Sept. 12, 1933. F. G. FOLBERTH ET AL 1,926,844

EXERCISER

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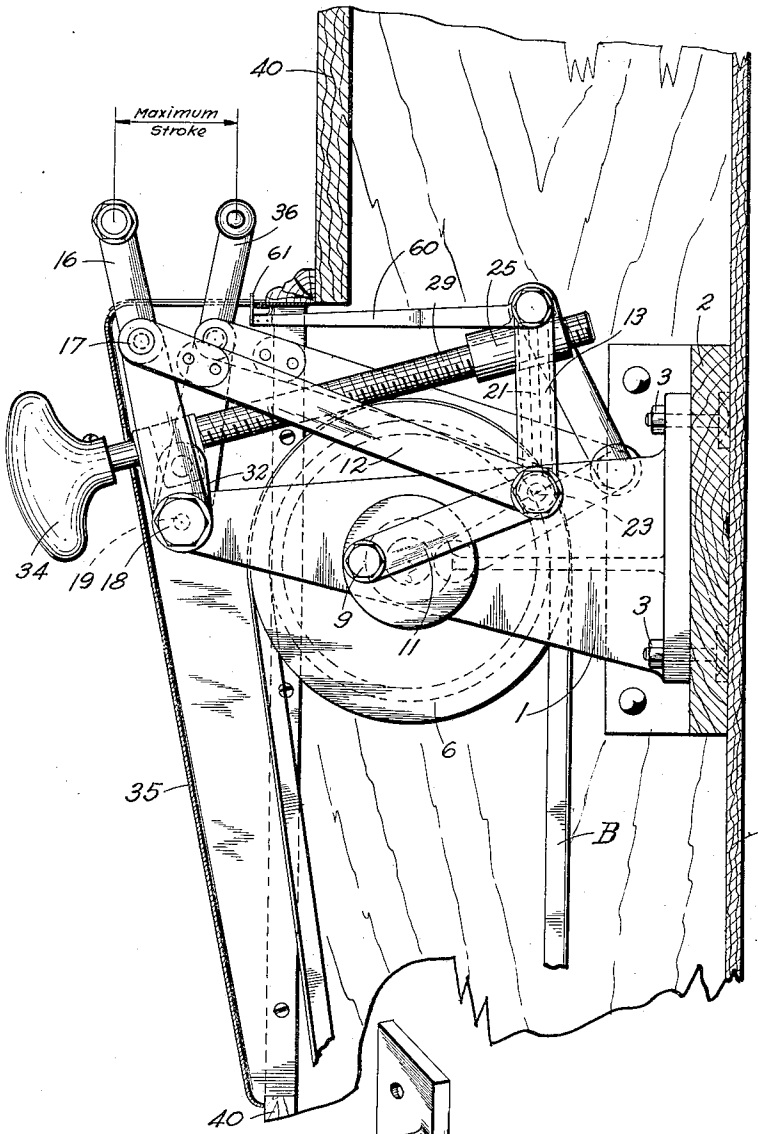


