April 12, 1932. F. G. FOLBERTH ET AL 1,853,304

EXERCISER

Filed Sept. 27, 1929 2 Sheets-Sheet 1

Fig. 5

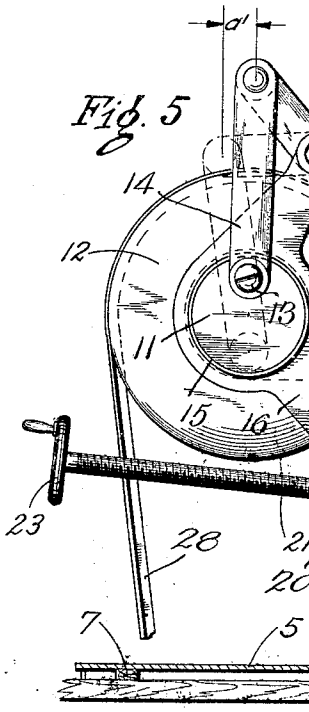
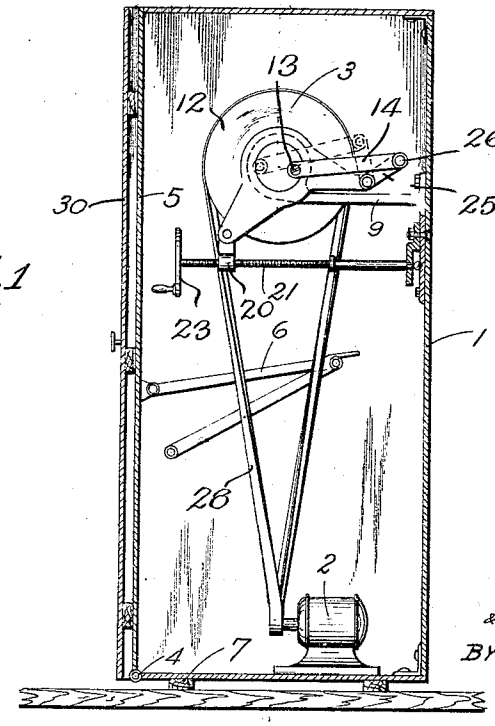


