May 17, 1960 E. MANDL ET AL 2,936,754

BODY EXERCISING AND RELAXING DEVICE

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Fig. 1.

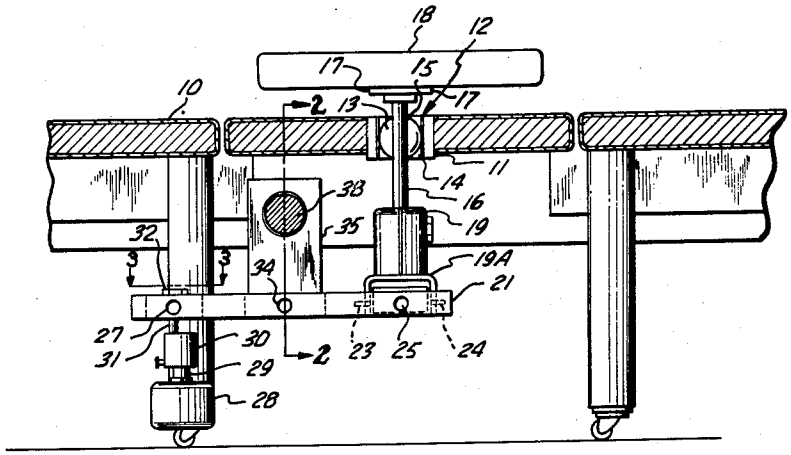


Fig. 2.

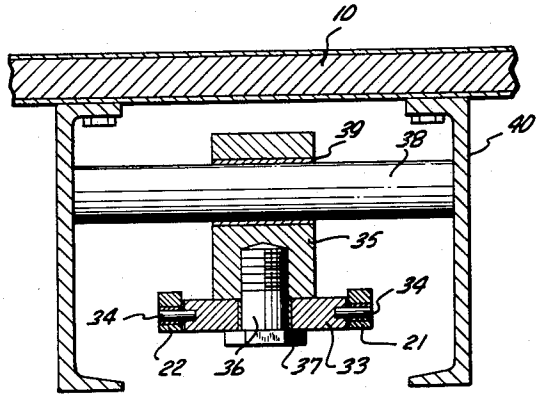
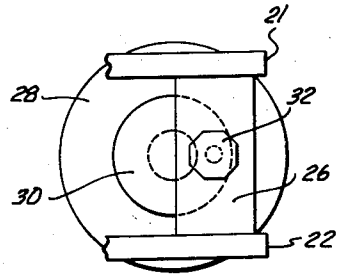


Fig. 3.



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Fig. 4.

