April 3, 1934. C. E. MILLER 1,953,424

THERAPEUTIC APPARATUS

Filed Feb. 25, 1929 6 Sheets-Sheet 1

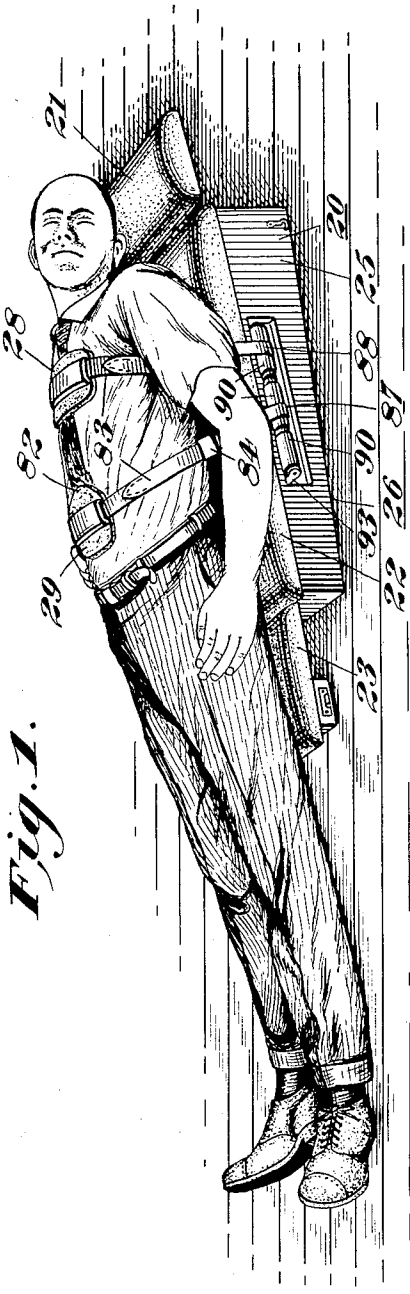


Fig. 1.

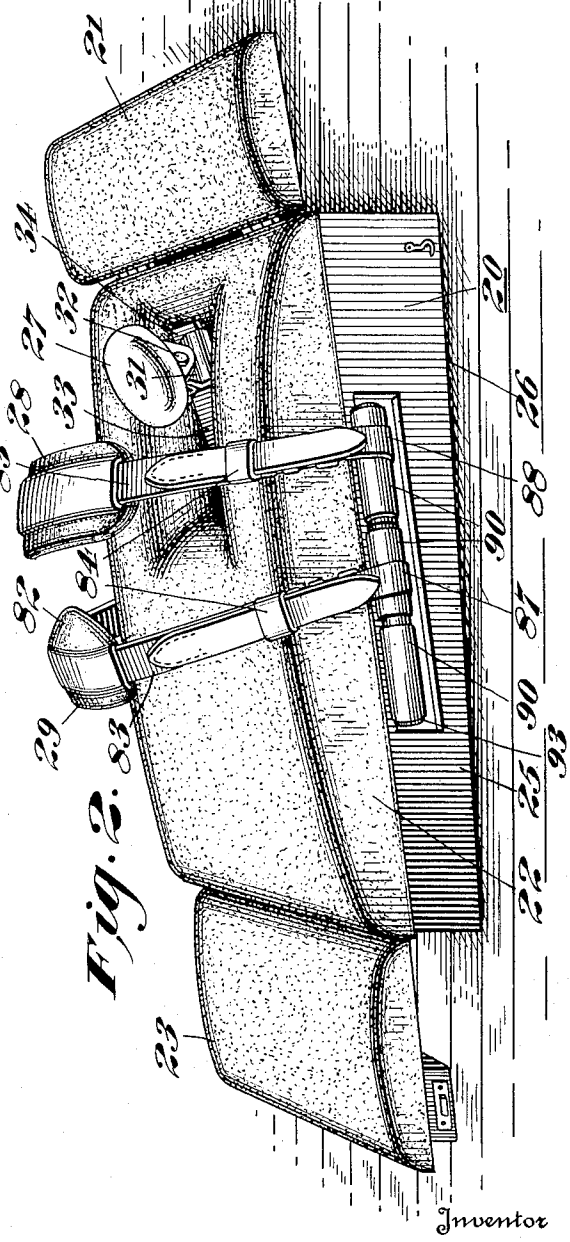


Fig. 2.

