Nov. 3, 1931. F. A. ANDERSON 1,830,380

MASSAGE AND EXERCISE MACHINE

Filed April 30, 1928 8 Sheets-Sheet 1

Fig. 1.

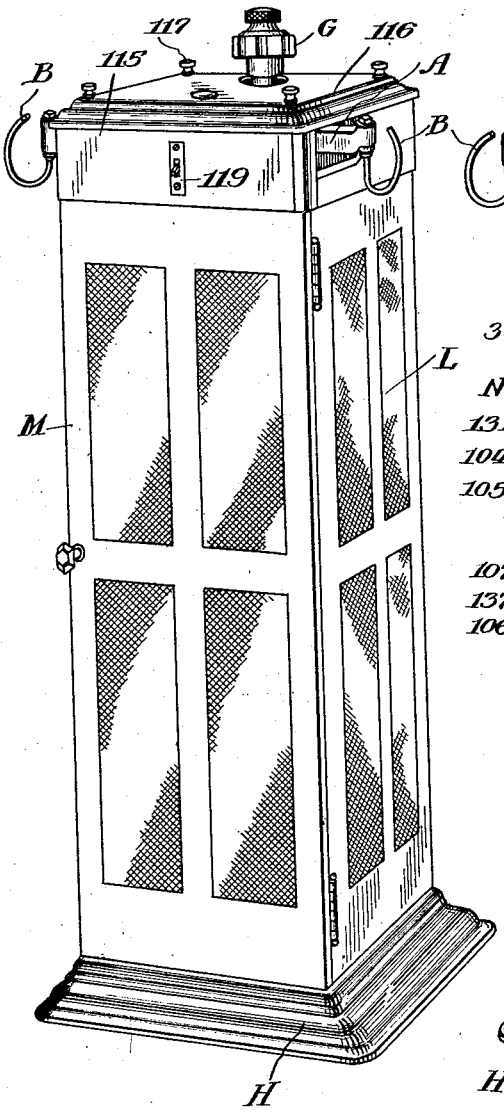
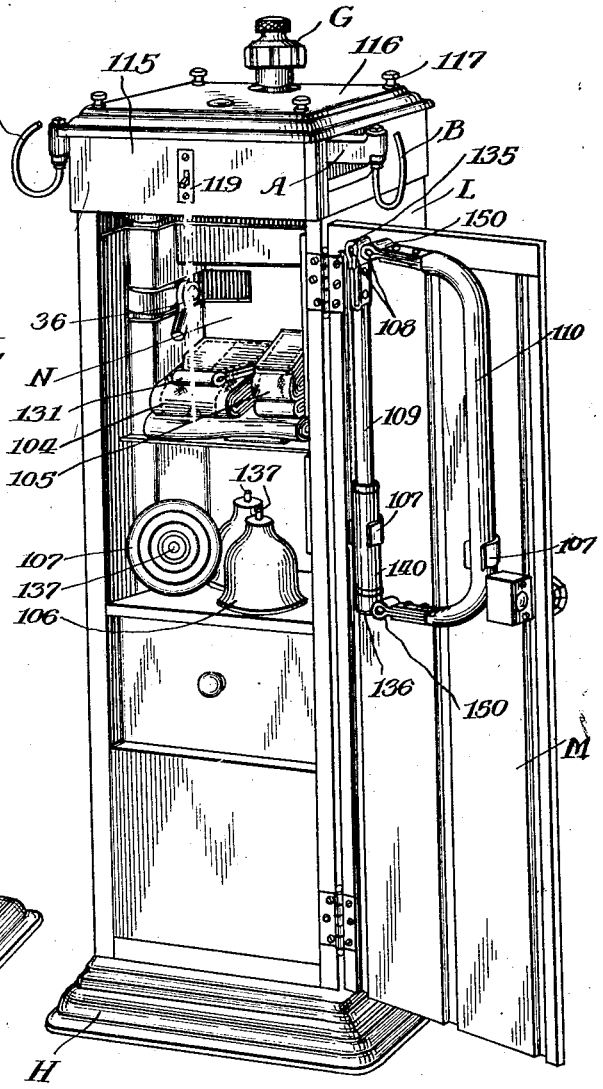


Fig. 2.