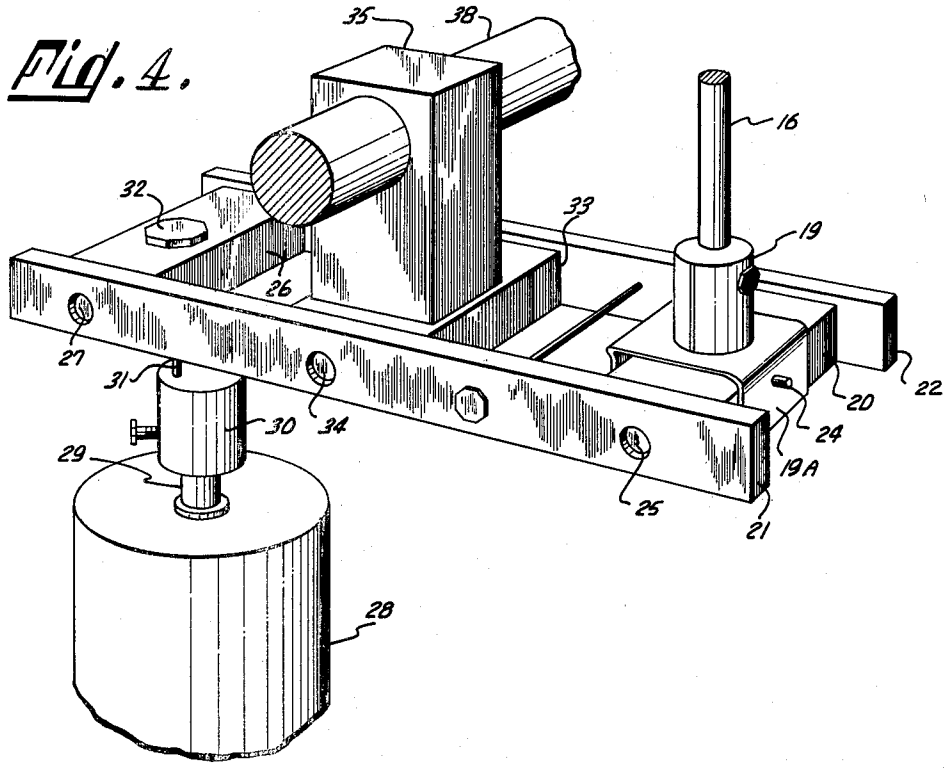
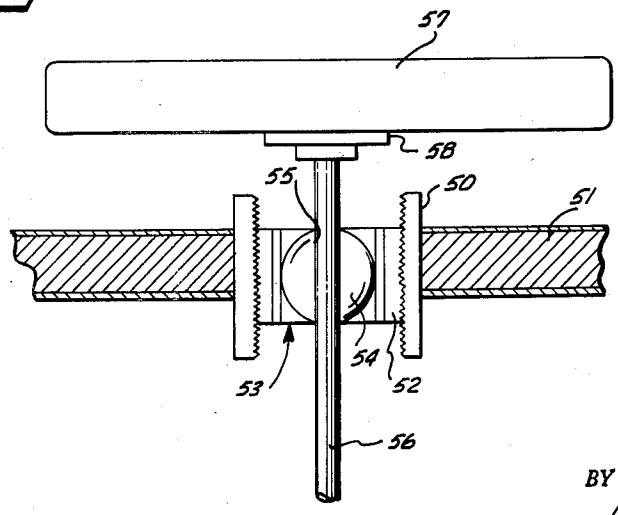


Fig. 5.



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BODY EXERCISING AND RELAXING DEVICE

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Application July 14, 1958, Serial No. 748,334

6 Claims. (Cl. 128—33)

This invention relates to a body exercising and relaxing device.

The induced motion of the body of a person by a surface contacting portions of the body and moving such portions provides marked stimulation of the circulation system and musclar relaxation. The massaging effect and overall body motion produced by the moving surface acts to increase blood flow and muscular activity, whereby blood circulation is increased and muscular tone is improved. Other benefits, such as posture improvement, loss of excess fatty tissue, elimination of accumulated toxins and relief of nerve and muscle tensions, are also gained through consistent use of a device producing body motion and massaging action.

The extent of these benefits is, however, dependent upon the type and intensity of the motion with which the body is massaged and set in motion. The complex muscular and circulatory systems of the human body are such that optimum results are achieved where the massaging effect is produced by an oscillating multidirectional motion. Such a motion not only reduces the time within which the desired results are obtained but further acts to combine all the benefits attainable through passive body motion into one operation.

The present invention provides a device whereby the motion of an oscillating surface is imparted to portions of the body directly in contact with the surface. Furthermore, the motion of the oscillating surface is such that other parts of the body, not in direct contact with the surface, are also set in motion to a somewhat lesser degree.

The present invention is a body exercising and relaxing device having a supporting structure and means fitted in the supporting structure for permitting universal tilting motion. A vertical shaft is slidably fitted through the means fitted in the supporting structure and has a platform joined to its top end. A motion generating means is adapted to connecting means so that the connecting means, being joined at one end to the bottom end of the vertical shaft, drives the shaft to produce a cyclic undulation of the platform. Means are joined to the connecting means for superimposing an upward and downward movement of a portion of the platform upon each cyclic undulation.

The effect produced by the moving platform of the device according to the invention is such that the long, short and diagonal muscles of the body are simultaneously placed in action in one operation, whereby muscular tensions are relieved and muscles are activated. In one embodiment of the device, means are provided whereby the intensity of the oscillations may be adapted to the needs of the person employing the device. The body exercising and relaxing device of the invention possesses the further advantage that its construction is simple and readily repairable so that it is readily maintained when in home use.