Fig. 1

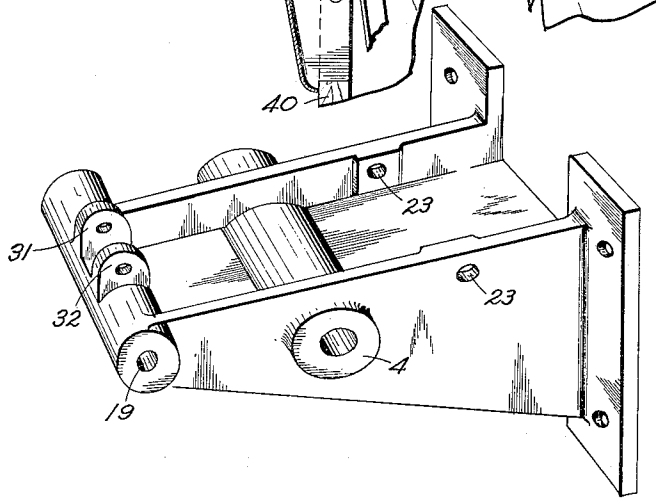


Fig. 2

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Fig. 4

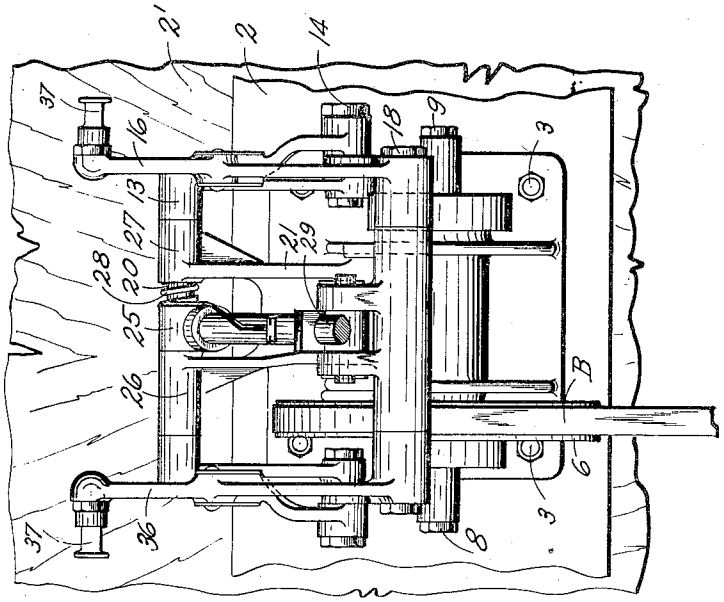
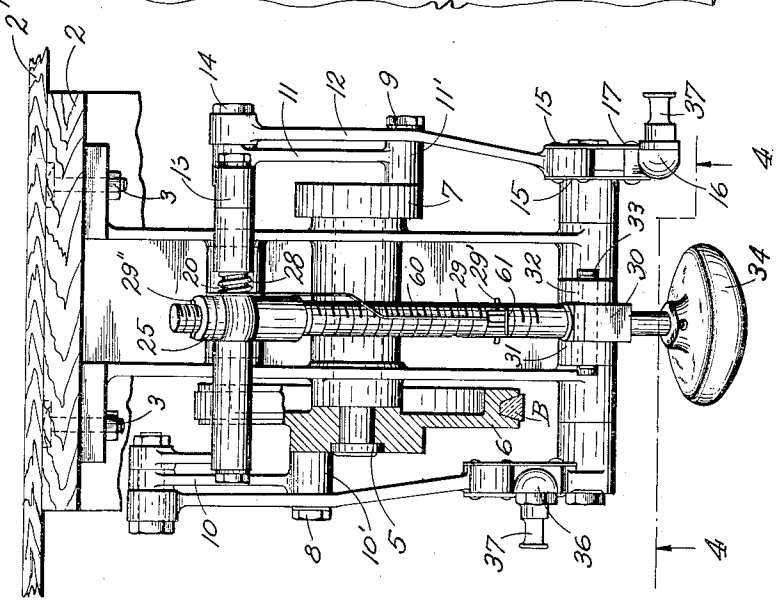


Fig. 3



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EXERCISER

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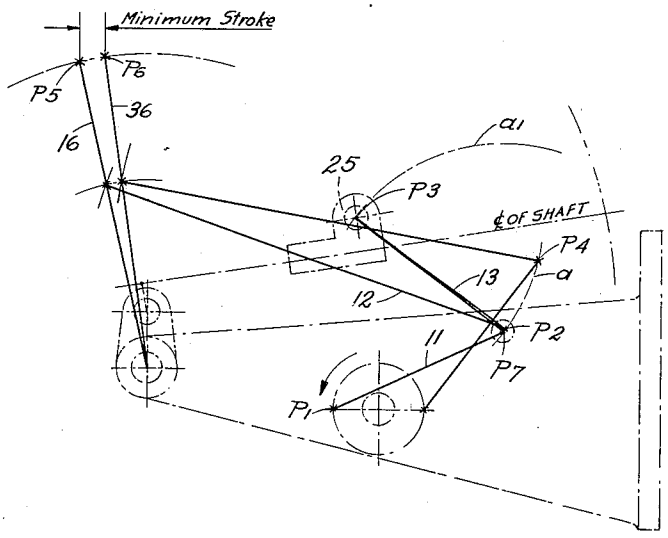