Inventor
Fritz A. Anderson

By Williams, Bradbury, McCaleb & Hinkle
Attys.

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MASSAGE AND EXERCISE MACHINE

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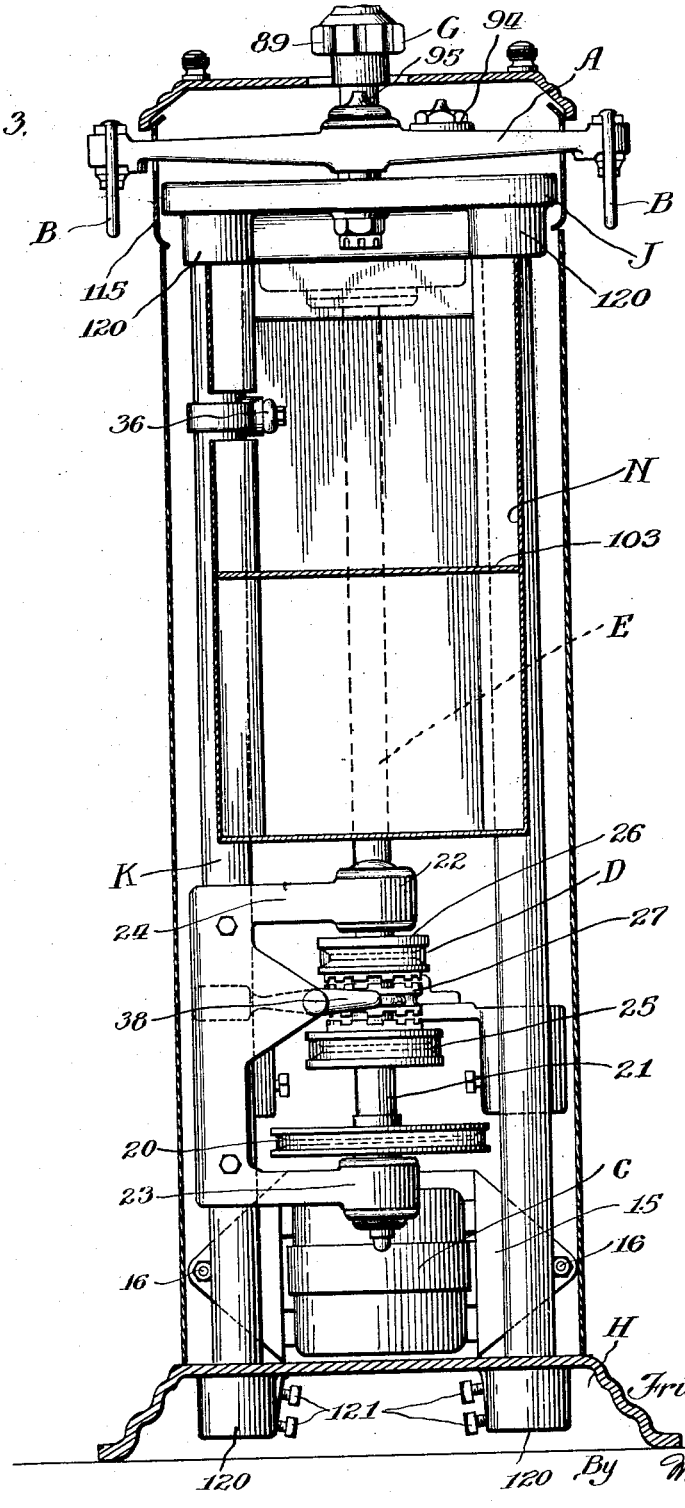
Fig. 3.



Inventor
Fritz A. Anderson
Williams, Bradbury,
McCaleb & Hinkle
By
Attys.