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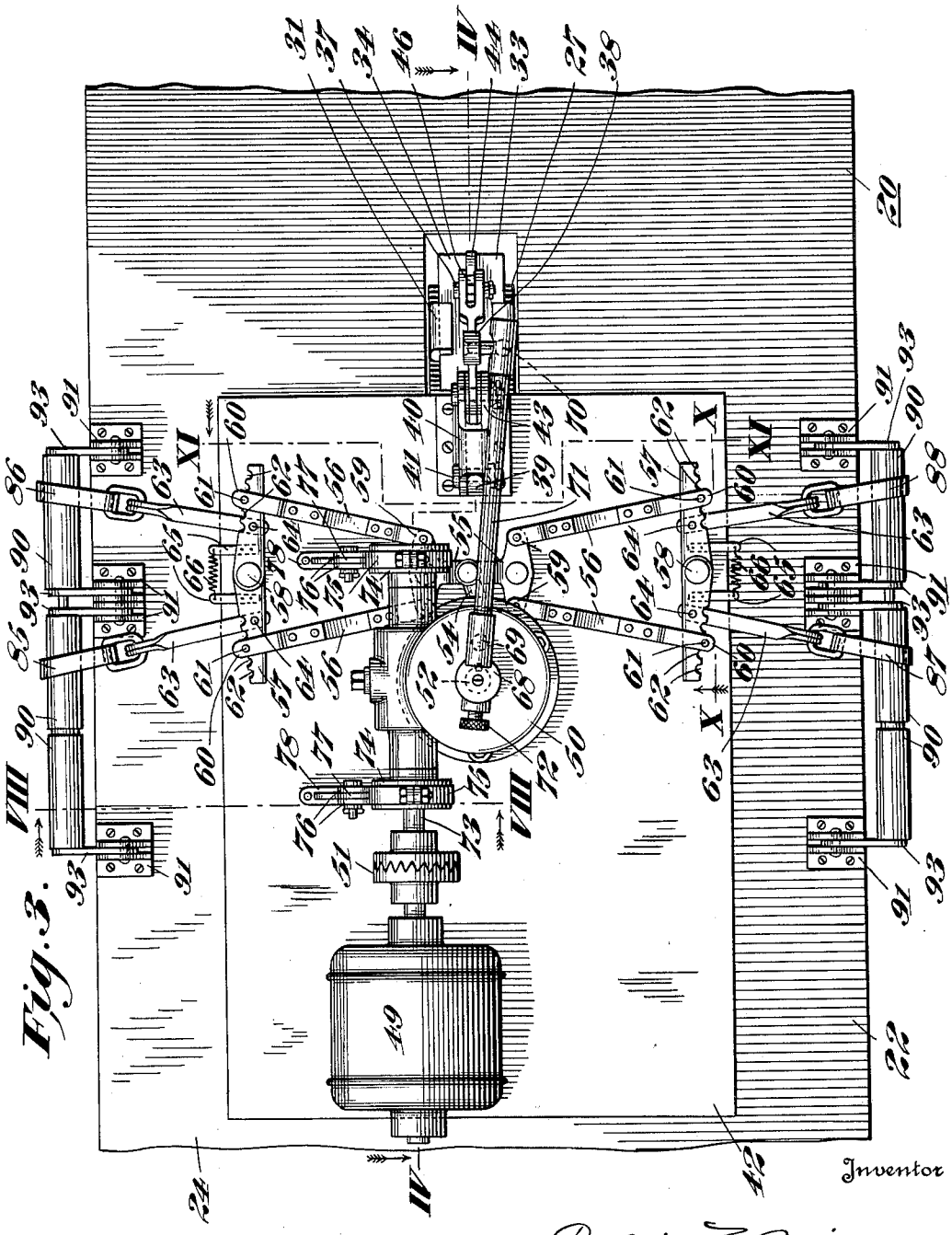


Fig. 3.

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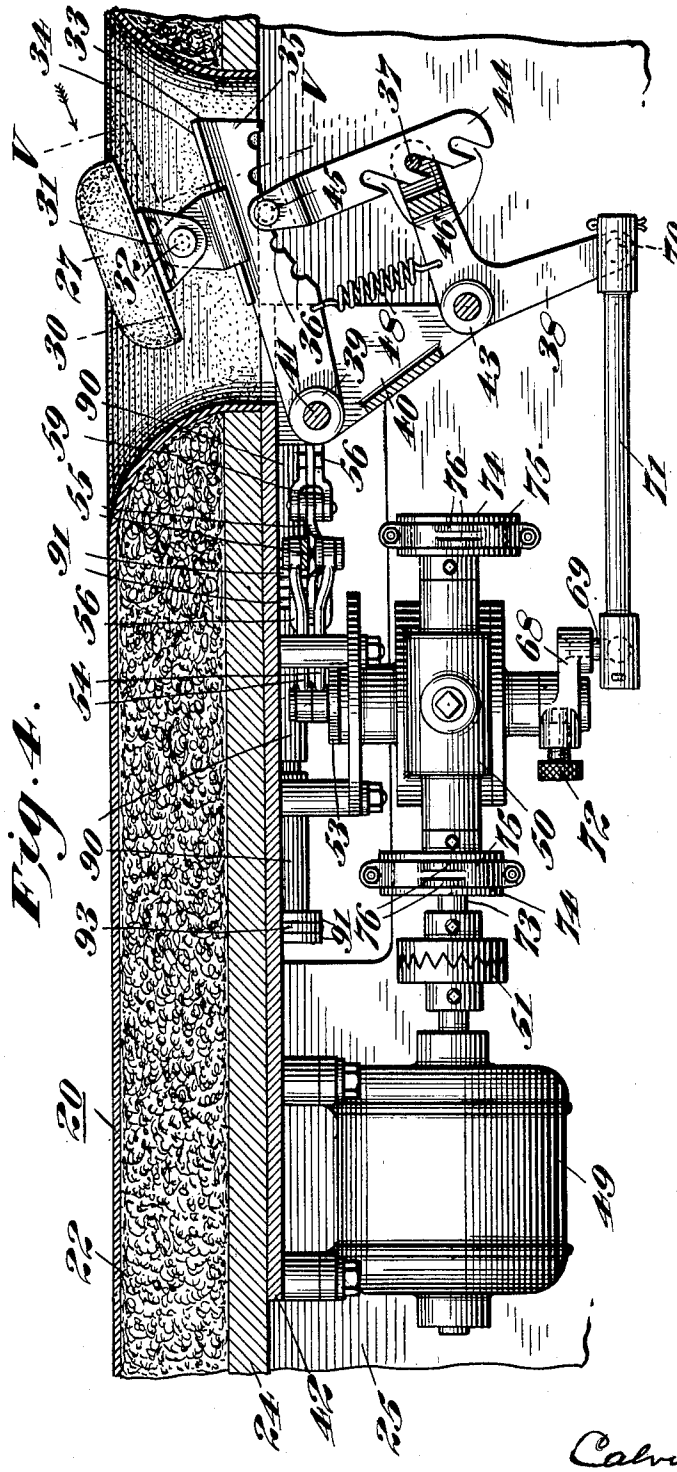


Fig. 4.

