March 29, 1938. E. H. HYTER 2,112,367

MASSAGING APPARATUS

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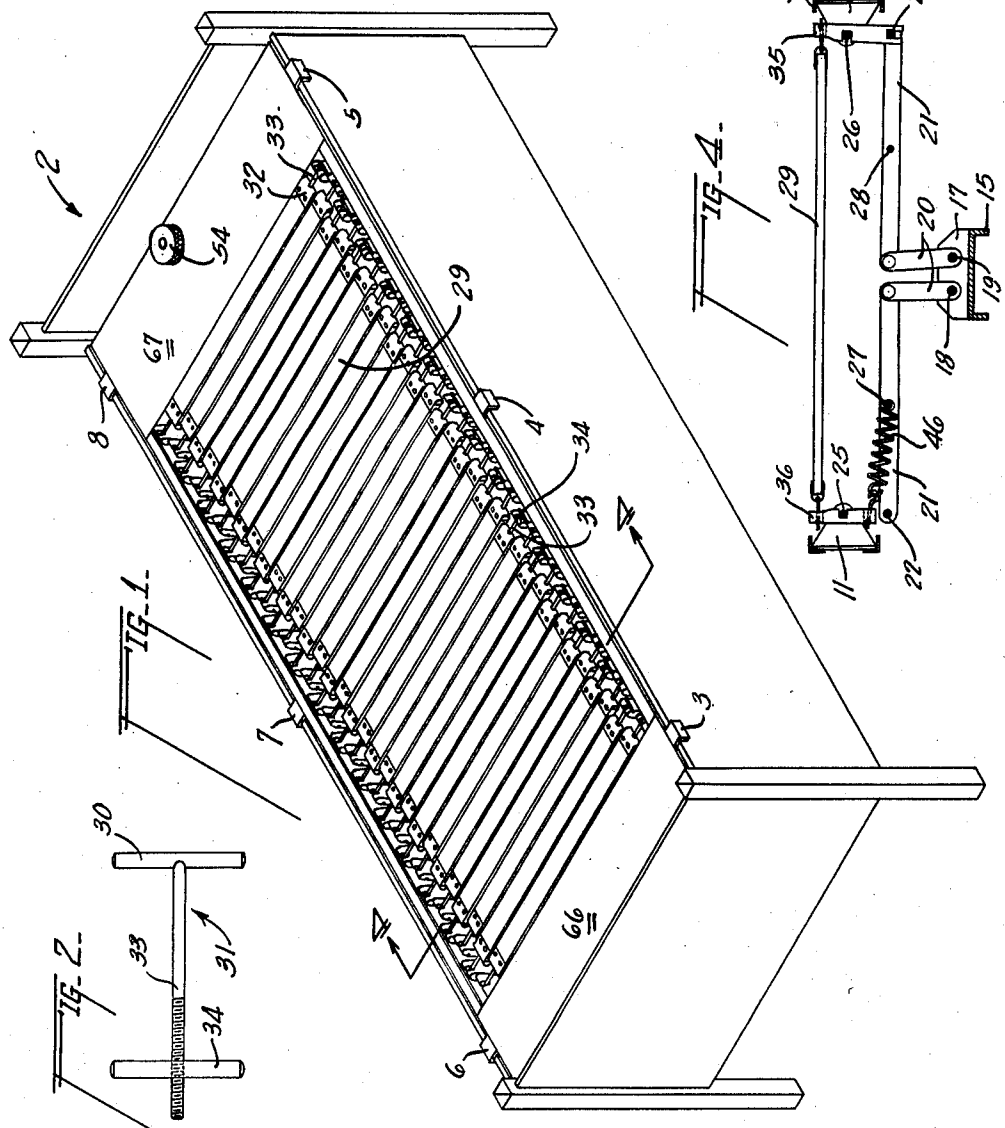


FIG. 1.

FIG. 2.