Fig. 5

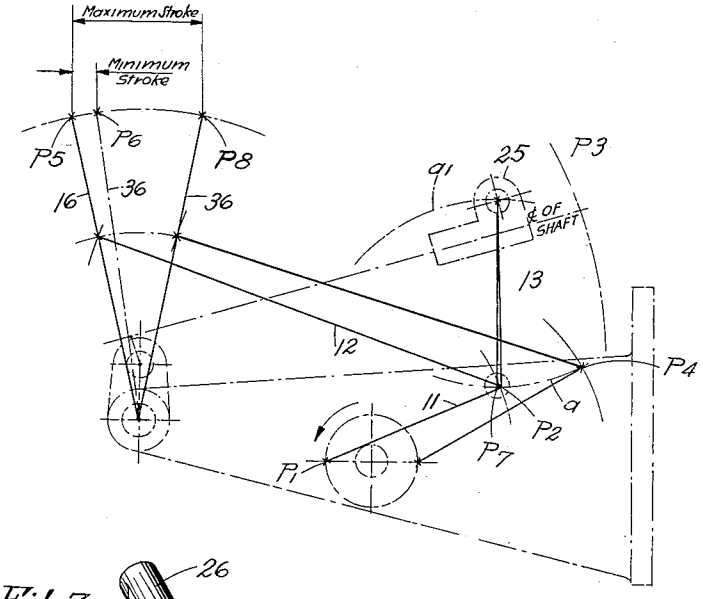


Fig. 6

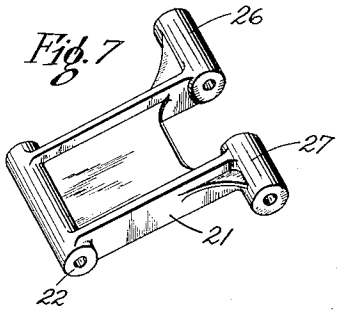


Fig. 7

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EXERCISER

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Fig. 8

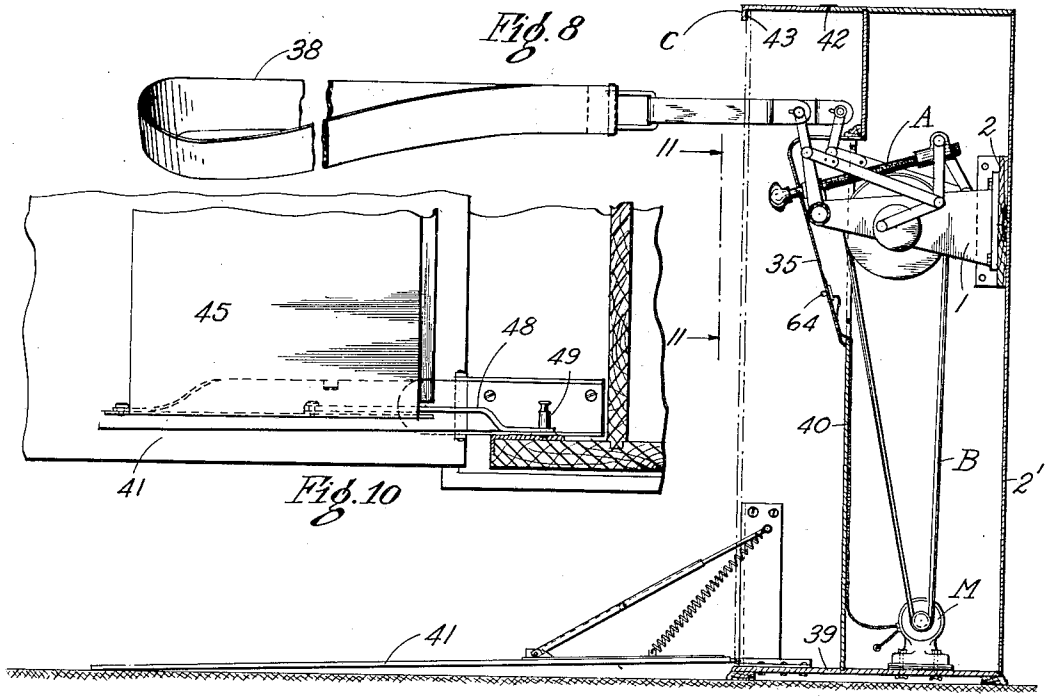
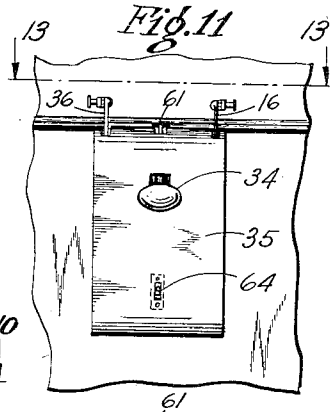