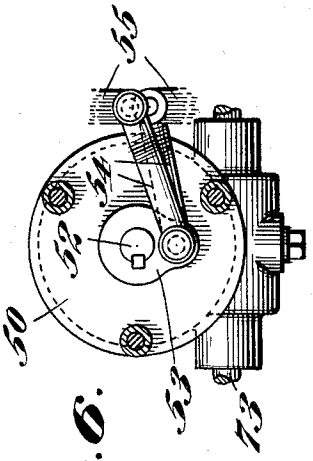


Fig. 6.

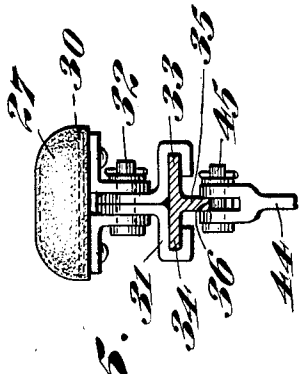


Fig. 5.

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Fig. 8.

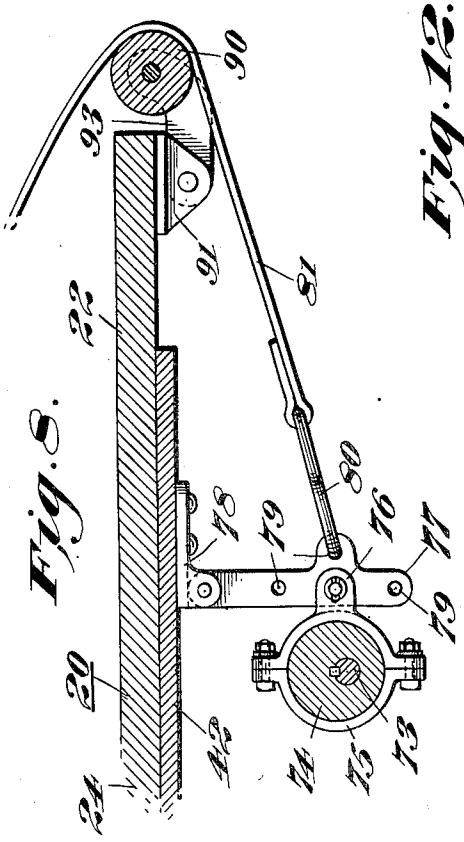


Fig. 12.

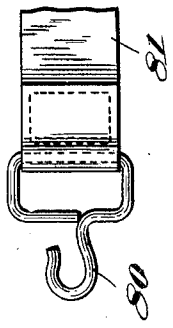


Fig. 10.

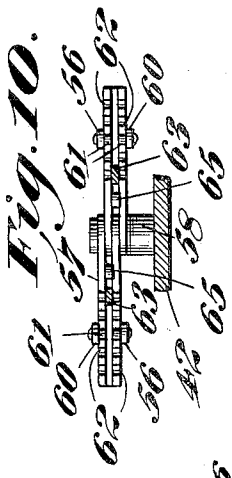


Fig. 11.

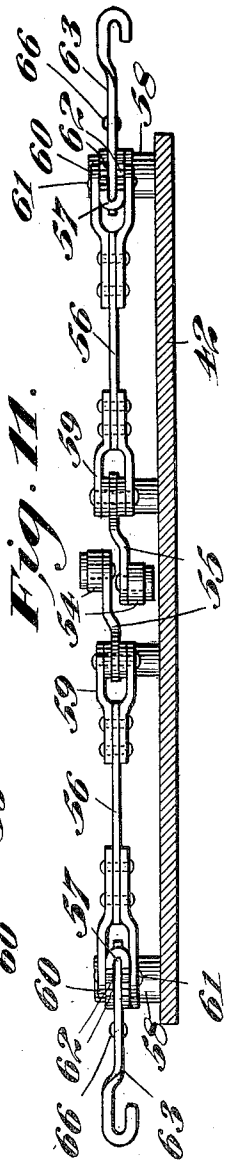


Fig. 7.

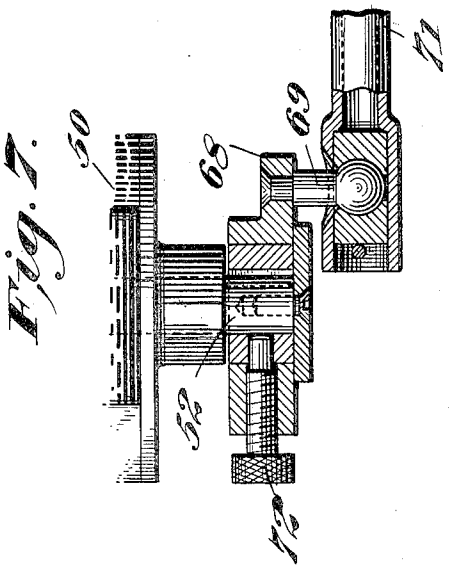


Fig. 9.



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Fig. 14.

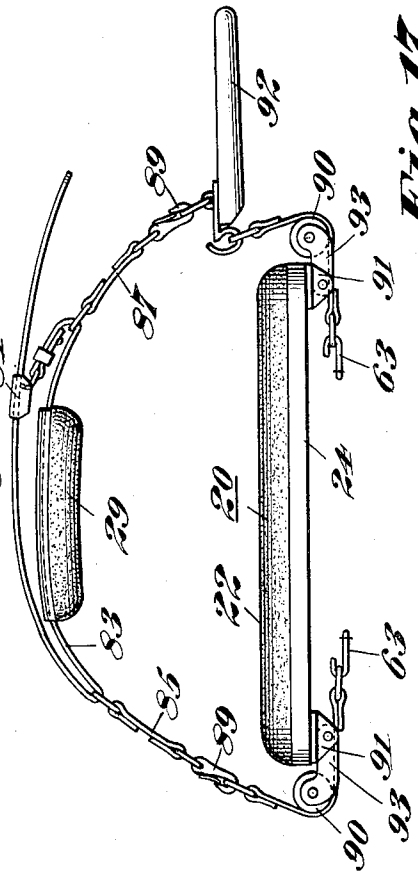


Fig. 17.