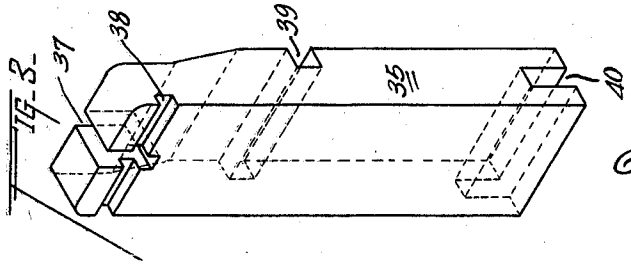


FIG. 3.

FIG. 4.

Ernest H. Hyter INVENTOR

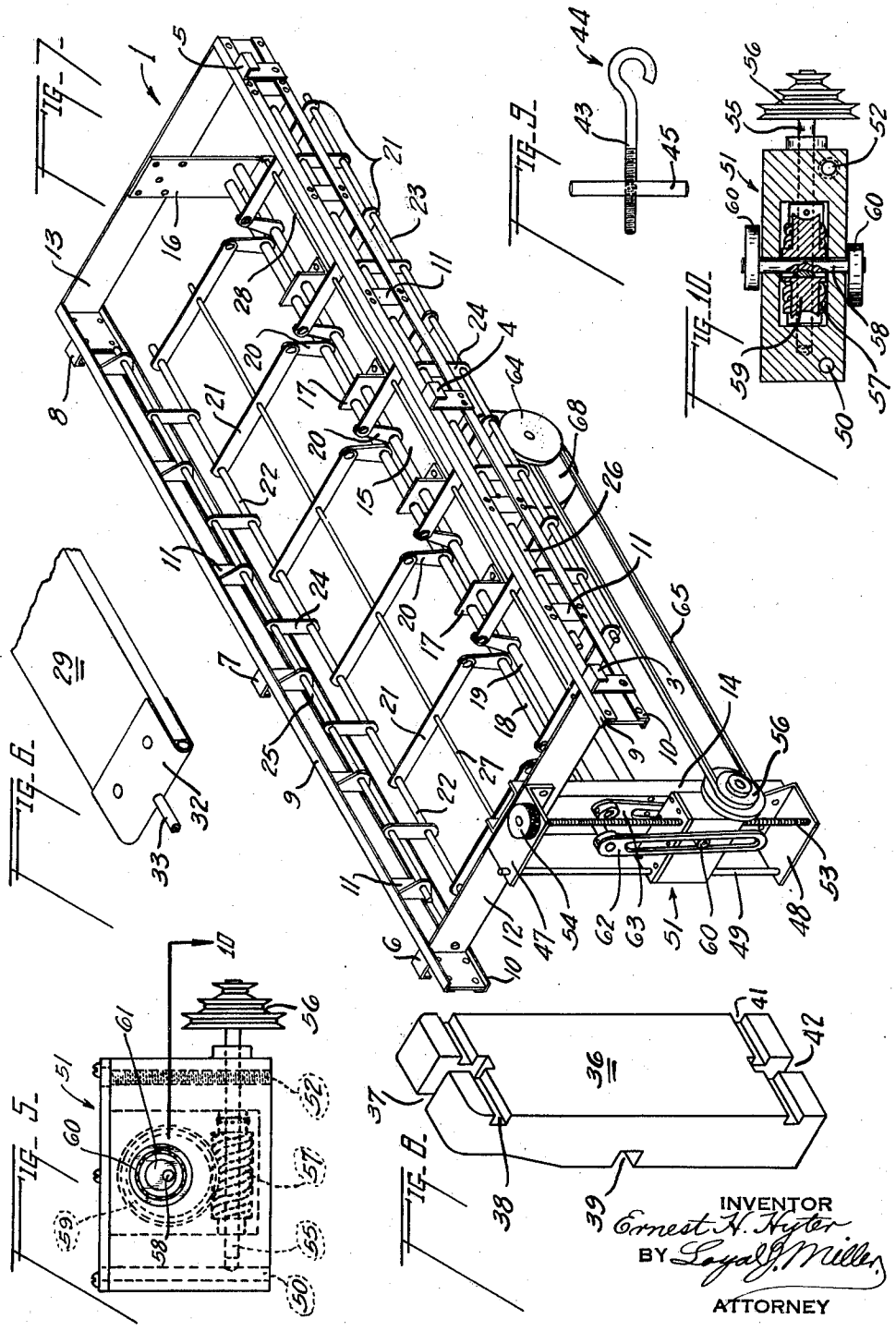
BY Edgar J. Miller

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MASSAGING APPARATUS

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UNITED STATES PATENT OFFICE

2,112,367

MASSAGING APPARATUS

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Application July 27, 1936, Serial No. 92,723

17 Claims. (Cl. 128—33)

My invention relates to a massaging apparatus.

The chief object of the invention is to provide an apparatus of this class which will massage, stimulate, and invigorate the human body without the exertion of effort on the part of the patient, and while the patient is in a relaxed prone or reclining position.

Other objects are to provide an apparatus of this class which will massage a greater portion of the body at one time than other apparatus presently in use; which provides a new vibratory movement for devices of this class; the vibratory movement of which may be varied both as to frequency and length of movement to suit the requirements of the individual patient; the supporting and massaging elements of which may be adjusted to accommodate the differing weights of the individual patients; the alternate massaging elements of which have a reciprocatory movement in opposite directions; the massaging elements of which are moved positively in both directions; which is power driven; which is comparatively compact, considering that it massages one entire side of the body at a time; which will thoroughly massage the entire body more completely and efficiently, and in much less time than devices presently in use; and, which will be efficient in accomplishing all the purposes for which it is intended.

Other objects of the invention, their results and advantages, will be apparent from the following description given in connection with the drawings, which are to be considered as illustrative only.

In the drawings:

