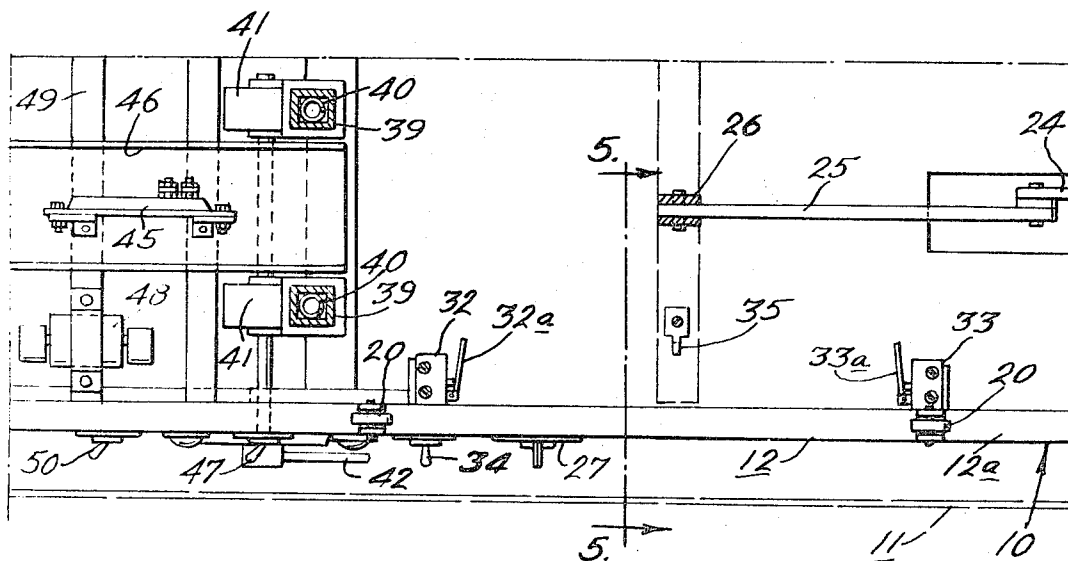


FIG. 5.

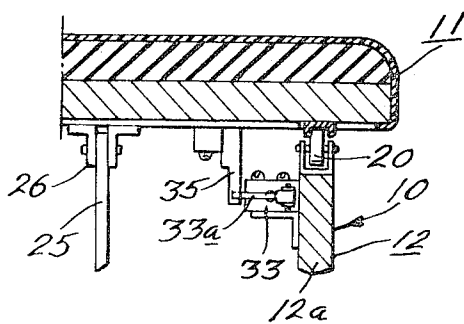


FIG. 6.

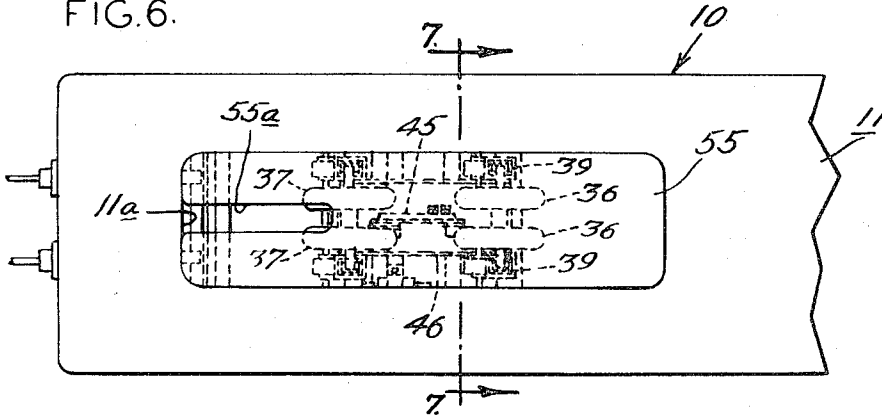


FIG. 7.