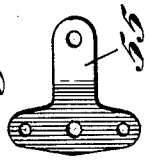


Fig. 16.

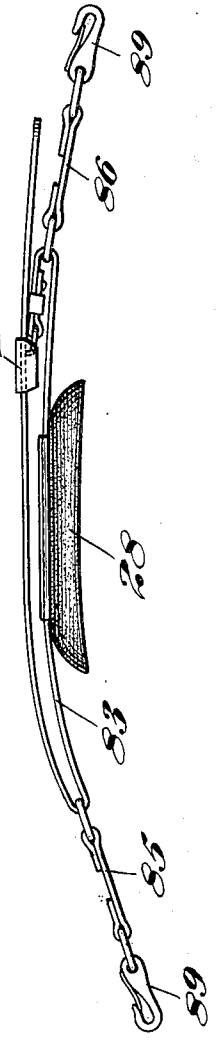


Fig. 13.

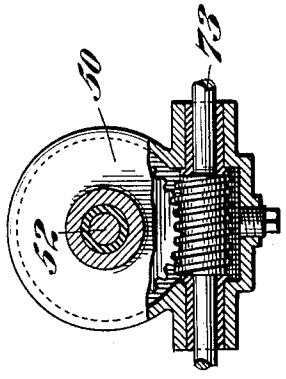
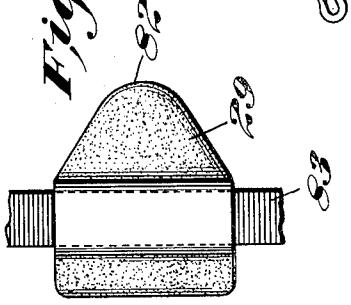


Fig. 15.



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Fig. 20.

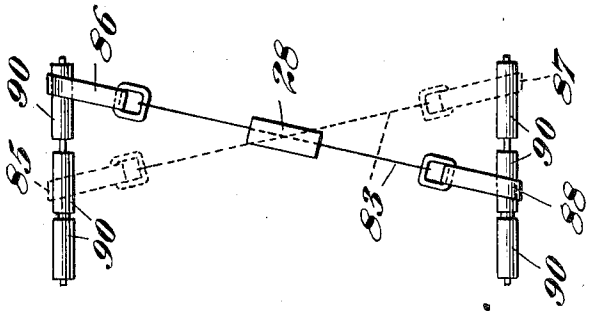


Fig. 19.

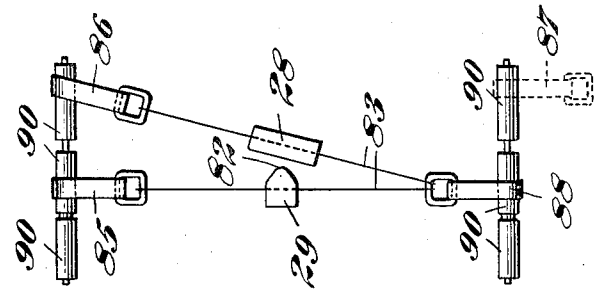
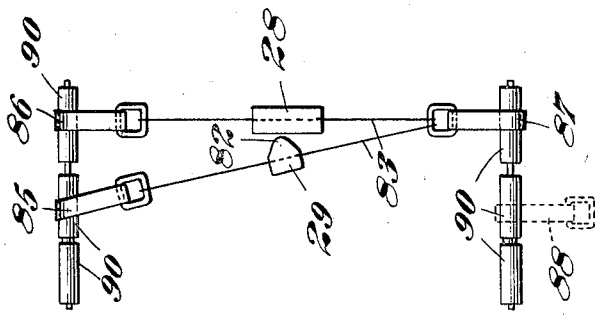


Fig. 18.



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Patented Apr. 3, 1934 1,953,424

UNITED STATES PATENT OFFICE

1,953,424

THERAPEUTIC APPARATUS

Calvin E. Miller, Bethlehem, Pa.

Application February 25, 1929, Serial No. 342,374

19 Claims. (Cl. 128—63)

This invention relates to therapeutic apparatus and more particularly to that which is adapted to the treatment of disease as practiced by the osteopathic profession.

The objects of my invention are:

1. To mechanically pump the lymph from every tissue and organ of the body, thus returning the lymph to the heart quickly.

2. To mechanically pump the venus blood back to the heart rapidly.

3. To restore the nutritive equilibrium to all body cells, by the mechanical removal of the waste material and the supplying of fresh nutritive lymph.

4. To provide mechanism to remove the edema or dropsical swelling from any part of the body.

5. To mechanically cause a specific defense within the body against bacterial diseases.

6. To provide mechanical means to quickly cause favorable changes to take place in the blood stream.

7. To increase the elimination of waste products from the body by mechanical means.

8. To mechanically relieve certain forms of paralysis by removing the fluid pressure from the affected nerve centers in the brain and spinal cord.