Figure 1 is a perspective view of the assembled device showing the arrangement of the massaging tapes or belts on the rocker arms;

Fig. 2 is a plan view of a preferred type T-bolt used for adjustably attaching the ends of the massaging tapes to the upper ends of the rocker arms;

Fig. 3 is a perspective view of a preferred embodiment of one of the long rocker arms;

Fig. 4 is a sectional view of the operating structure supporting frame work, taken along the line 4—4 of Fig. 1 and shows particularly the relations of the massaging tape, long and short rocker arms, pitman arms, pivot rods, and tension springs;

Fig. 5 is an end view of the gear box assembled, the internal gears being shown in broken lines, one eccentric bearing being shown on the outside of the box;

Fig. 6 is a perspective view showing in detail the manner in which the adjusting T-bolts are secured to the massaging tapes;

Fig. 7 is a perspective view of the operating structure and supporting frame work, with the massaging tapes and rocker arms removed;

Fig. 8 is a perspective view of a preferred embodiment of one of the short rocker arms;

Fig. 9 is a plan view of one of the T-hooks used to anchor one end of each tension spring to the lower end of each short rocker arm; and,

Fig. 10 is a diagrammatic view of the gear and eccentric assembly taken from the top looking down through the gear box.

Like characters of reference designate like parts in all the figures.

It is understood that various changes in the form, proportion, size, shape, weight, material and other details of construction, within the scope of my invention may be resorted to without departing from the spirit or broad principle of my invention and without sacrificing any of the advantages thereof; and it is also understood that the drawings are to be interpreted as being illustrative and not restrictive.

The inventive idea involved is capable of receiving a variety of mechanical expressions one of which, for the purpose of illustrating the invention, is shown in the accompanying drawings.