The body exercising and relaxing device according to the present invention, together with its advantages, will be more clearly understood from the following description

made in conjunction with the accompanying drawings in which:

Fig. 1 is a fragmentary elevation, partially sectioned, of one embodiment of the body exercising and relaxing device according to the invention;

Fig. 2 is a view taken generally along line 2—2 of Fig. 1;

Fig. 3 is a view taken along line 3—3 of Fig. 1;

Fig. 4 is a fragmentary perspective view of the embodiment shown in Fig. 1; and

Fig. 5 is a fragmentary elevation of a modification of the device according to the invention.

With reference to Figs. 1, 2, 3 and 4, one embodiment of the body exercising and relaxing device according to the invention comprises a substantially rectangular table top **10** supported by a framework adapted to maintain the top a suitable distance from a floor. The table top has a length several times its width so that it may conveniently accommodate the human form. The device may readily be designed so that it is a decorative article of furniture which may be covered with a suitable fabric and appear in the form of a couch.

At a generally central point in the table top, a bushing **11** is fitted through the table top. Within the bushing a universal bearing **12** is fixed. The universal bearing comprises a rotatable ball **13** retained within a housing **14** having an opening in both its top and bottom. The housing permits rotation of the ball through all planes but prevents vertical or horizontal movements of the ball itself. A suitable bearing surface is provided between the inner surfaces of the housing and the ball. A central bore **15** extends diametrically through the ball.

A vertical platform shaft **16** is fitted slidably through the central bore of the ball in the universal bearing. At its upper end the platform shaft is joined by means of a flange **17** to a rectangular platform **18**. The platform is positioned above the plane of the table top at an elevation such that a person can lie on the table and have a portion of his body supported by the platform without discomfort. The platform may be cushioned to provide a comfortable resting surface. The dimensions of the platform are adapted to provide an area suitable to produce a massaging effect on selected portions of the body. For example, the dimensions of the platform in the preferred embodiment of the device are approximately 10" by 15".

The bottom portion of the platform shaft is rigidly held within a sleeve **19** having joined to its bottom a clevis or yoke **19A**. The yoke is joined to a first cross-bar **20** fitted transversely between the ends of two horizontally spaced-apart linkage arms **21, 22** extending in parallel along the longitudinal axis of the table top. Two trunnions **23, 24**, projecting from opposite transverse sides of the cross-bar, provide an axle on which the opposite sides of the yoke are rotatably fitted. In this manner, the platform shaft may be tilted transversely with respect to the longitudinal axis of the linkage arms.

The first cross-bar is fitted with axle projections **25** which are journaled at opposite sides of the cross-bar into bearing surfaces mounted in the two linkage arms. The trunnions and the axle projections of the cross-bar act in conjunction as a universal joint for the platform shaft since the shaft may be tilted in two directions along each of two separate axes.

At the end of the linkage arms opposite to the first cross-bar, the parallel linkage arms are separated by a second cross-bar **26**. The second cross-bar is similar to the first cross-bar and is fitted with axle projections **27** which are journaled at opposite sides of the cross-bar into bearing surfaces mounted in the two linkage arms.

An electric motor **28**, used in the preferred embodiment as a driving means, is mounted so that an armature shaft **29** projects vertically from the motor at a

point below the second cross-bar. In the preferred embodiment, electric motor 28 is fixed to the framework providing support for table top 10. The top end of the armature shaft is fitted within a disc 30 having a diameter greater than the diameter of the armature shaft. An eccentric shaft 31 is keyed in an off-center position to the top surface of the disc. The other end of the eccentric shaft is journaled in a bearing surface mounted in a generally central position in second cross-bar 26. A cap 32 is fitted to the top end of the eccentric shaft projecting above the top surface of the cross-bar. The rotary motion of the armature shaft is transmitted by the eccentric shaft to the linkage arms and is translated into reciprocating longitudinal and lateral movements of the linkage arms. It can be readily seen that the degree of longitudinal and lateral movement is governed by the distance by which the eccentric shaft is off-centered from the armature shaft.