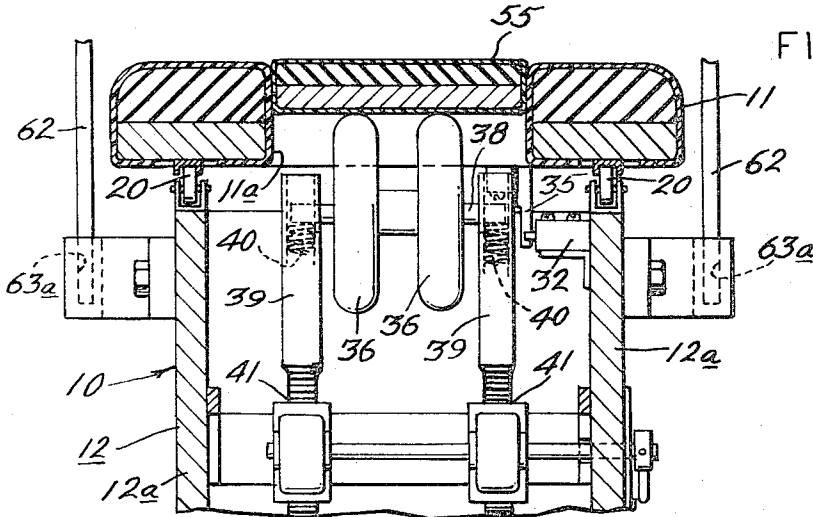


FIG. 8.

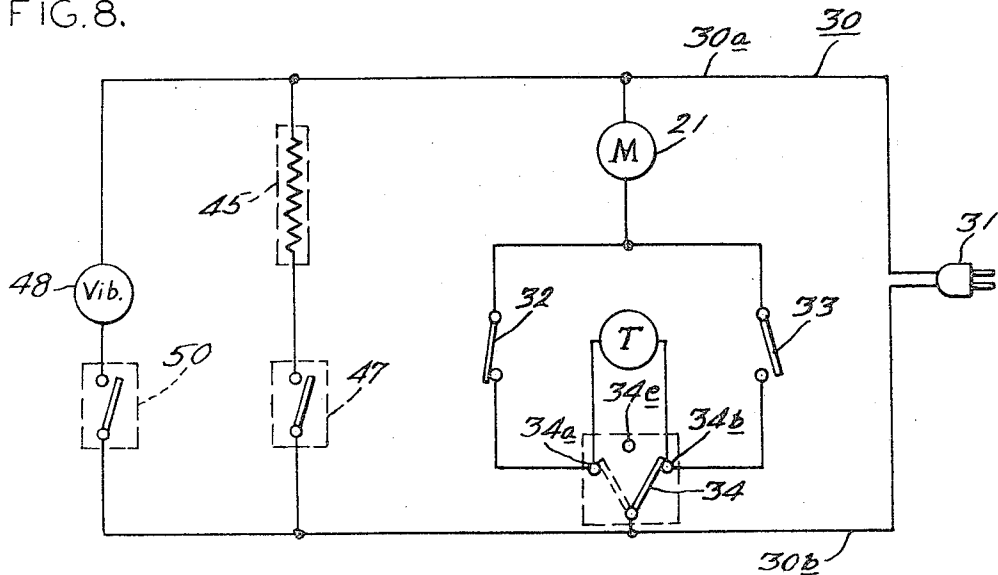
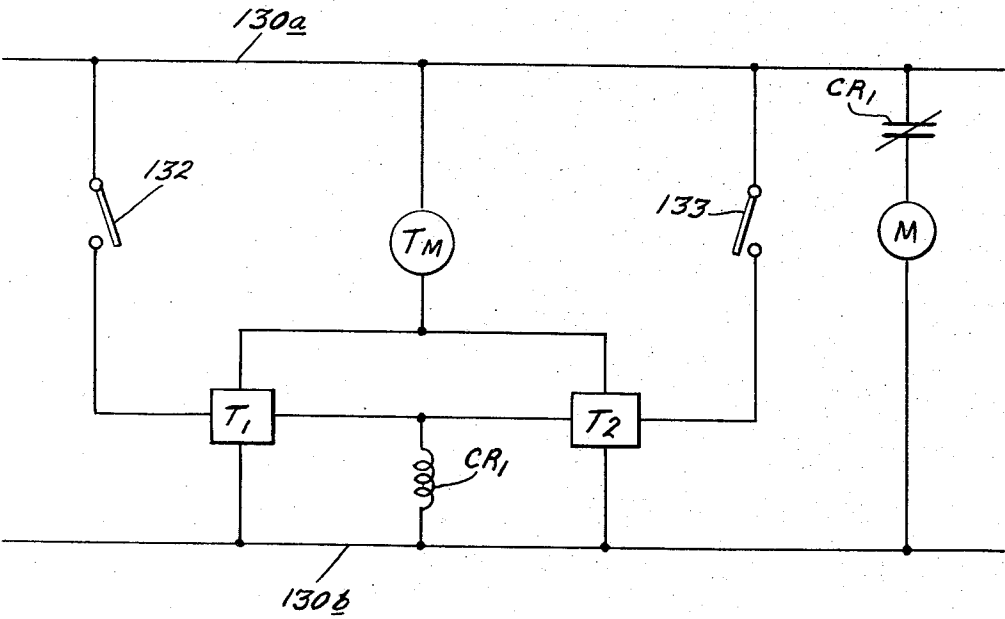