The operating structure is supported in a rectangular frame designated as a whole by numeral 1 (Fig. 7), which in turn is supported between the two side members of a four posted bed like frame 2 (Fig. 1) by means of overhanging hooks 3, 4, 5, 6, 7 and 8. The side members of the frame 1 are each composed of two identical angle iron strips 9 and 10. The angle irons are spaced apart by means of spaced brackets 11 riveted to one side of each of the angle irons. The two side members composed of the angle irons 9 and 10 are themselves spaced apart by end pieces 12 and 13 suitably attached to the opposite ends of each side member. Substantially at the center of end piece 12 is riveted or otherwise secured the upper end of a wide channel iron upright 14. A wide channel iron center beam 15 has one of its ends riveted to the upright 14 and its opposite end suitably secured to and supported by an upright 16, the upper end of which is rigidly secured to the end piece 13.

On the upper surface of the center beam 15 a plurality of aligned journal brackets 17 are rigidly secured. The upright portion of each bracket carries two oppositely positioned perforations for journaling a pair of shafts 18 and 19, the oppo-

site ends of which pass through and are journaled in aligned perforations in the uprights 14 and 16.

To each shaft 18 and 19, there is welded or otherwise rigidly secured in a substantially upright position a plurality of arms 20. A like plurality of pitman bars 21 are provided, the inner end of each bar being pivotally connected to the free end of the arms 20; the opposite ends of the bars being pivotally connected to oppositely disposed identical rods 22 and 23. Each of these rods is pivotally connected to the lower ends of a plurality of links 24, the upper ends of which are in turn pivotally connected to a pair of oppositely disposed rods 25 and 26. The rods 25 and 26 are journaled in perforations in the spaced oppositely disposed brackets 11.

A pair of anchor rods 27 and 28 are carried in aligned perforations in the pitman bars 21, intermediate the ends of the bars, one rod being on each side of the center beam 15.

From Fig. 4 it will be seen that with the various parts arranged as described, as the shafts 18 and 19 are oscillated, the pitman bars 21 and the rods 22 and 23 will receive a reciprocatory movement. It will also be seen that by varying the relative oscillation of the two shafts 18 and 19, the relative reciprocatory movement of the opposed bars and rods will be varied. The purpose of this movement and the means for accomplishing it will be herein later described.

The massaging elements proper are a plurality of parallel tapes or belts 29 (Figs. 1, 4 and 6). To the opposite ends of each belt 29 is pivotally attached the cross bar portion 30 of a threaded T-bar 31, preferably by means of an overlapping metal strip 32 (Fig. 6), the opposite ends of which are riveted on opposite surfaces of the belt, the rivets passing through the belt. The strip is perforated near its center to admit the shank 33 of the T-bar. The T-bar is provided with an adjustable cross bar 34 which is perforated crosswise near its center and internally threaded.

To support the belts 29 between the side members of the frame 1, I provide a plurality of long rocker arms 35 (Fig. 3) and a plurality of short rocker arms 36 (Fig. 8). The upper end of each rocker arm is bifurcated as at 37 to receive the shank 33 of the T-bars 31. An intersecting shallow cross notch 38 is provided near the end of each rocker arm to seat the adjustable cross bars 34 of the T-bars 31, as shown in Figs. 1 and 4. Equidistant from the upper end of each rocker arm is a cross notch 39, on the side of the rocker arm opposite that on which the notch 38 is located. The notches 39 are adapted to receive either of the rods 25 or 26, which in turn serve as pivot points for the various rocker arms, in the manner shown in Fig. 4. The lower end of each long rocker arm has a notch 40, the purpose of which is to receive either of the rods 22 or 23, which when they reciprocate, rock the various long rocker arms back and forth about their pivots, rods 25 or 26.

The short rocker arms 36 each have a cross notch 41 near their lower ends, located on the same side of the arm as notch 38. Each is also bifurcated, as at 42, to receive the shank 43 of an adjustable hook 44. The notch 41 is for the purpose of seating the threaded cross bar 45 of the hook 44. A tension spring 46 is provided for each short rocker arm 36, one of its ends being anchored to the adjustable hook 44 and the other end being anchored to either the rod 27 or 28, depending on the location of the arm.