9. To mechanically increase the activity of the glands by causing an increased absorption of the glandular secretions.

Generally speaking, this apparatus comprises body engaging members which engage the chest, the abdomen and an upper portion of the spine, respectively, and are adapted to exert pulsating pressures on the body in timed relation to each other. The chest and spinal members operate in unison but in opposite directions and the abdominal member operates in the same manner as the chest member but in alternating timed relation thereto. Suitable mechanism is provided to operatively connect the body engaging members with a source of power and the action produced thereby is a simultaneous intermittent pulsating pressure on the chest and the upper portion of the spine and a similar alternative action on the abdomen.

In using the term chest, it is to be understood as that portion of the body enclosed by the ribs and breast bone.

This apparatus by its pumping action on the body, is particularly adapted to increase the normal flow or movement of the lymph from the tissues and organs of the body into the blood stream and return the venus blood back to the heart quickly and supply fresh nutritive lymph. However, it is not limited to this function alone, as it is well adapted to treat the spine or other parts of the body when used in combination with a quick adjusting device which comprises a part of the complete machine. When used to increase the flow of the lymph, the patient lies on his back but when used for spinal treatment he lies face down on the support.

This apparatus is adapted to be attached to an office treating table or it may be embodied into a portable cabinet which serves a dual purpose for office or out-patient work and it is this last mentioned form which I have chosen to describe.

The novel features will be more fully understood from the following description and claims taken with the drawings.

Fig. 1 is a view representing a patient on the treating apparatus with the body engaging pads in operative position.

Fig. 2 is a perspective view of the apparatus showing the relative position of the back, chest and abdominal engaging members.

Fig. 3 shows the plan of the operating mechanism when viewed from the under side of the machine.

Fig. 4 is a section view taken on lines IV—IV of Fig. 3 and showing the motor, speed reducing gear and the back pad mechanism in particular.

Fig. 5 is a sectional view of the back engaging member taken on the line V—V of Fig. 4.

Fig. 6 is a plan view of the speed reduction gear and a portion of the driving mechanism as shown in Fig. 4.

Fig. 7 is a sectional view of a portion of the back pad operating mechanism at the lower end of the vertical driving shaft of the reduction gear as shown in Fig. 4.

Fig. 8 is an end view the vibrating mechanism taken on the line VIII—VIII of Fig. 3.

Fig. 9 is an enlarged view of one end of the adjustable links as shown in Fig. 3.

Fig. 10 is an enlarged sectional view taken on the line X—X of Fig. 3.

Fig. 11 is a sectional view through the bed plate taken on lines XI—XI of Fig. 3 and looking endwise on the actuating mechanism.

Fig. 12 shows the end of the strap and hook for attaching to the vibrating mechanism as seen in Fig. 8.

Fig. 13 is a sectional view of the speed reducing gear as seen in Figs. 3 and 4 showing the worm and a portion of the worm wheel.

Fig. 14 shows a pad and strap assembly in combination with a quick adjusting and tensioning lever.

Fig. 15 is a plan view of the abdominal pad and strap as shown in Figs. 1 and 2.

Fig. 16 is an enlarged view showing the make-up of the chest and abdominal straps as shown in Figs. 1, 2 and 4.

Fig. 17 is an enlarged view of the T levers as shown in Figs. 3 and 11.

Figs. 18, 19 and 20 are diagrammatic illustrations showing how the chest and abdominal straps can be connected to the operating mechanism to obtain different motions.

In the accompanying drawings, I have used the numeral 20 to indicate generally an upholstered frame or cabinet table containing the operating mechanism. The cabinet comprises a foldable head rest 21, a middle portion 22 housing the operating mechanism and a hinged end 23 adapted to support the lower portion of the body. The middle portion 22 is box-shaped, having a top 24, sides 25 and bottom 26. Openings are provided in the top and sides of the cabinet to accommodate the back pad 27 and to provide access to the operating mechanism. The top of the table 20 with its head rest 21 and hinged end portion 23 are generally representative of the top of a regular office treating table and the application of the mechanism to an office table is generally similar to that of the cabinet table 20.

Arranged longitudinally of the table is a series of body engaging members, comprising a back member 27, a chest member 28, and an abdominal member 29. The back member or pad 27 consists of a rectangular piece of sponge rubber covered with leather and secured to a thin metal plate 30. The pad 27 is pivotally mounted on a clip 31 by means of the pin 32 and the clip 31 in turn frictionally engages the arm 33 to provide sliding adjustment thereon. The purpose of the pivoted joint between the pad 27 and the clip 31 is to allow the pad to adjust itself to the body when in operative position. The sliding clip 31 to which the pad is attached is to provide longitudinal adjustment of the pad 27 relative to the arm 33 as may be required to suit conditions.

The arm 33 is T shape in section and the flanged or top portion 34 is adapted to be engaged by the clip 31. The web portion 35 of the arm is provided with a series of notches 36 formed on the arc of a circle for the purpose of adjustment hereinafter explained. The lower end 39 of the arm 33 is hinged to a bracket 40 by means of the pin 41. The bracket 40 is adapted to be secured to the bed plate 42 and is provided with a bearing 43 to form a support for the bell crank 38.

The link 44 connecting the hinged arm 33 and the bell crank 38 has a forked upper end and a pin 45 secured therein which engages one of the radial notches of the arm 33. The lower portion of the link has a series of downwardly inclined open notches 46 which are adapted to engage the pin 37 of the bell crank. A tension spring 48 is placed between the arm 33 and the bell crank 38 which acts to draw the two members together thereby holding the link 44 in engagement with the arm 33 and the bell crank 38.