Fig. 10

Fig. 11



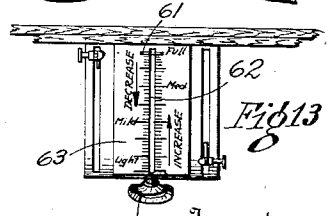


Fig. 13

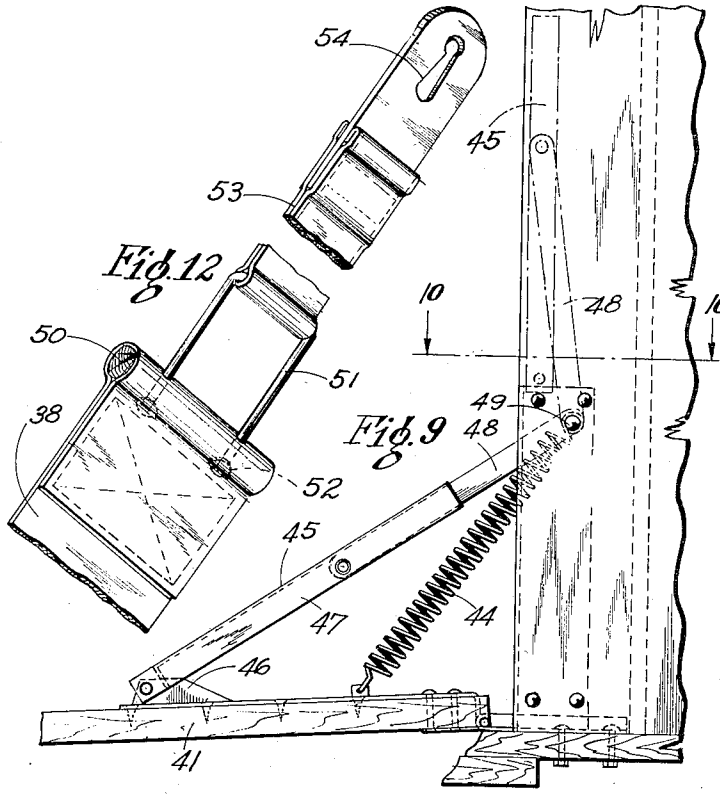


Fig. 12

Fig. 9

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UNITED STATES PATENT OFFICE

1,926,844

EXERCISER

Frederick G. Folberth and William M. Folberth,
Cleveland, Ohio

Application April 23, 1930. Serial No. 446,540

8 Claims. (Cl. 128—63)

This invention pertains to an exercising machine of the character wherein a vibratory motion is imparted to opposite ends of an applicator belt which encircles a portion of the body of the user, thereby imparting a vibratory motion and a massaging effect to the portion of the body to which the belt is applied.

Among the objects of the present invention are the provision of means whereby the amplitude of vibration may be varied during the operation of the machine, and whereby the movement imparted to the ends of the belt which are attached to the vibrating mechanism will always be in substantially a horizontal plane with practically no vertical component at any amplitude, thus avoiding a defect of many machines which are now on the market wherein variation of the horizontal amplitude of the stroke causes an inverse variation of the vertical component.

Another object of the invention is the provision of a cabinet wherein the machine may be contained in such a manner that no moving parts are exposed during operation which are within the reach of young children or which could be injurious to a grown person who might fall against the machine or accidentally get some part of the body or the clothing caught in the mechanism.