In assembling the massaging belts, rocker arms and springs on the structure shown in Fig. 7, a short rocker arm is always positioned opposite a long rocker arm, as in Fig. 4, the lower ends of the short rocker arms 36 being of a length to allow free movement of the rods 22 or 23 therebeneath. The long and short rocker arms are placed alternately side by side along each pivot rod 25 and 26, for the entire length of the frame 1, so that when the rods 22 and 23 move away from each other, the long rocker arms 35 on opposite sides of the frame 1 move alternate belts in opposite directions, at the same time causing the upper ends of the respective short rocker arms to move with the belts against the tension of the springs 46. As the rods 22 and 23 reverse their movement and move toward each other the springs 46 move the short rocker arms about their pivots, rods 25 and 26, thus moving the alternate belts in the opposite direction.

The means for oscillating the shafts 18 and 19 will now be described. On the outside of the end piece 12 at its center is welded or otherwise rigidly secured a bracket 47. A similar bracket 48 is also rigidly secured to the upright 14 near its lower end, the brackets being aligned vertically. A cylindrical guide rod 49 is vertically positioned between the two brackets and removably but rigidly secured therebetween in any suitable manner, preferably near the outer edge of each bracket. This rod passes either through a sleeve 50 formed in the side wall of a gear box designated as a whole by the numeral 51, or through suitably sized perforations in the top and bottom walls of the box. The rod thus serves as a guide for vertical movement of the box. A similar sleeve 52 is formed in an opposite wall of the gear box and is internally threaded to receive a threaded rod 53, the lower end of which is journaled in a suitable manner in the bracket 48, and the upper end of which extends through and is journaled suitably in the bracket 47. A thumb nut 54 is rigidly secured on the upper end of the rod 53, facilitating the turning of the rod in either direction, and the consequent raising or lowering of the gear box between the two brackets. The purpose of this raising and lowering movement will be herein later explained.

The gear box 51 is preferably made of bronze or other suitable bearing metal. Its opposite walls journal a shaft 55, one end of which protrudes from the gear box and carries a three size multiple groove V-belt pulley 56. Intermediate its ends and between the journaling walls of the gear box, the shaft 55 carries a worm drive gear 57, which is keyed or otherwise rigidly secured thereto. Thrust washers (not shown) may be provided at each end of the gear 57 to prevent end play. Above the shaft 55 and at right angles thereto is a second shaft 58 which is journaled in the intermediate opposite walls of the gear box, and both ends of which extend outside the gear box. On the portion of the shaft between the journaling side walls the shaft 58 carries a worm wheel 59 which is rigidly secured thereto, and which meshes with the worm gear 57.

As eccentrics 60 I prefer to use an ordinary ball and race assembly into the center of which is pressed or otherwise rigidly secured a circular plug 61 (Fig. 5) which has an off center perforation, through which an end of the shaft 58 protrudes. The plug 61 is keyed or otherwise rigidly secured to the shaft 58. One of these ec-

centrics 60 is secured to each end of the shaft 58, the eccentric plugs differing in their position on the shaft preferably by 180°, as shown in Fig. 10.

To transmit an oscillatory movement to the shafts 18 and 19 I employ a pair of yokes 62 and 63 each having an integral cylindrical collar at one end. The shaft 18 is longer than the shaft 19 and its end extends to a point substantially in alignment with the outer eccentric 60. Likewise the end of the shaft 19 terminates at a point substantially in vertical alignment with the eccentric on the opposite or inner end of the shaft 58. The collared end of the yoke 62 is keyed or otherwise rigidly secured to the end of shaft 18, and the yoke 63 is likewise secured to the end of shaft 19, each yoke extending downward in alignment with the eccentrics 60 on each side of the gear box. The longitudinal slot in each yoke affords a sliding passageway for each eccentric. The eccentrics 60, as they are rotated, force the yokes 62 and 63 to and fro thus oscillating the shafts 18 and 19.