The operating mechanism comprises a fractional horse power motor 49 connected to a worm gear drive 50 by means of a flexible coupling 51. To the upper end of the shaft 52 is secured a crank 53 to which is rotatably attached two driving links 54. The other end of each link is attached to separately pivoted T shaped levers 55. To each end of the T levers are pinned, links 56, which engage the hinged arms 57 having common pivot bearings 58. The links 56 connecting the T levers 55 and the hinged arm 57 have forked ends the one end 59 of each link is pivotally pinned to the T levers 55 and the other or outer end 60 is fitted with pins 61 adapted to engage the notches 62 of the hinged arms 57. The arms 57 are preferably made by bending a piece of thin metal to form a U section which will allow the interfitting of their pivoted ends. Intermediate the ends of the arms 57 and the pivot 58 are placed short members 63 having hooked ends. These hooked members 63 are provided with pin bearings 64 to allow the hooked ends to swivel. The pivoted ends of the hooked members fit into the U shaped section of the hinged arms 57. This construction allows the forked end 60 of the links 56 to be brought up to the adjusting notches 62 in the way of the hooked links 63, as the center portion of the pins 61 at the ends 60 of the links 56 are cut away to clear the hooked links 63. To each hinged arm 57 is fastened a short outstanding arm 65, the ends of which are connected by a tension spring 66 for the purpose of holding the outer ends of the links 56 in engagement with the hinged arms 57.

The motor, worm gear, bracket, and all of the pins and brackets serving as pivots for the various levers are secured to a single plate 42 so that the whole mechanism can be assembled as a unit to whichever type of table is desired.

To the shaft 52 extending from the lower end of the worm gear drive 50, is attached a crank 68 which is fitted with a ball ended pin 69. This pin and a similar pin 70 on the bell crank 38 is engaged by a connecting rod 71 to form a universal link connection. The crank 68 is provided with a thumb set screw 72 which operatively locks the crank to the shaft 52 of the worm gear, for the purpose of disconnecting the crank from its driving shaft, provided the back pad 27 is not required under certain conditions.

In addition to the back, chest and abdominal members, which operate at a comparatively slow cadence, there is provided means for producing rapid vibrations. On either end of the work shaft 73 which is directly driven by the motor 49 at high speed, are placed cams 74 having small eccentricity. Each cam is fitted with a split eccentric strap 75, one end 76 of which is forked and pivotally attached to the bed plate by means of the bracket 78. The link 77 is drilled with a series of holes 79 for the purpose of attaching the hooks 80 of the vibrating members 81. The holes 79 into which the hooks 80 are placed determine the stroke or action of the vibrating members 81 as may be desired by the operator. The vibrating members 81 comprise straps of suitable material fitted with hooks 80 adapted to engage the links 77.

The chest pads 28 and abdominal pads 29 are made of sponge rubber, the only difference being in their shape. The chest pad is rectangular while the abdominal pad is more triangular with the apex 82 of the pad directed towards the chest when in operative position. As shown in Fig. 16 each pad is slidably attached to a double looped strap 83 which is provided with a buckle 84 of the quick acting toggle type that requires no holes in the strap. To each looped end of the strap 83 are attached short single straps 85, 86, 87 and 88, having snap hooks 89 at their ends.

At each side of the table are rollers 90 trunnioned between arms 93 which are adapted to swing downwardly under the edge of the table so as to be out of the way when not in use. The

arms 93 are secured to the underside of the table by means of brackets 91. To the ends of the hooked levers 63 are attached the short single straps 85—88 which ride over the rollers 90 and to which the snap hooks 89 are attached as shown in Fig. 14.

When the apparatus described is used as a lymph pump, the patient to be treated is placed on his back on the table. The chest straps 28 and abdominal straps 29 are attached to the hooks 63 of the operating mechanism and properly adjusted by means of the buckles 83. The back pad 27 is adjusted longitudinally by sliding it up or down on the hinged arm 33, and the vertical adjustment is made by means of the slotted link 44. When the motor is started it creates a pulling action on the straps which has the effect of imparting a contracting and expanding manipulation to the chest and abdomen and at the same time produces an upwardly pressing movement against the spine. The action thus produced is a comparatively slow pulsating movement at the rate of about 120 pulsations per minute. The chest and back pads 28 and 27 respectively operate in unison, that is, as the chest straps are pulled downwardly to contract the chest, the back pad 27 simultaneously presses upwardly against the spine. During the period of the contraction of the chest pad 28, the abdominal pad 29 is being relaxed, thus producing an alternating up and down motion between the chest and abdominal pads. The three body members may be operated all at one time, or any one member may be used singly, or the combination of any two of the members may be employed as the treatment may require. A combination of various movements can be effectively produced with the chest and abdominal members. For instance—by connecting the ends of the chest strap to the short straps 86 and 87 and one end of the abdominal strap to the short strap 85 and the other end to strap 87, an up and down pulsating motion is imparted to the chest pad 28 and a transverse or rocking motion is given to the abdominal pad 29 as shown diagrammatically in Fig. 18.

Should it be desired to impart an up and down pulsating motion to the abdomen and a rocking motion to the chest, then the ends of the abdominal strap are attached to straps 85 and 88 and the chest strap is attached to straps 86 and 88 as shown in Fig. 19. If the rocking motion alone is desired, it can be obtained by attaching either a chest or abdominal strap to either set of diagonally opposed short straps 85 and 87 or straps 86 and 88 as shown in Fig. 20.

Referring to Fig. 1, it will be noted that the pressure pads 28 and 29, when in their correct operative position, are spaced relatively far apart. The chest pad 28 is positioned well up on the thorax, and the point of the abdominal pad 29 is positioned just below the diaphragm and on the anterior surface of the abdomen. The straps which connect the pads to the operating mechanism converge downwardly toward each other as they pass over the rollers 90, and the ends of the straps under the rollers, as shown in Fig. 3, continue in a converging direction toward the pivoted connections 64 of the hooks 63. Obviously, if the directional lines of the straps were continued they would intersect at approximately the center of the machine. The apparatus as a whole is so proportioned and located so as to impart an angular pull on the straps when correctly positioned on the body, for the purpose of producing a downward and forward motion of the chest pad, and a downward and backward motion of the abdominal pad. The terms forward and backward being considered as in the direction of the feet and head of the body, respectively. The angular motions of the straps with their pads impart to the body, as near as mechanically possible, pressures in the same direction and with the same technic as produced by hand, to obtain the desired effect of the treatment with reference to the objects of my inventions as heretofore set forth.