FIG. 9.



TREATMENT TABLE

The present invention relates to tables for use in treating the human body, and more particularly, the present invention relates to treatment tables which are designed to apply traction and other therapeutic action to the human body.

In U.S. Pat. No. 2,882,805, owned by the assignee of the present application, there is disclosed a treatment table which is designed to apply traction to the human body. The table includes a stationary support and a top mounted to the support for reciprocation longitudinally between limit positions. Traction apparatus which is capable of being mounted at either end of the table is provided. The top is reciprocated by an electric motor which is powered through a timer switch so that the top reciprocates for pre-selected periods of time. Thus, when the traction apparatus is secured to a patient lying on the table, the patient undergoes alternating periods of tension and relaxation as the top reciprocates between its limit positions.

Although the above-described treatment table operates satisfactorily, it has been observed that there may be occasions on which the patient is in a state of tension when the timer interrupts power to the motor and the top stops reciprocating. If an attendant is not present to properly deactivate the traction apparatus, constant traction may be applied to the patient for an undesirable amount of time. Since excessive traction is to be avoided, it is desirable for such a treatment table to be provided with means to return the top to a limit position which corresponds to an untensioned or relaxed state for the patient. It is also desirable for a table having a reciprocating top to be provided with means for arresting motion of the top at either of its limit positions for relatively short time intervals within the overall treatment period so that the patient undergoes sustained short periods of traction and/or relaxation.

In U.S. Pat. No. 2,781,040, which is also owned by the assignee of the present application, there is disclosed a treatment table having a top with an elongated aperture through which a set of rollers protrude for applying a rolling action against the back of a patient lying on the table to effect a therapeutic action as the top reciprocates relative to the rollers. Although such a table operates satisfactorily, a treatment table which possesses both a safety control circuit and means for applying heat to the patient as the top reciprocates would provide an improved therapeutic action. Moreover, a treatment table having readily accessible brackets for adjustably mounting leg rollers is also highly desirable.

With the foregoing in mind, it is a primary object of the present invention to provide a treatment table having traction apparatus and a reciprocating top with novel means for returning the top to one of its limit positions at the completion of a preselected period of time so that a patient lying on the table is not under traction when the top ceases to reciprocate at the completion of the time period.

It is another object of the present invention to provide an improved control circuit for use in a treatment table to permit an attendant to select the home position of a reciprocating table top.

As a further object, the present invention provides means for arresting motion of a reciprocating table top at one or the other of its limit positions for preselected periods of time during an overall treatment period so

that a patient lying on the top undergoes relatively short periods of traction and/or relaxation.

As another object, the present invention provides means for applying heat to a patient lying on the top of a table having safety control means of the type disclosed.

It is a still further object of the present invention to provide a treatment table having safety control means of the type disclosed with retractable body-engaging rollers which project through an aperture in the top of the table and which cooperate with a removable filler block to enable the table to be converted into a manipulating surface when the rollers are not in use.