It will be readily seen that the raising or lowering of the gear box 51 will cause the eccentrics 60 to contact the yokes 62 and 63 at a higher or lower point, thus either increasing or decreasing the limits of oscillation of the shafts 18 and 19, which movement in turn governs the limit of movement of the massaging tapes or belts 29.

The power unit for driving the shaft 55 is preferably an electrical motor 68 equipped with a three size multiple groove V-belt drive pulley 64 having a speed of approximately 1500 to 1750 R. P. M. This motor may be secured to the frame 1 at any desired point, preferably near the longitudinal center of the frame so that the gear box may be raised or lowered while the V-belt 65 is in position over both pulleys with little effect on the center to center distance between the pulleys. If desired the motor base may be slidably mounted to afford belt adjustment. The pulleys 56 and 64 are identical in size but are assembled in reverse relation, the smaller unit of the pulley 64 being in alignment with the larger unit of the pulley 56, and vice versa. This arrangement permits a reduction or increase in the speed of the shaft 55, if desired, with relation to the revolving speed of the pulley 64.

From the description thus far it will be seen that the operating structure frame 1, illustrated in Fig. 7, together with the belts 29, rocker arms 35 and 36, and springs 46 in assembled position thereon as described, constitutes a complete unit removable as a whole from the supporting frame 2. In assembling the device this unit is simply placed in position in the frame 2, and is supported therein by the hooks 3, 4, 5, 6, 7 and 8. A flexible foot rest 66 and a flexible head rest 67 are suitably secured crosswise on the frame 2 at either end. These rests serve not only for supporting the head and feet of an individual using the apparatus, but also to cover that portion of the device not equipped with belts. If desired they may be placed in a plane lower than the plane in which the belts lie, so that pillows may be placed on them without raising the head or foot level. The rod 53 may be extended through the rest 67 as shown, if desired.

In operation the individual assumes a prone position across the belts 29 and longitudinally of the complete device. If it is desired to massage only a particular portion of the body, that portion is placed next the massage belts. It is assumed, of course, that all the springs 46 have been adjusted for tension to suit the weight of the individual taking the treatment. This adjustment is made by removing the various hooks 44 from their positions in the bifurcated lower ends of the short rocker arms 36, and screwing the threaded cross bars 45 in a direction to either increase or decrease the spring tension as desired. An additional adjustment is, of course, possible by treating the cross bars 34 of the T-bars 31 in a similar manner. Experience is the only method of determining the proper spring tension for any particular weight. Particular spring tension adjustments will ordinarily be necessary only for extremely heavy or extremely light individuals.

After the proper adjustment of spring tension has been made, the belt 65 is placed in the desired grooves on the pulleys 56 and 64. If a slower motion is desired the larger groove of the pulley 56 and the smaller groove of the pulley 64 are used. The thumb nut 54 is now adjusted to either lower the gear box 51 thus shortening the stroke of the belts, or to raise the gear box, lengthening the strokes of the belts. Ordinarily a fleshy person will receive more benefit from a longer belt stroke, while a more slender individual might be made uncomfortable by the longer stroke, and would require a short stroke. It will also be readily understood that as the length of stroke is reduced, the frequency or rapidity of reciprocation of the belts may be increased. In practice the length of stroke is adjustable between $\frac{1}{16}$'' and $\frac{1}{2}$'', and the frequency of reciprocation is adjustable between 125 and 200 per minute. These ranges can of course be varied without changing the principle of the invention.

I also wish to call attention to the fact that with the structure described it is possible to impart various combinations of movement to the various massaging belts. If desired the belts may be made to reciprocate in alternate pairs, simply by a rearrangement of the long and short rocker arms. Also if desired any of the belts or any combination of them may be made to remain stationary while other belts reciprocate, simply by employing short rocker arms and tension springs to support both ends of those particular belts, in which case no movement is imparted by the moving rods 22 or 23.