Nov. 3, 1931. F. A. ANDERSON 1,830,380

MASSAGE AND EXERCISE MACHINE

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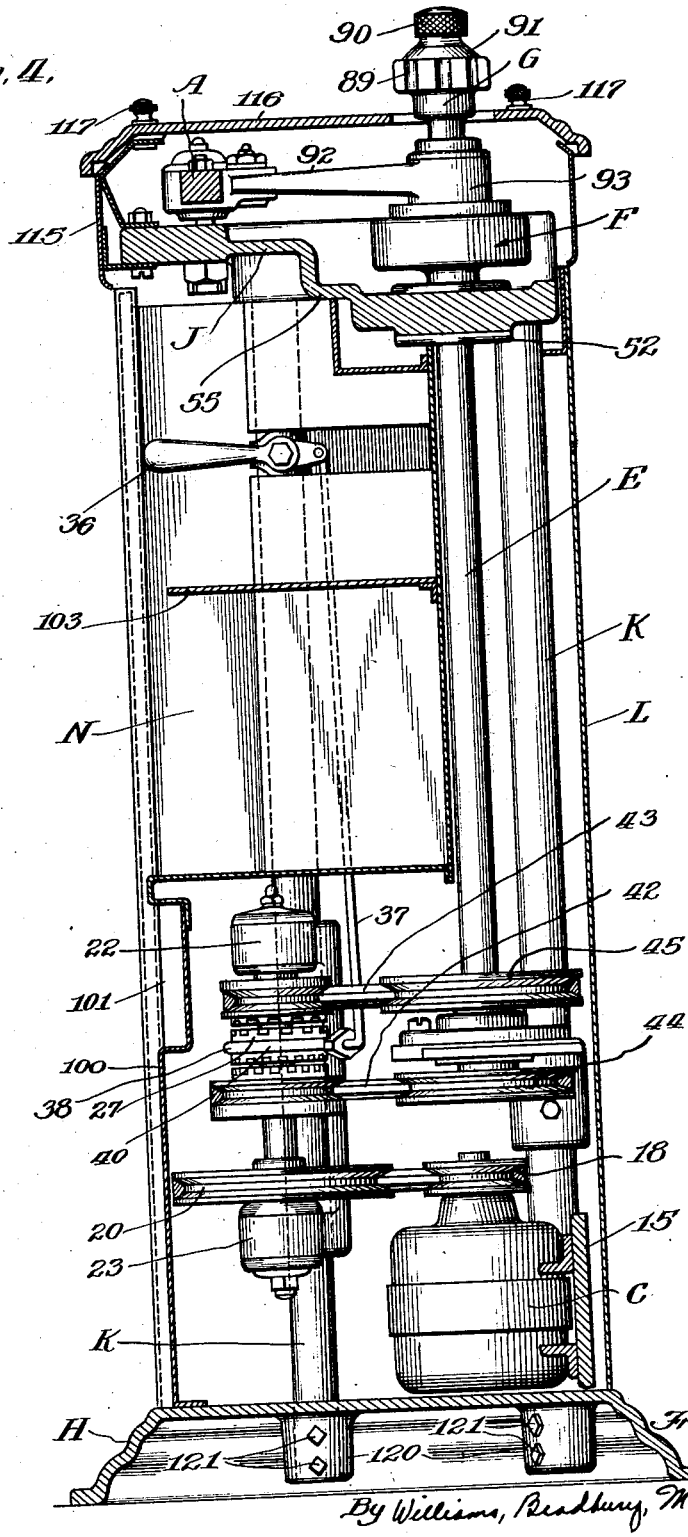
Fig. 4.



Inventor
Fritz A. Anderson

By Williams, Bradbury, McCaleb & Hinkle
Attys.

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MASSAGE AND EXERCISE MACHINE

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Fig. 10.

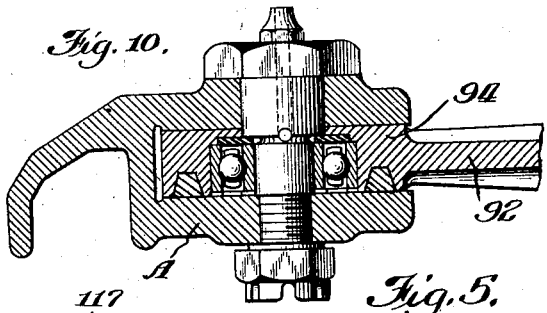

Fig. 5.

Inventor
Fritz A. Anderson
By Williams, Bradbury, McCaleb & Hinkle
Attys.