Fig. 2

Fig. 1



INVENTORS
FREDERICK G. FOLBERTH
& WILLIAM M. FOLBERTH
BY Riley & Watts
ATTORNEYS

April 12, 1932. F. G. FOLBERTH ET AL 1,853,304

EXERCISER

Filed Sept. 27, 1929 2 Sheets-Sheet 2

Fig. 3

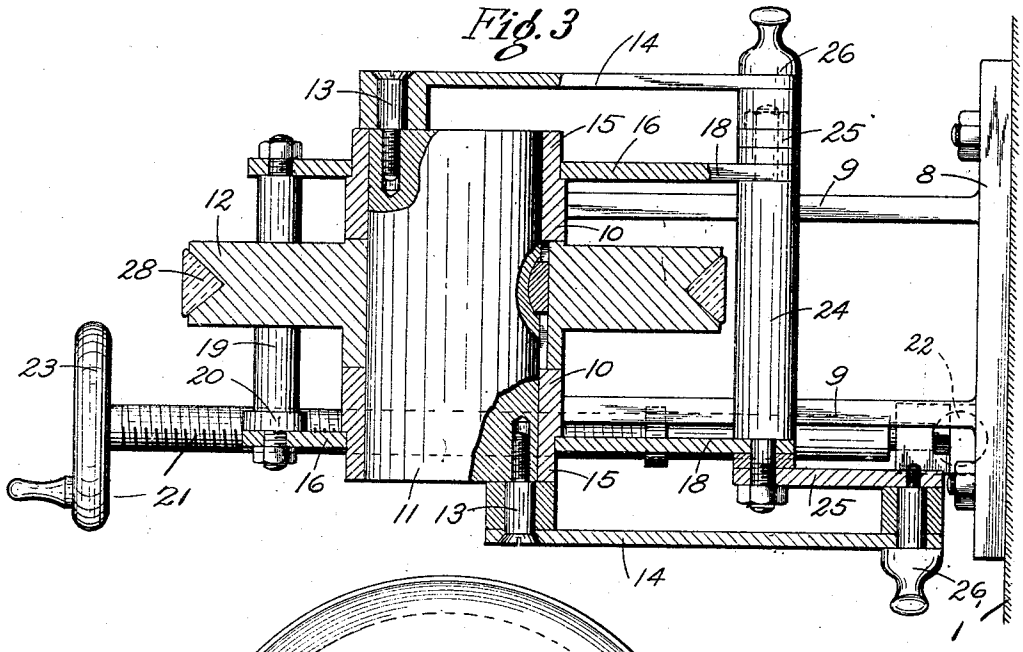
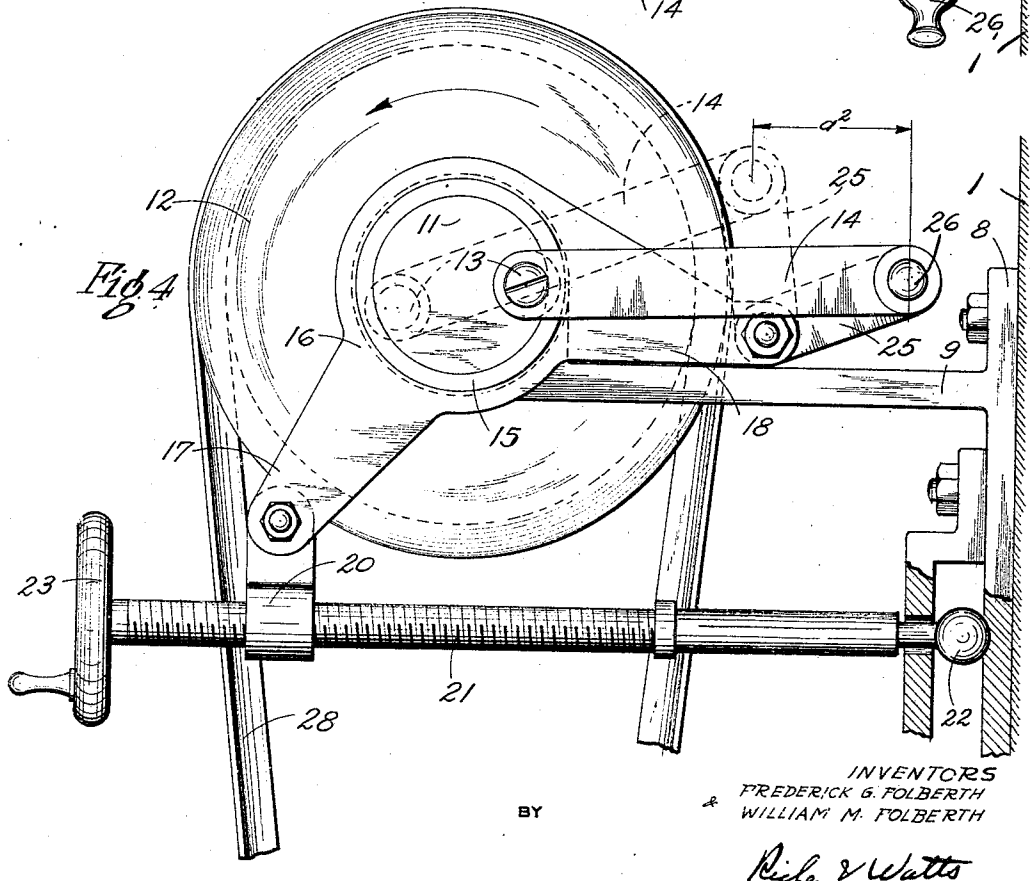


Fig. 4



INVENTORS
FREDERICK G. FOLBERTH
& WILLIAM M. FOLBERTH

BY

Riley & Watts

ATTORNEYS

Patented Apr. 12, 1932 1,853,304

UNITED STATES PATENT OFFICE

FREDERICK G. FOLBERTH AND WILLIAM M. FOLBERTH, OF CLEVELAND, OHIO

EXERCISER

Application filed September 27, 1929. Serial No. 395,547.

This invention relates to exercising machines and more particularly to the type of exercising machine which imparts a vibratory movement to various portions of the body through a fabric belt or the like.

An object of this invention is to provide an exercising machine wherein the amplitude of the vibrations may be adjusted while the machine is in motion, and wherein the adjustment may be made by the user.

Another object of the invention is to arrange the vibratory mechanism in such a manner that each end of the belt is pulled inwardly with maximum rapidity and allowed to move outwardly more slowly, in order to obtain an improved exercising and massaging motion, irrespective of the amplitude of the vibrations.

Another object of the invention is to provide an exercising machine that is self-bracing and which does not have to be secured to the floor, table, wall or the like.

Another object of the invention is to provide an exercising machine which, when in the operative position has none of the mechanical appearance that is common to machines of this type.

Another object of the invention is to provide an exercising machine which is relatively easy to construct and easy to manufacture.

Still other objects of the invention and the invention itself will become more apparent from the following description of an embodiment thereof, in which description, reference will be had to the accompanying drawings.