With all the adjustments made as desired the motor 68 is turned on and a reciprocating motion is transferred to the belts 29, alternate belts moving in opposite directions as previously described. The reciprocating belts, when moving at high speed, have a vibratory effect on the body, and when moving at slow speed have massaging effect. When a sufficient treatment has been given one part of the body, the individual simply rolls partially over and brings another portion of the body into contact with the belts. When the belts are moving at slow speed and at their maximum stroke a "pulling" or stretching action is exerted on the skin, which action produces almost complete relaxation of the muscles of the body. The fact that the entire weight of the body is supported by the device, and that no effort is required on the part of the individual taking the treatment, makes it possible for my apparatus to produce much more complete relaxation, and consequently much better results for the individual. Also these results are produced in much less time then they can be produced by present known apparatus.

While I have described and illustrated a specific embodiment of my invention I am aware

that numerous alterations and changes may be made therein, and I do not wish to be limited except by the prior art and the scope of the appended claims.

I claim:

1. In an apparatus of the class described, a plurality of closely adjacent parallel elements adapted to support the human body; means for movably supporting each of said elements at its extremities; means for imparting a positive reciprocatory movement to selected elements; means for simultaneously imparting a different positive reciprocatory movement to other selected elements; and a frame for supporting the entire structure thus described.

2. In an apparatus of the class described, a plurality of closely adjacent parallel flexible elements adapted to support the human body; means for supporting each of said elements at its extremities; means for imparting a positive reciprocatory movement to some of the elements; means for simultaneously imparting a different positive reciprocatory movement to others of the elements; and a frame for supporting the entire structure thus described.

3. In an apparatus of the class described, a plurality of adjacent parallel horizontally disposed elements adapted to support the human body; means for movably supporting each of said elements at its extremities; means for imparting a similar positive reciprocatory movement to selected ones of the elements; means for simultaneously imparting a different positive reciprocatory movement to others of the elements; and a frame for supporting the entire structure thus described.

4. In an apparatus of the class described, a plurality of horizontally disposed flexible elements arranged side by side in the same plane and adapted to support the human body; means for supporting each of said elements at its extremities; means for imparting a positive reciprocatory movement to alternate elements; means for simultaneously imparting an opposite positive reciprocatory movement to the remaining elements; and a frame for supporting the entire structure thus described.

5. In an apparatus of the class described, a plurality of adjacent parallel flexible elements adapted to support the human body; means for adjustably supporting each of said elements at its extremities; means for imparting a positive reciprocatory movement to selected elements; means for simultaneously imparting an opposite positive reciprocatory movement to other selected elements; and a frame for supporting the entire structure thus described.

6. In an apparatus of the class described, a plurality of adjacent parallel horizontally disposed elements adapted to support the human body; means for adjustably supporting each of said elements at its extremities; means for imparting a positive reciprocatory movement to selected elements; means for simultaneously imparting a different positive reciprocatory movement to other selected elements; and a frame for supporting the entire structure thus described.

7. In an apparatus of the class described, a plurality of horizontally disposed flexible elements arranged side by side in the same plane, and adapted to support the human body; means for adjustably supporting each of said elements at its extremities; means for imparting a positive reciprocatory movement to selected elements; means for simultaneously imparting an opposite positive reciprocatory movement to other selected elements; and a frame for supporting the entire structure thus described.

8. In an apparatus of the class described, a plurality of adjacent parallel flexible elements adapted to support the human body; means for removably supporting each of said elements at its extremities; means for imparting a positive reciprocatory movement to alternate elements; means for simultaneously imparting an opposite positive reciprocatory movement to the remaining elements; and a frame for supporting the entire structure thus described.

9. In an apparatus of the class described, a plurality of adjacent parallel elements for upholding the human body; means for adjustably and removably supporting each of said elements at its extremities; means for imparting a positive reciprocatory movement to alternate elements; means for simultaneously imparting an opposite positive reciprocatory movement to the remaining elements; and a frame for supporting the entire structure thus described.