Between the first and second cross-bars, a third cross-bar 33 is fitted with axle projections 34 journaled at opposite sides of the cross-bar in bearing surfaces mounted in the two linkage arms. As particularly shown in Fig. 2, a rocker arm 35 is joined to the upper surface of the third cross-bar by a bearing shaft 36 threaded at one end into the lower portion of the rocker arm. The bearing shaft is journaled in bearing surfaces located in a centrally located bore in the third cross-bar. In this manner, the rocker arm may be swiveled with respect to the cross-bar. A cap 37 is fitted to the bottom portion of the bearing shaft projecting below the bottom surface of the cross-bar. A rocker arm shaft 38 passes through a bore 39 positioned in the rocker arm transversely to the longitudinal axis of the linkage arms whereby the rocker arm is rotatable with respect to the shaft. The opposite ends of the shaft are rigidly supported by a bracket 40 depending from the bottom of the table top.

The oscillations of the platform of the body exercising and relaxing device of the present invention will be understood from the following description of its operation. The bottom end of the platform shaft is joined to the linkage arms so that the bottom end moves responsive to movements of the linkage arms. The universal bearing through which the shaft intermedially passes restrains horizontal movements of that portion of the shaft and therefore acts as a fulcrum. The movements of the upper end of the shaft, to which the platform is rigidly fixed, accordingly are opposite in direction to those of the bottom end of the shaft.

The linkage arms are driven responsive to the rotation of the eccentric shaft on disc 30. The longitudinal and lateral components of each ninety degrees of rotation of the eccentric shaft produce a resultant displacement of the linkage arms and, as a result, of the bottom end of the platform shaft. Each quadrantal rotation of the eccentric shaft, during the course of one complete rotation, produces a directionally-different resultant displacement of the bottom end of the platform shaft. Consequently, a different corner of the platform is dipped downwardly as the eccentric shaft rotates through each of the four quadrants. Furthermore, if the position of of a given corner of the platform is considered as a point, the locus of the point as the eccentric shaft makes a complete rotation would describe a square as the result of the lateral and longitudinal displacements of the point. The successive dipping of the four corners of the platform together with its lateral and longitudinal displacements are referred to, for convenience, as the undulation of the platform.

The maximum longitudinal displacement of the linkage arms occurs when the eccentric shaft is rotated 180° from its position as shown in Fig. 1. The effect of the rocker arm is to produce an upward movement of the end of the linkage arms to which the platform shaft is attached. This upward movement is pivoted on cross-bar 26. As a result, a side of the platform transverse to the longitudinal axis of the linkage arms is elevated and depressed during each complete rotation of the eccentric shaft.

During each complete rotation of the eccentric shaft, therefore, the corners of the platform are successively dipped downwardly while the platform is longitudinally and laterally displaced. In addition, an elevating and depressing of each transverse side of the platform is superimposed. The combined effect of these motions of the platform is to produce an oscillating multidirectional action which is extremely effective for purposes of massaging.

With reference to Fig. 5, a modification of the embodiment shown in Figs. 1 through 4 is shown. An internally-threaded sleeve 50 is fitted through a table top 51 at a generally central point. A bushing 52 is externally threaded to mate with the threads of the sleeve so that the bushing may be positioned at any vertical height within the sleeve. The bushing is adapted to house a universal bearing 53 comprising a rotatable ball 54 having a central bore 55. The universal bearing is identical to the one described in conjunction with the embodiment shown in Figs. 1 through 4. A vertical shaft 56, joined at its upper end to a platform 57 by means of a flange 58, is adapted at its bottom end (not shown) to be driven by drive means in a manner identical to that described in conjunction with the embodiment shown in Figs. 1 through 4. By means of this modification of the invention, the vertical position of the universal bearing within the sleeve can be adjusted to vary the length of the platform shaft which protrudes above the bearing. In this manner an easily-adjustable means for adjusting the intensity of the vibrations of the platform is provided. The utility of the body exercising and relaxing device is thereby increased, particularly for home use.

It is readily apparent that other modifications in the body exercising and relaxing device according to the invention may be made within the scope of the invention. For example, the rocker arm may be positioned at one end of the linkage arms with the eccentric shaft coupled to a cross-bar located at a point longitudinally between the rocker arm and the platform shaft. This modification would affect the extent to which a transverse side of the platform is raised and lowered without affecting the undulation of the platform.

Furthermore, it is apparent that variations in the intensity of the oscillations of the platform may be achieved by varying the relationship between certain physical dimensions. The maximum longitudinal and lateral displacements of the linkage arms are controlled by the distance by which the eccentric shaft is off-centered on the disc. The relationship of this off-center distance to the length of rocker arm affects the extent to which the transverse side of the platform is raised. These modifications produce variations in degree only and do not change the basic oscillations of the platform. It is further apparent that it is within the scope of the invention to orient the longitudinal axis of the linkage arms relative to the longitudinal axis of the table top so as to obtain any desired relationship between the principal axis of platform motion and the user's body.