As a still further object, the present invention provides a pair of brackets which are mounted on the sides of a treatment table of the type disclosed for receiving leg roller stanchions in a manner which permits the position of the leg rollers to be adjusted longitudinally of the table.

More specifically, the present invention provides a treatment table which includes a stationary support and a top mounted to the support for longitudinal reciprocation by an electric motor. The top cooperates with traction apparatus for applying tension periodically to a patient lying on the table as the top reciprocates between its limit positions. In one embodiment, control means is provided for arresting motion of the top at one of its limit positions after a predetermined period of time so that a patient undergoing periodic traction is in an untraced condition when the top stops reciprocating. The control means includes a pair of normally-closed limit switches mounted in spaced relation to the support and engageable by an actuator which depends from the top. The switches are periodically opened as the top reciprocates between its limit positions, and a variable timer switch is connected in a circuit with the motor and the limit switches so that one or the other of the limit switches powers the motor until engaged by the actuator after the timer switch interrupts power to the motor. A selector switch is also connected in the circuit to permit an attendant to select which of the limit switches is to control the motor and hence to determine the home or terminal position of the table. The selector and limit switches also permit an attendant to displace the top of the table from one limit position to another without actuating the timer switch. In another embodiment, the control means includes a pair of limit switches connected to a pair of auxiliary timers each of which is capable of actuating a control relay to deenergize the motor for a relatively short time period to cause the patient to undergo relatively short periods of traction and/or relaxation during a longer period of treatment as determined by a master timer. In order to augment the therapeutic action of the table, a series of rollers protrude through an aperture in the table top for engaging the patient as the top reciprocates, and heating means is mounted below the rollers for applying heat through the aperture and to the patient. In addition, there is provided means to vibrate the top as it reciprocates. The rollers are resiliently mounted for retraction downwardly through the aperture and a filler block is sized to be received in the aperture and supported on the rollers for converting the top into manipulating surface with the resiliently-supported filler block providing a desirable recoil action during manipulation. A pair of brackets each having a series of sockets is mounted to the support below the top for receiving

ing leg roller stanchions so that the position of the leg rollers may be adjusted lengthwise of the table.

These and other objects, features and advantages of the present invention should become apparent from the following description when taken in conjunction with the accompanying drawings in which:

FIG. 1 is a plan view of a therapeutic table embodying the present invention;

FIG. 2 is a front elevational view of the table illustrated in FIG. 1;

FIG. 3 is an enlarged sectional view taken along lines 3—3 of FIG. 2;

FIG. 4 is an enlarged fragmentary sectional view taken along line 4—4 of FIG. 2 to illustrate a heating element and a pair of limit switches below the top of the table;

FIG. 5 is an enlarged fragmentary sectional view taken along line 5—5 of FIG. 4 to illustrate an actuator depending from the table top for engaging the limit switches as the top reciprocates;

FIG. 6 is a fragmentary plan view of the table of FIG. 1 but illustrating a filler block installed in an aperture in the table top;

FIG. 7 is an enlarged sectional view taken along line 7—7 of FIG. 6 to illustrate the filler block being supported by rollers retracted below the top of the table;

FIG. 8 is a schematic diagram of a control circuit which is utilized in the present invention for enabling an attendant to select the home position of the top; and

FIG. 9 is a schematic diagram of a modified control circuit which may be utilized in conjunction with a treatment table having a reciprocating top.

Referring now to the drawings, there is illustrated in FIGS. 1 and 2 a therapeutic table 10 which embodies the present invention. In the illustrated embodiment, the table 10 has a flat rectangular top 11 which is mounted on an elongated upstanding support 12. Apparatus for applying traction to a patient lying on the top 11 is indicated generally at 13 and 18. The apparatus 13 is removably mounted at either end of the support 12 by means of clamping brackets 14 and 15, respectively, and includes a strap 16 which is adapted to be secured by a conventional harness to a patient lying on the top 11. An operator 17 permits the amount of traction applied by the strap 16 to be adjusted by an attendant. The traction apparatus which is indicated generally at 18 is secured to the top 11 at a location remote from the traction apparatus 13 and includes a strap 19 which is adapted to be secured to the patient by means of a conventional harness assembly which is not shown. For a more detailed discussion as to the structure and operation of the traction apparatus 13 and 18, reference is made to the aforementioned U.S. Pat. No. 2,822,805.