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MASSAGE AND EXERCISE MACHINE

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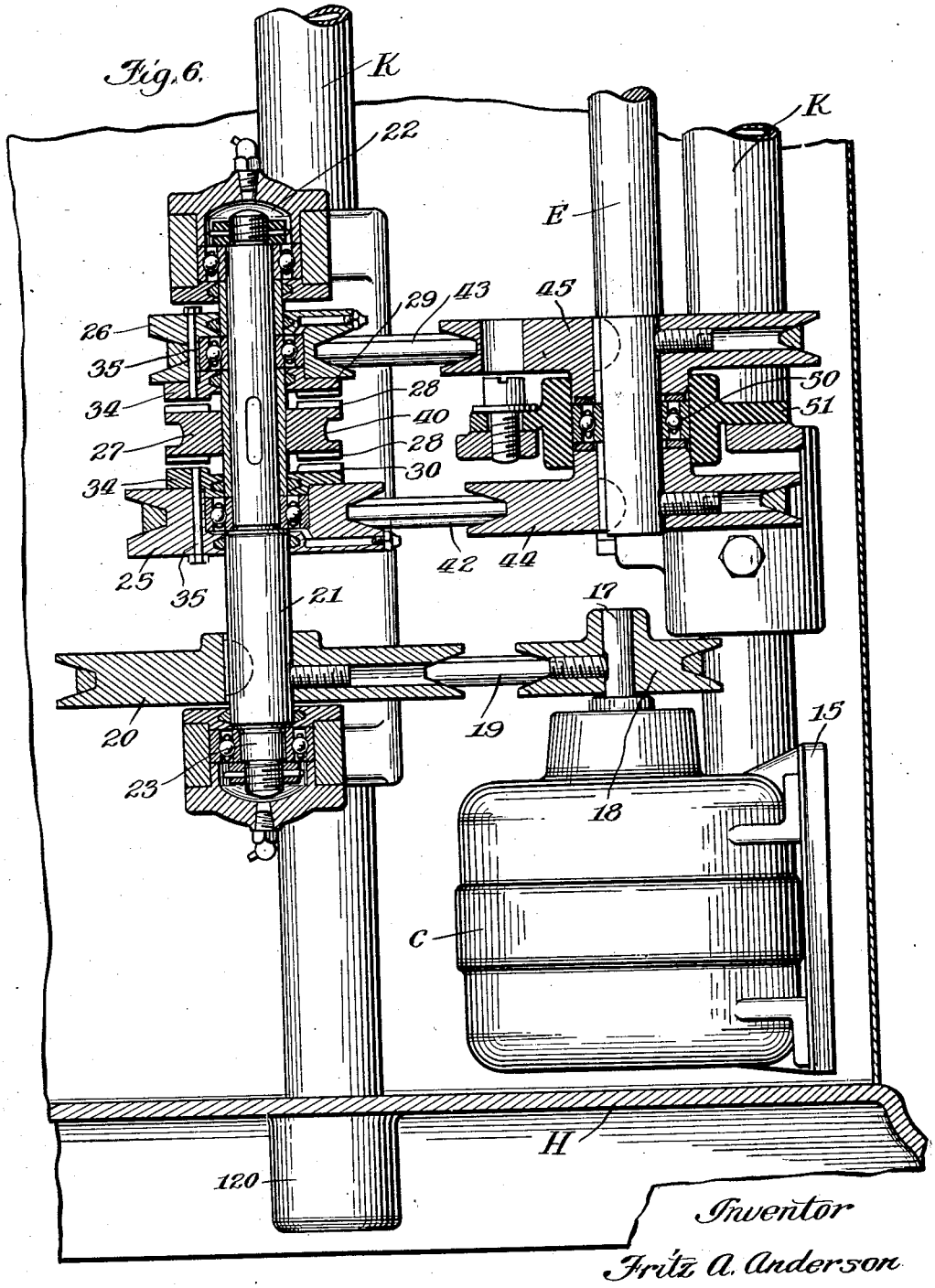
Fig. 6.



Inventor

Fritz A. Anderson

By Williams, Bradbury, McCaleb & Hinkle

Attys.