In the drawings:

Fig. 1 is a side view of an exercising machine in folded or inoperative position, one wall of the cabinet being broken away to show the mechanism;

Fig. 2 is a similar view of the machine in opened position ready for operation;

Fig. 3 is a top plan view, partly in section, of the vibratory mechanism;

Fig. 4 is an enlarged side elevational view thereof;

Fig. 5 is another view of the vibratory mechanism showing the effect of an extreme adjusted position.

Referring to the drawings, wherein like symbols designate corresponding parts throughout the several views, the machine comprises a cabinet 1 housing an electric motor 2 and a vibratory mechanism 3.

The cabinet is provided with opposed ornamental doors 29 and 30, hinged to the side walls and meeting at the center to close the front of the cabinet and conceal the mechanism. A platform 5 is hinged to the bottom wall at 4 and connected to the side walls by means of toggle links 6. In its raised position the platform is disposed immediately behind and parallel with the doors 29 and 30, and in its lowered position rests upon the floor to serve as a stand for the user of the device. Feet 7 are mounted on the bottom of the cabinet and the outer surface of the platform 5 to engage the floor.

The vibratory mechanism is supported from the rear wall of the cabinet by a bracket 8 having a pair of forwardly projecting arms 9 terminating in aligned bearings 10. A shaft 11, carrying a pulley 12, is journaled in the bearings 10. Diametrically opposed crank pins 13 project from the opposite ends of the shaft 11, each crank pin carrying a connecting rod or link 14.

The exterior surfaces of the bearings 10 are shouldered to provide reduced outer end portions 15, which serve as bearings for a pair of bell crank levers 16. Each of the bell crank levers is provided with two angularly disposed arms 17 and 18. A spacing member 19 having reduced threaded ends rigidly connects the arms 17 of the two levers. A threaded member 20, pivotally carried by the spacer 19 at one end thereof, is disposed upon a threaded shaft 21. One end of the shaft is mounted upon the bracket 8 by means of a ball joint 22, and the opposite end is provided with a hand wheel 23 by which the shaft can be rotated to move the member 20 therealong and correspondingly rotate the bell crank levers 16 about their bearings 15.

The outer ends of the arms 18 are connected by a spacer 24 similar to the spacer 19. The reduced ends of the spacer 24 are extend-

ed past the arms 18 to provide bearings for links 25, the outer ends of which are pivoted to the links 14 by means of connectors 26. The outer ends of the connectors 26 are formed as buttons to receive the ends of a flexible applicator belt 27.

It will be evident from the foregoing description that rotation of the shaft 11 by the electric motor 2 through the medium of the drive belt 28 will cause oscillation of the links 25 about their pivots on the spacer 24. Such oscillation will be transmitted to the flexible applicator belt 27 as a longitudinal vibration, the amplitude of the vibration being determined by the length of the horizontal component of the oscillatory movement of the ends of the links 25. When the bell crank levers are in the position shown in Figure 4, the vibrations will be of large amplitude, because in this position the horizontal component of the oscillation of the links is large, as indicated by the distance a^2. By turning the hand wheel 23 to move the member 20 rearwardly, the bell crank levers will be rotated to the position shown in Figure 5, in which the horizontal component of the vibrations, indicated by the distance a^1, is reduced to a small amount. Intermediate positions of the bell crank levers provide any degree of adjustment desired.

It will be noted that the link 14 moves rearwardly when an end of the belt is being pulled inwardly, and that the link 25 moves from a substantially vertical position to a rearwardly inclined position. It is well known that a crank and connecting rod produces deviations from a simple harmonic motion, due to the angularity of the crank, and that such deviations result in a faster movement of the reciprocating end of the connecting rod while the crank moves through the two quadrants nearest to the reciprocating end than when it moves through the two quadrants farthest from the reciprocating end. In addition, when the line of motion of the reciprocating end of the crank does not pass through the center of the circle defined by the rotation of the crank, the two dead centers are not diametrically opposed, and the connecting rod necessarily moves faster when the crank moves through the shorter distance between dead centers than when it moves through the longer distance, the speed of rotation of the crank being assumed to be constant at all times.