Another object is the provision of a cabinet of the character mentioned, having a counterbalanced door which will also serve as a platform for the user of the machine so that no wall securing means or permanent attachment of any part of the machine or cabinet to any part of the house is necessary.

Another object is the provision of an improved applicator belt for vibratory exercising machines.

Another object is the provision of means for indicating the length of stroke and hence the intensity of the vibration for each position of the stroke adjusting mechanism regardless of whether the exerciser is operating or idle.

The present application relates to exercisers and cabinets of the general type described in our co-pending application, Serial No. 395,547, filed September 27, 1929, which has matured into a Patent No. 1,853,304, April 12, 1932. Reference is made to the accompanying drawings and to the following specification for the details of a preferred embodiment of our present invention, but it is to be understood that the scope of the invention is to be determined not by the description and drawings, but by the claims appended hereto.

In the drawings:

Fig. 1 is a side view of the vibration producing mechanism of our exerciser;

Fig. 2 is a detached perspective view of the main supporting frame for the vibration producing mechanism;

Fig. 3 is a plan view, partly in section, of the vibration producing mechanism;

Fig. 4 is a front view of the vibration producing mechanism taken on line 4—4 of Fig. 3;

Fig. 5 is a diagrammatic illustration of the vibration producing linkage when set to give the minimum stroke;

Fig. 6 is a view similar to Fig. 5 but illustrating the linkage as set to give the maximum stroke;

Fig. 7 is a detached perspective view of the stroke adjusting nut guiding link;

Fig. 8 is a side elevation partly in section of our exerciser in its cabinet, the door being lowered to form a platform for the user;

Fig. 9 is an enlarged side view of the platform counter-balancing and locking arrangement;

Fig. 10 is a view taken on line 10—10 of Fig. 9;

Fig. 11 is a view taken on line 11—11 of Fig. 8;

Fig. 12 is a perspective view of one end of our applicator belt;

Fig. 13 is a plan view taken on line 13—13 of Fig. 11 and showing our stroke indicator.

The general layout of our exerciser is best illustrated in the drawings in Fig. 8; the cabinet C is adapted to house the vibration producing mechanism, generally referred to as A, and the driving motor M. The motor M is mounted on the base of the cabinet and is connected to the actuating mechanism A by the belt B.

Referring to Fig. 1 of the drawings, the vibration producing linkage of our exerciser is supported by the main frame or bracket 1, which is secured to the cross member 2 of the cabinet by the bolts 3.

The bracket 1 has a transversely extending bearing portion 4 in which is supported the main shaft 5 of the actuating mechanism. A pulley 6 is secured to one end of the shaft 5 and the crank member 7 is secured to the opposite end. The pulley 6 has a grooved periphery adapted to take the drive belt B and has a crank pin 8 supported by the hub. The crank member 7 has a crank pin 9 similar to crank pin 8 and offset the same distance from the center line of the shaft 5 but removed 180° in angular relation from the pin 8. Links 10 and 11 have end bearing portions 10′ and 11′ which are rotatably supported by the crank pins 8 and 9 respectively. The opposite end of link 11 is connected to one end of connecting link 12 and link 13 by the bolt 14. This bolt 14

acts as a bearing for the links 11, 12 and 13 and permits them to turn on the bolt 14 independently of each other. The front end of link 12 has fingers 15 riveted to it. These fingers form a forked end portion for the link 12 and are provided with holes at their outer ends. The fingers 15 engage opposite sides of the belt actuating lever 16 and are connected thereto by a pin 17. The lever 16 is rotatably mounted on shaft 18 which is supported by the end bearing portion 19 of the bracket 1.

The link 13 is pivoted at its lower end at the common pivot point of links 11 and 12. The upper end of the link 13 is mounted on a shaft 20 which is supported by the upper end of the guide link 21. The lower end of the link 21 is pivotally mounted on a shaft which passes through the bearing 22 (see Fig. 7) in the guide link 21 and is supported in the holes 23 in the side flanges of the bracket 1.