10. In an apparatus of the class described, a plurality of adjacent parallel elements for upholding the human body; means for movably supporting each of said elements at its extremities; means for imparting a similar positive reciprocatory movement to any desired combination of the elements; means for simultaneously imparting an opposite positive reciprocatory movement to any desired combination of the elements not included in said first combination; and a frame for supporting the entire structure thus described.

11. A massaging apparatus comprising a bed-like frame, a plurality of massaging elements supported therein for reciprocable movement with respect thereto, means for reciprocably moving a number of said elements with respect to said frame, and means for reciprocably and simultaneously moving the balance of said elements with respect to said frame in a direction opposite to the movement of said first mentioned number of elements.

12. A massaging apparatus including a frame, a plurality of massaging elements movably supported therein, and means for reciprocably moving said massaging elements with respect thereto comprising: a pair of adjacent parallel rock shafts centrally journaled between the ends of said frame; a plurality of lever arms rigidly secured to each shaft; a pair of rods, each secured parallel and adjacent to one side member of said frame; a plurality of rocker arms pivoted on each of said rods, each rocker arm having its upper end attached to one of said massaging elements; a rod connecting the lower ends of the rocker arms located on each side of said frame; a plurality of spaced pitman arms each having one of its ends pivotally connected to one of said lever arms and its other end pivotally connected to one of said rods; a yoke rigidly secured to one end of each of said rock shafts; a rotatable eccentric slidably engaged by each yoke; and a motor for rotating the eccentrics; whereby the eccentrics oscillate the rock shafts, which motion is transmitted through the lever arms, pitman arms and rocker arms to the massaging elements.

13. A massaging apparatus including a frame, a plurality of massaging elements supported therein, and means for reciprocably moving said massaging elements with respect thereto comprising: a motor; a pair of eccentrics driven by said motor; a yoke for each eccentric; a pair of

parallel shafts adapted to be oscillated by said yokes as the eccentrics are rotated therein; spaced levers rigidly secured to each shaft; a plurality of rocker arms pivotally mounted side by side adjacent each side of said frame, each adapted to support one end of one of said massaging elements; and pitman arms connecting said levers and the lower ends of said rocker arms.

14. A massaging apparatus including a frame; a plurality of massaging elements movably supported therein; a motor; a plurality of reciprocably movable members driven by said motor and supported in said frame, and driving connections between said reciprocably movable members and said massaging elements including a plurality of rocker arms pivotally mounted along each side of said frame; the upper ends of said rocker arms serving to support said massaging elements.

15. A mechanical movement comprising a driving member consisting of a pair of oppositely disposed eccentrics mounted rigidly on a single shaft, a plurality of reciprocably driven members, and interposed mechanism including: a yoke for each eccentric; a rock shaft rigidly secured to one end of each yoke; spaced outstanding lever arms rigidly secured to each shaft; two groups of oppositely disposed rocker arms, each group mounted on a common pivot rod, the upper ends of each group secured to and supporting opposite ends of said plurality of driven members, the lower ends of predetermined ones of each group being locked together for simultaneous rocking movement; and pitman arms connecting the lower ends of the locked rocker arms of each group with the lever arms on the adjacent rock shaft.

16. A massaging apparatus including a frame, a plurality of crosswise elements movably supported therein and adapted to support the human body, and means for reciprocating various ones of said elements in different directions at different times.

17. A massaging apparatus including a frame; a plurality of massaging elements for supporting the human body; a plurality of rocker arms pivotally mounted on said frame, the upper end of each of said rocker arms supporting one end of one of said massaging elements; and means for rocking various ones of said rocker arms in different directions about their pivots including a power unit, a shaft driven thereby, and operative connections between said shaft and the lower ends of various ones of said rocker arms including an eccentric yoke for said shaft.

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