Referring to Fig. 1 it will be noted that the support is wider than the human body resting thereon and that the straps connected to the resilient pressure members extend downwardly and laterally from the body due to the position of the rollers over which the straps pass to the underside of the support. This is further exemplified in Fig. 14 which shows the spreading of the straps at the rollers. It is desired that the pressures applied to the body be concentrated upon the anterior portion of the trunk and that there be little or no pressure at the sides of the trunk to cause transverse pressures at the same time.

When using the apparatus for spinal treatment, the patient is placed face down on the table, and to either the chest or abdominal straps is attached a lever 92 as shown in Fig. 14. The lever 92 is held in one hand of the operator and when pressed downwardly produces tension on the strap. When the pressure on the lever is released the strap may readily be moved to another position while the mechanism is operating. It will be readily seen that with this lever when used as a quick adjusting device, practically the whole range of the spine can be treated without moving the patient or without stopping the machine to make adjustments.

When treating a person of large physique it may be desirable to increase the intensity of action of the chest and abdominal pads. This can be accomplished by adjusting the straps tightly by means of the buckles 84. On the other hand, when treating a patient of slight build the action can be reduced by loosely adjusting the straps. It will therefore be seen that the adjustment of the straps also has an effect which is equivalent to increasing or decreasing the stroke of the operating mechanism and thus provides two means of adjustment of the chest and abdominal pads in combination with the links 56.

The length of stroke of the hooked levers 63 depends upon which notch of the arm 57 is engaged by the end 60 of the connecting link. The nearer the end 60 of the link relative to the pivot 58, the greater will be the movement of the hook. Likewise, the farther the end 60 of the link relative to the pivot 58, the less will be the movement of the hook 63.

In addition to the longitudinal and vertical adjustments of the back pad heretofore mentioned, there is also an adjustment for regulating its stroke. As the general features of this adjustment are similar to that of the hook members just described, it is therefore not necessary to repeat it.

When the machine is used as a vibrating apparatus the patient is placed in the position desired by the operator. The hook 80 at the end of the vibrating strap 81 is attached to one of the links 77 and the strap is taken over one of the rollers 90 at the edge of the table and brought in contact with the body of the patient, while the

operator applies tension to the free end of the strap. The operation of the motor causes the link, to which the strap is attached, to reciprocate rapidly, thus imparting to the strap a vibrating motion, the vibrations being equivalent to the speed of the motor which is preferably about 1700 R. P. M. The strap may be attached to either of the links 77, or two straps may be used at the same time by attaching a strap to each link and their application directed as desired.

From the foregoing it will be obvious to those skilled in the science of healing that I have provided a therapeutical apparatus that will produce by mechanical means, curative results according to the objects of my invention hereinbefore set forth, and in a manner whereby actual practice by hand has proven most effective. Furthermore, the apparatus may be made a part of a regular office treating table or it may be portable and easily carried.

The invention can be carried out in various ways other than the arrangement of parts which I have chosen to illustrate and describe. For example, the mechanism comprising the links and levers driven by the motor, which go to form a part of the operating means, may be other than that described, and while I have shown my invention in one form it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art, or as, are specifically set forth in the appended claims.

I claim:

1. In a therapeutic apparatus comprising reciprocable pressure members adapted to engage the chest, the abdomen and the spine, and means for operating said members to produce intermittent pressures on said parts of the body.

2. In a therapeutic apparatus comprising reciprocable pressure members adapted to engage the chest, the abdomen and the spine, means for operating said members to produce simultaneous pressures on the chest and spine and an alternating pressure on the abdomen, said abdominal pressure member being substantially triangular in form.

3. In a therapeutic apparatus comprising reciprocable members adapted to engage the chest, the abdomen and the spine, and means operatively connecting said members with a source of power to impart pulsating pressures to the body at a rate greatly exceeding the normal rate of respiration.

4. In a therapeutic apparatus comprising reciprocable pressure members adapted to engage the chest, the abdomen and the spine, mechanism for operating said members to produce intermittent pressures on said parts of the body, and means to regulate the stroke and the degree of pressure imparted to the body by said members.

5. In a therapeutic apparatus comprising a support for a recumbent human body, rollers attached to said support and transversely spaced at a greater distance than the width of said body, straps adapted to span the chest and the abdomen and to pass downwardly over said rollers, mechanism located beneath said support operatively connected to the ends of said straps adapted to intermittently pull and release the straps to produce alternating pressures on said parts of the body in directly opposite relation one to the other, the pull of said straps over the body being in a downwardly converging direction toward said rollers.

6. In a therapeutic apparatus comprising a support for a recumbent human body; a plurality of pads operatively disposed above said support and adapted to engage the chest and the abdomen of said body, a pad disposed in the top of said support and adapted to engage a portion of the spine, mechanism adapted to reciprocate said pads to produce alternating pressures on said parts of the body, said support having foldable end portions and an intermediate portion adapted to enclose said mechanism.

7. In a therapeutic apparatus comprising a support for a recumbent human body; a plurality of straps having pads slidably connected thereto operatively disposed above said support and adapted to engage the chest and abdomen of said body, means to reciprocate said pads, said means comprising a motor, a speed reducing gear operatively connected to said motor, a crank driven by said gear, sets of members having hooked ends positioned transversely opposite each other and adapted to engage said straps, and means operatively connecting said crank and said hooks, whereby, the transverse distance between one set of co-operating hooks may be decreased and the distance between another set of hooks increased simultaneously.