As in the above-noted patent, the top 11 of the table 10 of the present invention is mounted for reciprocation longitudinally relative to the support 12. For this purpose, a series of rollers 20,20 are interposed between the underside of the top 11 and the side rails 12a,12a of the support 12 (see FIG. 3), and a motor 21 is mounted inside the support 12 and is connected through a drive assembly 22 to a speed reducer 23 having an arm 24 which rotates about a horizontal axis. A link 25 is connected at one end to the arm 24 and at the other end to a pivot connection 26 on the underside of

the top 11. Thus, when the motor 21 is energized, the top 11 reciprocates through one complete cycle each time the arm 24 makes a complete revolution.

In using the table 10, the traction apparatus 13 and 18 is connected in the customary manner to a patient lying on the table 11. For example, the apparatus 18 may be connected to the cervical or thoracic portion of the patient's body, and the apparatus 13 may be connected to the lumbar or lower back portion of the body.

Thus, a patient lying on the table 11 and connected to the traction apparatus 13 and 18 as described above undergoes alternating periods of traction when the motor 21 is energized and the top 11 reciprocates between its rightwardmost and leftwardmost limit positions.

As discussed in U.S. Pat. No. 2,822,805, a desirable therapeutic action may be affected in this manner, and as described thus far the table 10 and its associated apparatus is conventional.

The patient lying on the top 11 normally undergoes the alternating traction treatment for a predetermined period of time, and for this purpose, a timer switch indicated at T in FIG. 8 is provided to power the motor 21 for preselected periods of time. The time period is selected by means of a dial 27 which is located on the front of the table-support 12 at about its vertical median. Depending upon the location of the top 11 at the completion of a time period, a patient lying on the top 11 may or may not be in a state of traction. For instance, if the top 11 were to stop when in its leftward limit position while the patient was undergoing lumbar traction with the traction apparatus 13 and 18 connected as described above, an undesirable amount of traction may be applied to the patient if an attendant is not present to discontinue operation of the traction apparatus at the completion of the time period.

In accordance with the present invention, control means is provided to prevent an undesirable amount of traction from being applied by causing the top 11 to return to a home position which corresponds to a relaxed or untraced state for the patient on the table. In the illustrated embodiment, the control means operates to return the top 11 to its rightwardmost limit position indicated in broken lines in FIG. 2. As best seen in FIG. 8, the control means comprises a circuit 30 having a plug 31 which is adapted to be inserted in an electrical receptacle for applying a voltage across lines 30a and 30b. The motor 21 indicated as M in FIG. 8 is connected to the line 30a through a pair of normally-closed limit switches 32 and 33 and to the line 30b through a three-position selector switch 34. The switch 34 has two terminals 34a and 34b, to which the limit switches 32 and 33 respectively, are connected. The timer switch T is connected across the terminals 34a and 34b, and the common terminal of the switch 34 is connected to the line 30b. The central or neutral position 34e of the switch 34 is unconnected in the circuit 30.

As may be seen in FIGS. 3, 4 and 5, the limit switches 32 and 33 are mounted in spaced relation to the support 12 below the top 11. An actuator 35 is mounted to the underside of the top 11 and depends therefrom to engage the operating arms 32a and 33a of the limit switches 32 and 33, respectively. The limit switches 32 and 33 are spaced from one another a distance which is slightly less than the total displacement of the top 11 so that the actuator 35 engages the operating arms 32a and 33a each time the top 11 reciprocates. It is noted

that the limit switch arm 33a is engaged when the top is in its rightwardmost limit position, and the limit switch arm 32a is engaged when the top is in its leftwardmost limit position. For the convenience of the attendant, the selector switch 34 is mounted on the front of the support 12 in close proximity with the dial 27 of the timer switch T.