In Figure 4 of the drawings the connecting link 14 is shown at one dead center in full lines, and at the other in dotted lines. The direction of rotation of the crank is indicated by the arrow on the pulley 12. It will be seen that the angular distance from the dotted line position to the full line position is less than the distance from the full line to the dotted line position, and that consequently the end of the connecting link 14 moves faster in pulling the belt inwardly than in allowing it to move outwardly. An additional factor producing irregularity of motion and multiplying the effect of the offset crank as described above results from the fact that the link 25 moves from a substantially vertical position to an inclined position, all of the link motion being in a "slow" quadrant, considering the link as a crank arm. Since a crank, in moving through a "slow" quadrant at uniform speed produces a relatively slow movement of the connecting rod, it follows that a uniform motion of the connecting rod produces a more rapid movement of the crank in such a quadrant. In other words, by reason of the angularity of the link 25, the fast motion of the connecting link 14 is multiplied, and an extremely violent jerk is applied to the end of the belt 27, giving an improved exercising and massaging action. It will be seen that there are three factors contributing to the production of the quick pull on the belt; the disposition of the connecting link 14 on the opposite side of the crank from the operating portion of the belt, the offset arc through which the end of the connecting link travels, and the fact that all of the motion of the link 25 occurs in a slow quadrant.

When it is desired to use the exerciser the door 5 is lowered to the position shown in Figure 2, and the toggle brace 6 is pressed down to lock the door in position. The user then stands upon the door 5, passes the applicator belt 27 about his body, and connects the ends of the belt to the buttons 26. It will be seen that when the user leans against the belt a couple is created tending to rotate the cabinet about the pivotal connection 4. This couple is resisted by the brace 6. With this arrangement all of the thrust against the vibratory mechanism is taken up within the device, making external anchors unnecessary.

Although we have described one embodiment of the invention in detail, it is to be understood that the specific terminology employed is not intended to be restrictive and that various modifications can be made without departing from the scope or spirit of the invention as herein claimed.

We claim:

1. In an exercising machine, an oscillatory mechanism including a driven shaft, a pair of supports for said shaft, a pair of movable bell crank levers carried by said supports, a pair of cranks secured to said shaft and a pair of connecting rods connected to said cranks, a pair of links oscillatably carried by a pair of ends of said bell crank levers and the free ends of said links being connected to said connecting rods, the point of junction of said links and rods beng adapted to vibrate a belt.

2. In an exercising machine, an oscillatory mechanism including a driven shaft, a pair of supports for said shaft, a pair of movable

bell crank levers carried by said supports, a pair of cranks secured to said shaft and a pair of connecting rods connected to said cranks, a pair of links oscillatably carried by a pair of ends of said bell crank levers and the free ends of said links being connected to said connecting rods, the other ends of said bell crank levers being adjustably secured to said support.

3. In an exercising machine, an oscillatory mechanism including a driven shaft, a pair of supports for said shaft, a pair of movable bell crank levers carried by said supports, a pair of cranks secured to said shaft and a pair of connecting rods connected to said cranks, a pair of links oscillatably carried by a pair of ends of said bell crank levers and the free ends of said links being connected to said connecting rods, and means to adjustably hold the other ends of said bell crank levers.

4. In an exercising machine, an oscillatory mechanism including a driven shaft, a pair of supports for said shaft, a pair of movable bell crank levers carried by said supports, a pair of cranks secured to said shaft and a pair of connecting rods connected to said cranks, a pair of links oscillatably carried by a pair of ends of said bell crank levers and the free ends of said links being connected to said connecting rods, the point of junction of said links and rods being adapted to vibrate a belt, and means to change the position of said links from one plane to another.

5. Means for producing horizontal vibratory movement, comprising a support, a shaft journalled in said support and having a crank on one end, a bell crank pivoted to said support and having a link pivoted to an end thereof, a connecting rod mounted on said crank and pivotally connected to the free end of said link, whereby rotation of said shaft produces oscillation of said link, and means for rotating said bell crank with respect to said support to vary the horizontal component of the oscillation of said link.

6. Means for producing horizontal vibratory movement, comprising a support, a shaft journalled in said support and carrying a crank, a bell crank rotatably mounted on a bearing co-axial with said shaft, and having a link pivoted to an end thereof, a connecting rod mounted on said crank and pivotally connected to the free end of said link, whereby rotation of said shaft produces oscillation of said link, and means for rotating said bell crank with respect to said shaft to vary the horizontal component of the oscillation of said link.

7. An exerciser including a support, means adjustably mounted upon said support and carrying a pair of oscillatory links, a horizontally disposed flexible applicator belt having its ends carried by said links, means for oscillating said links, and means for adjusting said first mentioned means with respect to said support to vary the horizontal component of the oscillation of said links and thereby vary the stroke of said flexible belt.

In testimony whereof we hereunto affix our signatures this 19th day of September, 1929.

FREDERICK G. FOLBERTH.
WILLIAM M. FOLBERTH.