8. In a therapeutic apparatus comprising straps having pads connected thereto adapted to engage the chest and abdomen of said body, means to reciprocate said pads, said means comprising a motor, a reduction gear operatively connected to said motor, a crank operatively connected to said gear, hinged arms disposed on the opposite sides of said gear, hooked members pivotally connected to said arms and adapted to engage said straps, pivotally mounted T shaped levers located intermediate said hinged arms, the fulcrum points of said T levers being in transverse alignment with each other, means to operatively connect said crank and said levers, and an adjustable means operatively connecting said hinged arms to said levers to provide adjustment for the length of stroke of said hook members and thereby the reciprocation of said pads.

9. In a therapeutic apparatus comprising a support for a recumbent human body; pressure members adapted to engage the chest and the abdomen, means located beneath said support for reciprocating said members to produce alternating pressures on said parts of the body, said means including pivoted arms, links adapted to engage said arms at different positions relative to said pivots, and means to hold said links in operative engagement with said arms at any of said positions.

10. In a therapeutic apparatus comprising a support for a recumbent human body; separate straps adapted to span the chest and the abdomen, resilient pressure members slidably connected to said straps, automatic mechanism located under said support for actuating said straps to produce a pulling and releasing action on the ends of said straps to effect pulsating pressures on said parts of the body, the directional pull of said straps being in a downward and converging direction, to produce a downward and forward motion of the chest pressure member and a downward and backward motion of the abdominal pressure member.

11. In a therapeutic apparatus comprising a strap having a pad slidably connected thereto adapted to engage the spine of a patient lying

face down on said support, automatic power actuated mechanism connected to each end of said strap adapted to intermittently tension and release said strap to effect pulsating pressures on the spine, and a hand operated lever adapted to be operatively attached to said strap to effect quick adjustment of said strap longitudinally of the body and variation of pressure of said pad while said mechanism is in motion.

12. In a therapeutic apparatus comprising a support for a recumbent human body; a plurality of yielding members adapted to engage the chest, the abdomen, and a portion of the spine, automatic mechanism for reciprocating said members to produce alternate pressures on said parts of the body, said spine engaging member being slidably and pivotally mounted on a hinged arm operatively attached to the underside of said support, means to regulate the height of said arm relative to said support and means to regulate its reciprocating stroke.

13. In a therapeutic apparatus, a support for a recumbent human body, said support having an opening through its top portion, a spine engaging member disposed in said opening, automatic means for reciprocating said member, said means comprising a lever pivotally mounted in a bracket which is attached to the underside of said support, a bell crank located below said lever and operatively supported by said bracket, an adjustable link operatively connecting said arm and said crank, and a resilient member connected to said arm and said crank for holding said link in engagement with said arm and said crank.

14. In a therapeutic apparatus comprising a support for a recumbent human body; a plurality of pressure members operatively disposed above said support and adapted to engage spaced portion of the body, a pressure member operatively disposed in an opening through the top of said support, a mechanism operatively connected to said pressure members for reciprocating same to produce alternating pressures on the body, said reciprocating means for said members embodying a means adapted to render the last said pressure member inoperative without affecting the operation of the other pressure members.

15. In a therapeutic apparatus comprising a support for a recumbent human body; a plurality of straps adapted to span said body transversely of said support, rollers positioned at the sides of said support over which the lower portions of said straps pass, automatic mechanism positioned beneath said rollers operatively connected to the ends of said straps and adapted to impart an alternating tensioning and releasing effect to said straps, and means to actuate said mechanism at a rate exceeding the normal rate of respiration, the lines of movement at the end of said straps being in a plane substantially different from the lines of movement of those portions of the straps adapted to engage the body.

16. In a therapeutic apparatus comprising a support for a recumbent human body, a plurality of straps adapted to span the chest and the abdomen transversely of said support, rollers positioned at the sides of said support over which the straps pass to the underside of said support, automatic mechanism positioned underneath said support and operatively connected to said straps to alternately tension and release the straps to effect pressures on said parts of the body, the directional lines of the pull on the straps intersecting underneath and substantially at the center of the support and continuously diverging outwardly and upwardly over the body.

17. In a therapeutic apparatus comprising a portable support for a recumbent human body, reciprocable pressure members adapted to engage the chest, the abdomen and an upper portion of the spine, means for operating said members to produce simultaneous pressures on the chest and the spine and an alternating pressure on the abdomen, the movement of the chest member being downwardly and toward the feet, and the movement of the abdominal member being downwardly and toward the head, said support having a shallow box-like middle portion and folding end members attached thereto.

18. In a therapeutic apparatus comprising a support for a body; a strap having a resilient pad slidably connected thereto and operatively disposed above said support to engage the body, means located under said support to reciprocate said strap and said pad, said strap comprising a center portion in the form of an open elongated loop, a buckle attached to one end of the strap to secure its other end, snaps connected to the looped ends of the strap, and additional straps to connect said snaps to said reciprocating means, whereby, slack in the looped strap may be adjusted without disturbing the position of said pad when properly located on the body.

19. In a therapeutic apparatus comprising a support for a body; a strap made up of a plurality of parts operatively disposed above said support to span the body, operating means located under the support to reciprocate the ends of said strap, and a hand operated lever adapted to connect upper and lower portions of said strap for regulating the tension thereof, said lever comprising a handle, an upturned hook secured to one end of the handle, a ring set back from the hook and attached to the handle, whereby, said hook may be attached to the lower portion of the strap, and said ring engage the upper portion of the strap.

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