The adjusting nut 25 is also supported and guided by the shaft 20 and is disposed between the upstanding arms 26 and 27 of the guide link 21. In the form of our invention illustrated a spring 28 is inserted between the arm 27 and adjusting nut 25. This spring surrounds the shaft 20 and is under compression so that it prevents any rattling or play of the parts and facilitates the easy and economical assembly of the mechanism. The nut 25 has threaded engagement with the threaded shaft 29. Shaft 29 has a bearing portion adjacent the forward end and is rotatably supported in the bearing block 30. Bearing block 30 is disposed between the two upstanding lugs 31 and 32 of the bracket 1 and is pivoted thereto by a pin 33 which passes through holes in the lugs 31 and 32. An adjusting knob 34 is secured to the end of the shaft 29 which is adapted to extend out through the protecting cover plate 35. Stop pins 29′ and 29″ on the shaft 29 limit the movement of the nut 25 and determine the maximum and minimum stroke.

The links 11 and 13 comprise a toggle the joint of which is at the bolt 14. By changing the position of the upper pivot point of the toggle the degree of movement imparted to the joint of the toggle by the rotation of the shaft 5 may be varied.

The linkage above described, is particularly adapted to give the desired oscillating movement to the belt actuating lever 16. The belt actuating lever 36 is connected to the power driven crank pin 8 and to the adjusting nut 25 by linkage which is identical with that described in regard to lever 16. Therefore, it will not be necessary to here describe in detail the linkage which controls the movement of lever 36, but it will be sufficient to say that, as the crank pin 8 is removed 180° from the crank pin 9, the belt actuating lever 16 will be in its extreme forward position when the belt actuating lever 36 is in its most rearwardly position and vice versa.

The free ends of the levers 16 and 36 carry studs 37 to which the ends of the applicator belt 38 may be quickly and easily attached or detached.

As best seen in Fig. 8, the rear cover plate 2′ of the cabinet extends upwardly from the base 39 and may be held in place by suitable fasteners. The bracket 1 is secured to the cross member 2 as above described and the actuating mechanism and driving motor are enclosed within the walls of the cabinet. The portion of the actuating mechanism which projects out beyond the front wall 40 of the cabinet C is enclosed by the sheet metal cover plate 35. This cover plate 35 has slots in its upper surface to accomdate the movement of the levers 16 and 36 and is provided with an aperture on its front wall through which the shaft 29 passes. From the above description it can be seen that the moving parts of the exerciser are entirely enclosed with the exception of the upper end of the arms 16 and 36. These must necessarily project out beyond the enclosure so that the ends of the belt 38 may be attached thereto.

To indicate the intensity of the vibration imparted to the applicator belt we have provided the indicator arm 60 which is mounted on the shaft 20 and extends forwardly. The pointer portion 61 of the arm 60 projects up through a slot 62 in the top of the cover plate 35. A graduated scale 63 may be secured to the cover 35 so that the user of the apparatus can tell at a glance whether the exerciser is set to give a light, medium or heavy vibratory treatment. When the knob 34 is turned the shaft 20 is moved and this movement is indicated by the pointer 61 on the scale 63. As the position of the shaft 20 determines the length of stroke of the arms 16 and 36, the pointer 61 will give a true reading of the intensity of vibration. A switch 64 may be mounted on the front of cover plate 35 and connected to control the driving motor M.

The top, bottom and side walls of the cabinet project out beyond the fixed front wall 40 and the platform 41 is hinged at its lower edge to the front edge of the base 39. In Fig. 8 the platform 41 is shown in full lines in position to support the user of the apparatus and is shown in dot and dash lines in closed position. When in the closed position, the platform 41 forms a front panel which completely hides the operating mechanism. It will be noted that the top of the cabinet is hinged at 42, and is provided at its edge with a downwardly projecting lip portion 43. When the platform is in the closed position, this lip portion 43 overlaps the top edge of the platform 41 and forms an effective lock therefor.

The platform 41 is provided with counterbalancing springs 44 which are secured at one end to the platform and at the other to the side walls of the cabinet. These springs are so positioned and adjusted that they will prevent the platform from falling to the floor from its closed position when it is released by lifting the front portion of the top of the cabinet.