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MASSAGE AND EXERCISE MACHINE

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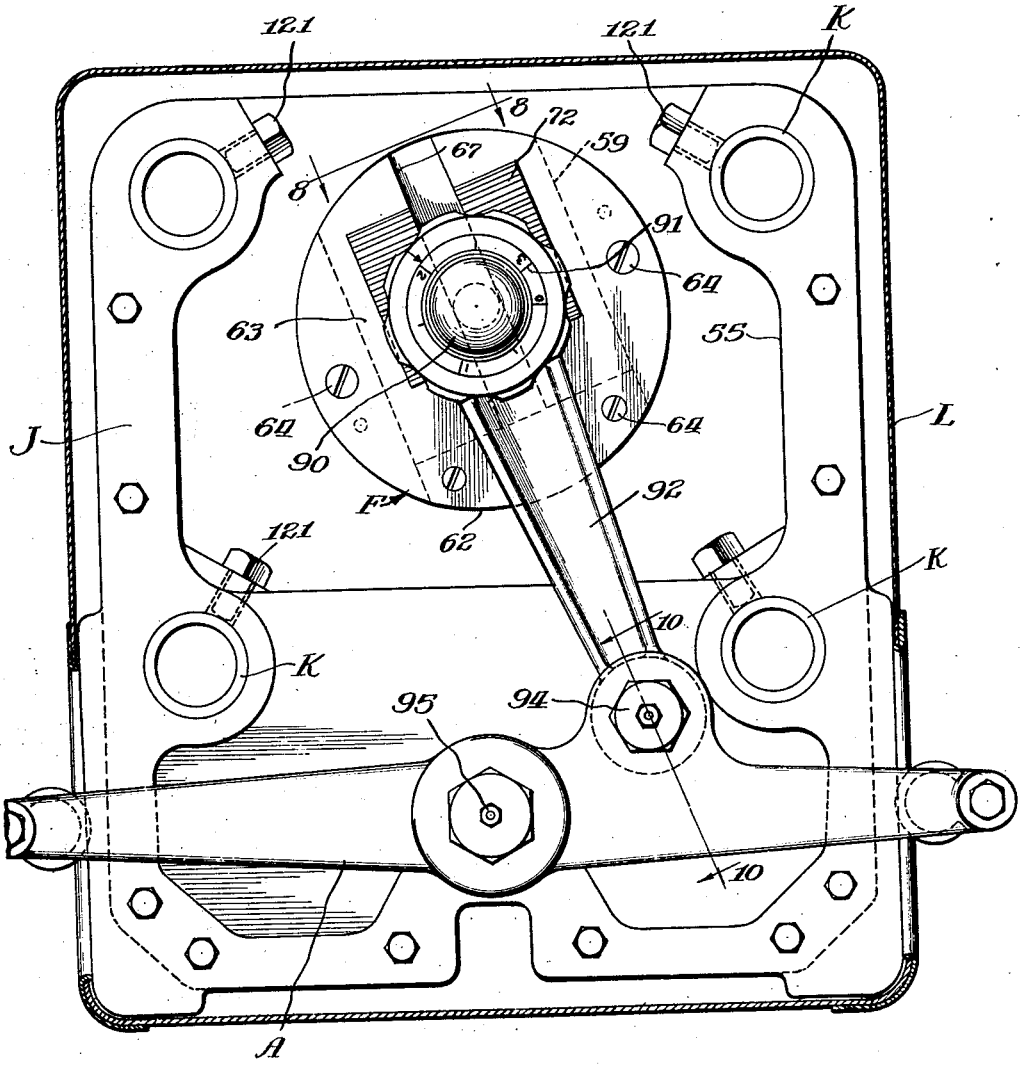
Fig. 7.



Inventor
Frits A. Anderson
By Williams, Bradbury, McCaleb & Hinkle
Attys.

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MASSAGE AND EXERCISE MACHINE

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Fig. 8.