In use, an attendant secures the traction apparatus 13 and 18 in the customary manner to a patient lying on the top 11. For instance, if the patient were lying on the top 11 with the lumbar or lower portion of his body connected to the traction apparatus 13, it would be desirable for the top 11 to stop in its rightwardmost limit position indicated in broken lines in FIG. 2 at the completion of the desired time period. To insure this, the attendant displaces the selector switch 34 rightward into the position indicated in full lines in FIG. 8, and reciprocation of the top 11 is initiated when the dial 27 is turned to the desired time setting. If the top 11 is in its rightwardmost limit position when the timer switch T is set, the limit switch 33 is held open by the actuator 35, and current flows through the selector switch 34, the timer T, the left limit switch 32, and the motor M to initiate reciprocation of the top 11. Of course, if the top 11 were in its leftward limit position when the selector switch 34 is displaced rightward, the motor M would be energized for a short period of time to cause the top 11 to move rightward into its rightwardmost limit position. The same action occurs if the top 11 stops in its rightwardmost position and the selector switch 34 is displaced leftward before the timer switch T is set.

When the motor 21 is energized and the table top 11 reciprocates, the limit switches 32 and 33 are periodically opened when engaged by the actuator 35. It is noted that periodic opening of the left limit switch 32 does not interrupt power to the motor M since power continuity is maintained by virtue of the normally-closed position of the right limit switch 33 for that portion of the reciprocating cycle that the actuator is disengaged therefrom. At the completion of a preset time interval the electrical path through the timer switch T is opened; however, the motor 21 continues to be powered by the normally-closed limit switch 33 until the limit switch 33 is engaged by the actuator when the top 11 advances into its rightwardmost limit position. At such time, the motor is de-energized, and the person lying on the top 11 is in an untensioned or relaxed state. It should be apparent that the top 11 can be made to stop in its leftwardmost limit position simply by displacing the selector switch 34 leftward into the position indicated in broken lines in FIG. 8. With this structure an attendant is able to avoid the possibility that an undesirable amount of traction may be applied to the patient.

In order to augment the therapeutic action effected by virtue of the periodic application of traction, the top 11 is provided with an elongated aperture 11a, and two pairs of rollers, 36,36 and 37,37 which project upwardly through the aperture 11a (see FIG. 2). The rollers, such as the pair 36,36 are mounted in spaced relation on a common axle 38, and as best seen in FIG. 3, the ends of the axle 38 engage the tops of compression springs 40,40 which are retained in upstanding retaining tubes 39,39. A rack and pinion gear assembly indicated generally at 41 is provided for raising and lowering the wheels 36,36, and an operating handle 42 is

provided on the front of the support 12 to permit an attendant to raise and lower the wheels 36,36. It is noted that the wheels 37,37 are mounted in a similar fashion. Both pairs of wheels are normally raised as to protrude slightly above the top 11 for engaging a patient along his spinal column when lying backdown on the top 11. It has been found that the action of the rollers on the body as the top reciprocates provides a highly desirable therapeutic effect.

In accordance with another object of the present invention, there is provided means to apply heat through the aperture 11a and to the patient lying on the top 11. As best seen in FIGS. 3 and 4, the heat is generated by a heating element 45 which is mounted in a housing 46 located below and between the pairs of wheels 36 and 37. The housing 46 and the heating element 45 are elongated and extend lengthwise of the table 10 substantially centrally of the aperture 11a. Preferably, the housing has a U-shaped transverse cross-section and is open at its opposite ends and top for permitting air to circulate upwardly across the heating element 45 and through the aperture 11a. The heating element 45 is wired in the circuit of FIG. 8 with a separate power switch 47 to enable the table 10 to be used with or without heat.

In order further to enhance the therapeutic action of the table 10, a vibrator 48 is mounted in the support 12 for vibrating the top 11 as it reciprocates. As may be seen in FIGS. 3 and 4, the vibrator 48 is fastened onto a frame element 49 which extends widthwise of the support 12 adjacent the rollers 36 and 37. Of course, the vibrator 48 may be mounted at some other location. It is noted that the vibrator 48 is connected in the circuit of FIG. 8 with a separate power switch 50 to enable the vibrator to be used selectively depending on the therapeutic effect desired.