To prevent the cabinet from being pulled over on to the user when the apparatus is in use and to eliminate the necessity of securing it to the floor or wall, we have provided the plate member 45 which is pivotally secured at its lower edges to the side brackets 46 on the platform 41. This plate member 45 has downwardly extending side flanges 47 to which are pivoted the arms 48. These arms are pivoted to the plate member 45 at a point spaced from its upper end and are pivoted at their upper end to the side walls of the cabinet C by pins 49. When the platform is in position for use, these bracing members are in the position shown in full lines in Fig. 9, and when the platform is folded to enclose the operating parts of the apparatus, the plate member 45 and the arms 48 assume the position shown in dot and dash lines.

The ends of the fabric belt 38 are folded around hand gripping members 50. U-shaped

metal rods 51 pass through the grips 50 and also through the fabric of the belt 38 and are secured in position by riveting over their ends as shown at 52 (Fig. 12). Short sections of fabric belt 53 extend from the closed ends of the U-shaped pieces 51 and are secured to tabs, preferably of leather, which have button-hole shaped apertures 54. These apertures 54 are adapted to be slipped over the studs 37 on the oscillating arms 16 and 36.

The above described belt construction provides an applicator belt which may be easily and quickly attached and detached from the oscillating arms and which may be used to encircle the user's body to give the desired vibratory action. The hand grips 50 are also adapted to be grasped in the hands of the user to give a more direct vibrating and exercising effect to the arms and upper parts of the body. A convenient handle or hand-grip is provided by the round pins 50. The U-shaped rods 51 do not interfere with the user's grasping the grips, and by the above-described belt construction the necessity for having separate hand grips is eliminated. In other types of vibratory exercizers with which we are familiar, it is necessary to completely remove the belt and attach individual handle members to the vibrating members when it is desired to receive the vibrations of the machine direct to the hands and arms rather than through the applicator belt.

The operation of our exerciser may best be understood by reference to Figs. 5 and 6 of the drawings which are diagrammatic representations of the linkage. In Fig. 5 the mechanism is set to give the minimum stroke of the vibrating arm and in Fig. 6 to give the maximum stroke. In these views the various links are represented by single lines and have been numbered to correspond with the reference numbers given the corresponding parts in the above description of the other views of the drawings.

When adjusting nut 25 is in its forward position (Fig. 5) the arms 16 and 36 will have their minimum stroke. Considering only the linkage which actuates the lever 16, the point P1, which is the pivot point between the crank pin 9 and the link 11, travels in a circular path as indicated by the broken line and in the direction shown by the arrow. The movement of the point P2 which is the pivot point of levers 11, 12 and 13 is along the arc, *a*, which is drawn about the fixed point P3 on the adjusting nut 25. A movement of the pivot point of links 11, 12 and 13 from the point P2 to the point P4 along the arc, *a*, causes the link 16 to move from the farthest forward position P5 to its most rearwardly position P6. It is seen from Fig. 5 that the movement of the end of the lever 16, and in like manner the movement of the end of lever 36, has a very small vertical component, the movement of the ends of these levers being substantially horizontal.

In Fig. 6 the position of the adjusting nut 25 has been changed to give the maximum length of stroke. In moving from the position shown in Fig. 5 to the position shown in Fig. 6 the point P3 on the adjusting nut, moves on the arc indicated at *a*1 and which is drawn around the fixed center point P7. As the point P3 is the center of the arc, *a*, it is evident that movement of the point P3 will cause the position of the arc, *a*, to change. In Fig. 6 movement of the point P1 through an angle of 180 degrees will cause the point P2 to move from P2 to P4. This movement of the point P2 will cause the vibrating lever 16 to move from point P5 to point P8 giving the maximum stroke.

Fig. 6 clearly illustrates that the vertical component of the movement of the end of lever 16, and likewise lever 36, when set to give the longest stroke, is very small, and that substantially all of the movement of the end of the lever is horizontal thus giving the most desirable and effective vibratory movement to the applicator belt.