We claim:

1. A body exercising and relaxing device comprising a supporting structure, means fitted in the supporting structure for permitting universal tilting, a vertical platform shaft slidably fitted through said means to project above the supporting structure, a platform joined to the projecting end of the platform shaft, motion-generating means fixed to the supporting structure, connecting means joined at one end to the bottom end of the platform shaft, means joining the motion-generating means to the other end of the connecting means and adapted to displace said connecting means laterally and longitudinally and thereby to produce a cyclic undulation of the platform,

and means joined to the connecting means to pivot longitudinal displacements of the connecting means and thereby to produce alternately upward and downward movements of opposite lateral portions of the platform upon each cyclic undulation.

2. A body exercising and relaxing device comprising a supporting structure, means fitted in the supporting structure for permitting universal tilting, a vertical platform shaft slidably fitted through said means to project above the supporting structure, a rectangular platform joined to the projecting end of the platform shaft, motion-generating means fixed to the supporting structure, connecting means joined to the bottom end of the platform shaft, means joining the motion-generating means to the other end of the connecting means and adapted to displace said connecting means laterally and longitudinally and thereby to produce cyclically successive dipping of each of the corners of the platform coneurrently with alternating lateral and longitudinal displacements thereof, and means joined to the connecting means to pivot longitudinal displacements of the platform and thereby cyclically produce alternately upward and downward movements of opposite lateral sides of the platform.

3. A body exercising and relaxing device comprising a supporting structure, means fitted in the supporting structure for permitting universal tilting, a vertical platform shaft slidably fitted through said means to project above the supporting structure, a platform joined to the projecting end of the platform shaft, motion-generating means including a vertical rotatable drive shaft, said motion-generating means being fixed to the supporting structure, an eccentric shaft joined to the drive shaft in an off-center position, horizontal connecting means separately joined to the eccentric shaft and bottom end of the platform shaft respectively, whereby the connecting means is laterally and longitudinally displaced during each rotation of the eccentric shaft, and means joined to the horizontal connecting means to pivot longitudinal displacements thereof and thereby produce an upward and downward movement of one end of the connecting means during each rotation of the eccentric shaft.

4. A body exercising and relaxing device comprising a supporting structure, a housing fitted in the supporting structure, said housing retaining a ball having a central bore and rotatable within the housing, a vertical platform shaft slidably fitted through the bore in the ball,

a platform joined to the top end of the platform shaft, motion-generating means including a vertical rotatable drive shaft, an eccentric shaft joined to the drive shaft in an off-center position, horizontal connecting means separately joined to the eccentric shaft and bottom end of the platform shaft respectively, whereby the connecting means is laterally and longitudinally displaced during each rotation of the eccentric shaft, and means joined to the horizontal connecting means to pivot longitudinal displacements thereof and thereby produce an upward and downward movement of one end of the connecting means during each rotation of the eccentric shaft.

5. Apparatus in accordance with claim 4 wherein the means joined to the horizontal connecting means is a rocker arm joined at its bottom end to the connecting means at point between the eccentric shaft and the platform shaft and mounted at its upper end to be pivotable with relation to an axle fixed to the supporting structure.

6. A body exercising and relaxing device comprising a supporting structure, an internally-threaded sleeve fitted in the supporting srtucture, a housing externally-threaded to be adjustable in vertical position within the sleeve, said housing retaining a ball having a central bore and rotatable within the housing, a vertical platform shaft slidably fitted through the bore in the ball, a platform joined to the top end of the platform shaft, motion-generating means including a vertical rotatable drive shaft, an eccentric shaft joined to the drive shaft in an off-center position, horizontal connecting means separately joined to the eccentric shaft and bottom end of the platform shaft respectively, whereby the connecting means is laterally and longitudinally displaced during each rotation of the eccentric shaft, and means joined to the horizontal connecting means to pivot longitudinal displacements thereof and thereby produce an upward and downward movement of one end of the connecting means during each rotation of the eccentric shaft.

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