The table 10 is capable of being used as a stationary treatment or manipulating table. For this purpose, a filler block 55 (FIG. 6) is installed in the aperture 11a, and as best seen in FIG. 7, the filler block 55 rests on top of the rollers 36 and 37 to provide the table 10 with a substantially planar manipulating surface. It has been found that when the rollers 36 and 37 are not completely retracted so that the top surface of the filler block 55 is raised slightly above the surface of the top 11 a desirable recoil action occurs when a patient is being manipulated. It is noted that the filler block 55 has an elongated recess 55a which extends inwardly from the narrow end of the block 55 to serve as a breathing space for patient in prone position and to enable the block 55 to be inserted and withdrawn readily from the aperture 11a.

As another feature, the treatment table of the present invention has a pair of leg rollers 60,60 which are designed to engage and massage the legs and/or thighs of the patient as the top reciprocates. As best seen in FIGS. 1 and 2, the rollers 60,60 are mounted on a common axle 61 which overlies and extends transversely to the top 11. The axle 61 is supported at its ends by a pair of stanchions 62,62 the lower ends of which are removably received in sockets 63a,63a in a pair of brackets 63,63 mounted on opposite sides of the support 12 below the top 11. In the illustrated embodiment, each bracket 63 has a series of four sockets and as may be seen in FIG. 1, the brackets extend outwardly from the sides of the support a slight distance to permit the stanchions to clear the side edges of the top 11. With this

structure, the leg rollers may be adjusted relatively quickly and easily into at least four different locations.

If desired, the heater 45 and/or the vibrator 48 may be wired with their switches 47 and 50, respectively, in parallel with the motor 21 between the line 30a and the limit switches 32 and 33 so that current to them is also interrupted at the completion of a predetermined time period.

In accordance with another object of the present invention, a modified control circuit is provided so that a patient may undergo relatively short periods of sustained traction and/or relaxation while undergoing treatment. To this end, a pair of auxiliary solid state timer switches T_1 and T_2 (FIG. 9) are connected in parallel with one another and in series with a master timer T_M across power lines 130a and 130b. A pair of normally-open limit switches 132 and 133 are mounted in the table and are activated in a manner similar to the switches 32 and 33 described above. The switch 132 is connected to the timer T_1 and the switch 133 is connected to the timer T_2 , the timers T_1 and T_2 being internally constructed to start counting when their associated switches are closed. The outputs of the timers T_1 and T_2 are both connected to the coil of a relay CR_1 , and the relay CR_1 has normally-closed contacts connected in series relation with a motor M which reciprocates the top as described above. Thus, activation of either timer upon closing of its limit switch energizes the coil of relay CR_1 to open its contacts for interrupting power to the motor M for a period of time as determined by the setting of the auxiliary timers. Preferably, the timers T_1 and T_2 are adjustable to periods of time shorter than the period of treatment afforded by the master timer. As a result, either timer T_1 or T_2 may be set to arrest motion of the top at either its rightward-most or leftwardmost limit position for a brief period of time before continuing reciprocation of the top. Hence, the patient may undergo brief periods of continuous traction and/or relaxation within the overall period of treatment.

In view of the foregoing, it should be apparent that there has now been provided a treatment table which is very safe in operation and which provides an improved therapeutic action when in use.

While preferred embodiments of the present invention have been described in detail, various modifications, alterations and changes may be made without departing from the spirit and scope of the present invention as defined in the appended claims.

I claim:

1. In a therapeutic table including a stationary support, tractive means mounted to said support for securement to a person, a top mounted to said support for horizontal displacement relative to the support and said tractive means between one limit position corresponding to an untensioned state and another limit position corresponding to a tensioned state, electrically-energized means connected to said top for reciprocating said top between said alternate limit positions, and timer switch means connected to said reciprocating means for energizing said reciprocating means for a preselected time, the improvement comprising: means associated with the said reciprocating means and timer for automatically arresting movement of said top in said one limit position after the completion of said pre-

selected period of time, whereby the person is in an untensioned state when the table stops reciprocating.