It will be seen from the above description that we have provided an exerciser of rugged construction which may be easily adjusted during its operation to give the desired length of stroke and resulting intensity of vibrating effect. Moreover, by means of our linkage the vertical component of the movement of the vibrating arm is maintained at a minimum during the entire range of adjustment of the length of the stroke. The exerciser, together with the enclosing cabinet, forms a complete unit which may be moved from one part of the house to the other, and need not be secured to the wall or externally supported or braced in any manner. Our platform construction, and mechanism for connecting it to the cabinet, prevent any possible accident to small children or others through the platform falling from its closed position and our stroke indicator enables the user to set the exerciser to give the desired intensity of vibration before starting the treatment.

While we have described the illustrated embodiment of our invention in some particularity, modifications and variations thereof may appear to those skilled in the art to which it appertains and we do not, therefore, limit ourselves to the precise details shown and described, but claim as our invention all embodiments thereof coming within the scope of the appended claims.

We claim:

1. In a vibratory mechanism means for translating rotary movement into oscillatory movement including a shaft having a crank, a toggle, a connecting link, a lever, means to selectively change the position of one end of said toggle including a threaded nut and a screw through said nut, one end of the toggle being pivoted on said nut whereby rotation of the screw moves said end of the toggle and the other end being pivoted to said crank, said connecting link being connected at one end to said lever at a point intermediate its ends and at the other end to the joint of said toggle.

2. In apparatus of the class described, mechanism for translating rotary motion into vibratory motion comprising a rotatable shaft, a crank on said shaft, a toggle, a vibrating lever, a connecting link pivoted at one end at the joint of said toggle and at the other end to said vibrating lever, an adjusting nut, said toggle being pivotally connected at one end to said crank and at the other end to said nut, means for changing the position of said nut to control the length of the vibratory stroke of said lever and means for rotating said shaft.

3. In apparatus of the class described, mechanism for translating rotary motion into vibratory motion comprising a rotatable shaft, a crank on said shaft, a toggle pivoted at one end to said crank, adjustable means to which the other end of said toggle is pivoted, and means for translating the motion of the joint of said toggle into substantially horizontal arcuate motion having a small vertical component.

4. An exerciser comprising a motor, a rotatable shaft, means connecting said motor to drive said

shaft, a crank on said shaft, a toggle pivotally connected at one end to said crank, an adjustable pivot to which the other end of said toggle is pivoted, means for changing the position of said pivot, a vibrating lever and means connecting said toggle and said lever whereby movement of said toggle will cause the end of said lever to move in a substantially horizontal path.

5. An exerciser including a motor, an applicator belt and mechanism for translating rotary into vibratory motion, said mechanism comprising a driven shaft, oppositely disposed cranks at opposite ends thereof, toggles secured at one end to and actuated by each of said cranks, an adjustable support for the free ends of said toggles and means for applying the movement of the joint of each of said toggles to the opposite ends of said applicator belt.

6. An exerciser including a motor, an applicator belt and mechanism for translating rotary into vibratory motion, said mechanism comprising a driven shaft, oppositely disposed cranks at opposite ends thereof, toggles secured at one end to and actuated by each of said cranks, an adjustable support for the free ends of said toggles and means for applying the movement of the joint of each of said toggles to the opposite ends of said applicator belt said means comprising vibrating levers adapted to be engaged by the ends of said belt and connecting links connecting each of said levers with the joint of its corresponding toggle.

7. An exerciser including a motor, an applicator belt and mechanism for translating rotary into vibratory motion, said mechanism comprising a driven shaft, oppositely disposed cranks at opposite ends thereof, toggles secured at one end to and actuated by each of said cranks, an adjustable support for the free ends of said toggles, means movable with said support for indicating the position of said support said means including an indicating finger and a scale calibrated to show intensity of vibration, and means for applying the movement of the joint of each of said toggles to the opposite ends of said applicator belt.

8. An applicator belt for exercising machines comprising a flat fabric body engaging belt member, hand gripping pins at the ends of said belt member and secured thereto by doubling back the ends of said fabric belt member around said pins, U-shaped rods having their open ends secured to said pins, connecting belt members secured to the closed ends of said U-shaped rods, said connecting belt members having apertures at their ends adapted to engage the vibrating parts of said exercising machine.

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