2. Apparatus according to claim 1 wherein said automatic means includes switch means connected to said reciprocating means and operable when said top is out of said one limit position to continue to power said reciprocating means after said timer ceases to power said reciprocating means, and means for actuating said switch means when said top reaches said one limit position to deactivate said reciprocating means.

3. Apparatus according to claim 2 wherein said switch means includes a pair of limit switches associated with said top, and said actuator means includes a pair of actuators for engaging said limit switches, means mounting said limit switches for movement relative to said actuators as said top reciprocates, and including a selector switch connected to said limit switches for rendering a selected one operable to continue to power said reciprocating means after the completion of said preselected time period and until engaged by its associated actuator.

4. Apparatus according to claim 3 wherein each of said pair of limit switches has a normally-closed position, and said selector switch has two contact positions and a common pole, said timer switch being connected across said contact positions and said normally-closed limit switches being connected to said contact positions in series with said electrically-energized reciprocating means, so that when the selector switch is positioned in one of its contact positions, current flows through the corresponding limit switch after the timer switch opens and interrupts flow through the other limit switch, whereby the top is arrested at the limit position corresponding to the location of the limit switch connected to said contact position.

5. Apparatus according to claim 1 including an aperture in said table top, a set of rollers having peripheral portions projecting upwardly through said aperture for engaging the person when lying on the top, and heating means mounted in said support adjacent said aperture for applying heat through said aperture and to said person.

6. Apparatus according to claim 5 wherein said heating means includes a heating element located in said support and housing means containing said heating element for directing heated air upwardly between the rollers.

7. Apparatus according to claim 5 including means in said support mounting said rollers for vertical displacement, and a filler block sized to be removably received in said aperture and supported by said rollers.

8. Apparatus according to claim 7 wherein said roller-mounting means includes elastic means mounting said rollers to said support so that said filler block and rollers cooperate to react resiliently as the person is being treated on the table.

9. Apparatus according to claim 1 wherein said support has upstanding sides, and including a bracket mounted to each side below said top with said brackets being elongated in the direction of the top and having a series of spaced sockets, and leg-support roller means overlying and extending transversely to said top, said roller means having a pair of members depending alongside the edges of the top and mounted in selected ones of said sockets, so that the position of the leg-support roller means may be readily adjusted longitudinally of the table top.

10. Apparatus according to claim 1 including means for vibrating said top as said top reciprocates.

11. In a therapeutic table including a stationary support, tractive means mounted to said support for securing to a person, a top mounted to said support for horizontal displacement relative to the support and said tractive means, electrically-energized means connected to said top for reciprocating said top between alternate limit positions, and master timer switch means connected to said reciprocating means for energizing said reciprocating means for a preselected period of time, the improvement comprising: auxiliary timer switch means associated with said master timer switch means and said reciprocating means for automatically arresting movement of said top in at least one of said limit positions and reactivating movement of said top after the lapse of a period of time less than said preselected period of time.

12. Apparatus according to claim 11 including limit switch means associated with said auxiliary timer switch means and operable when said top is in said one limit position to actuate said auxiliary timer switch

means for counting said lesser period of time.

13. Apparatus according to claim 12 including actuator means for engaging said limit switch when said top is in said one limit position and means mounting said limit switch for movement relative to said actuator means as said top reciprocates.

14. Apparatus according to claim 13 wherein said auxiliary timer switch means includes a pair of auxiliary timers associated with said reciprocating means and said master timer with said auxiliary timers each corresponding to one of said limit positions, and including a limit switch associated with each of said auxiliary timers and operable when said top is in one of said limit positions to actuate the corresponding auxiliary timer.

15. Apparatus according to claim 14 including a relay having normally-closed contacts connected in series relation with said electrically-energized means and a coil connected to both of said auxiliary timers for opening said contacts for said period of time upon activation of either of said auxiliary timers.

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