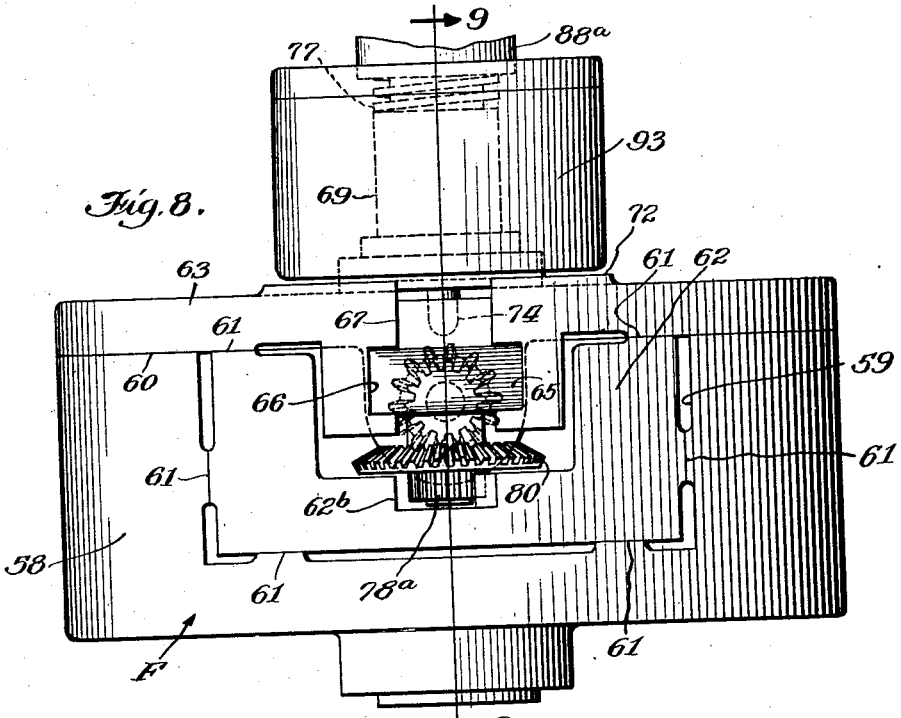
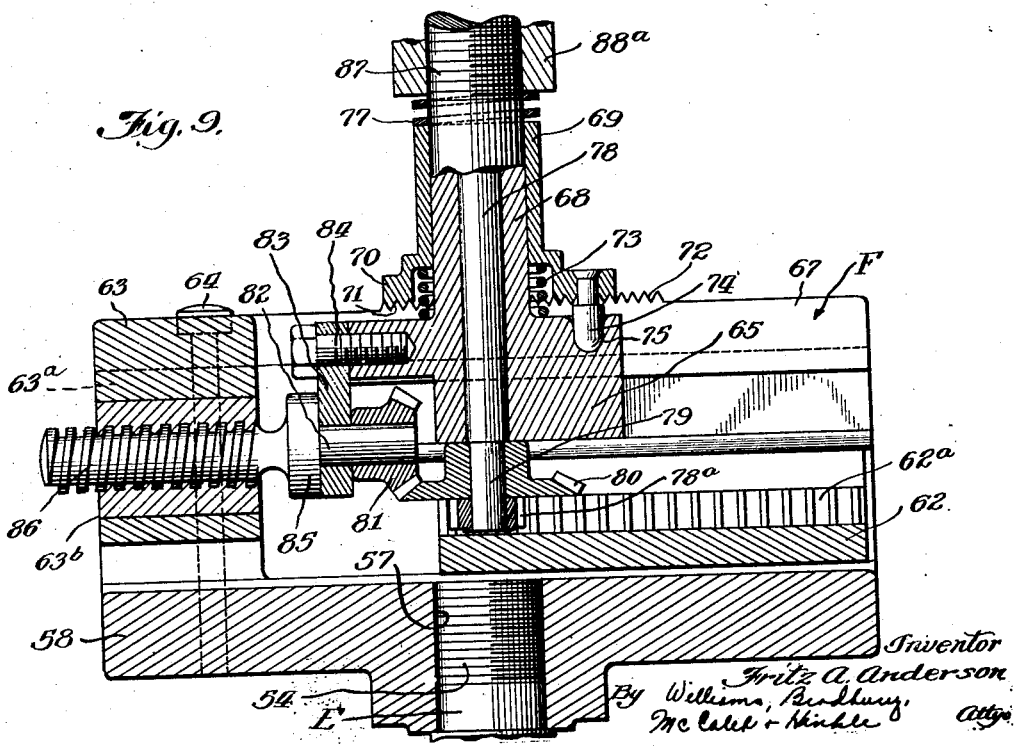


Fig. 9.



Inventor
Fritz A. Anderson
By Williams, Bradbury, McCaleb & Hinkle
Attys.

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MASSAGE AND EXERCISE MACHINE

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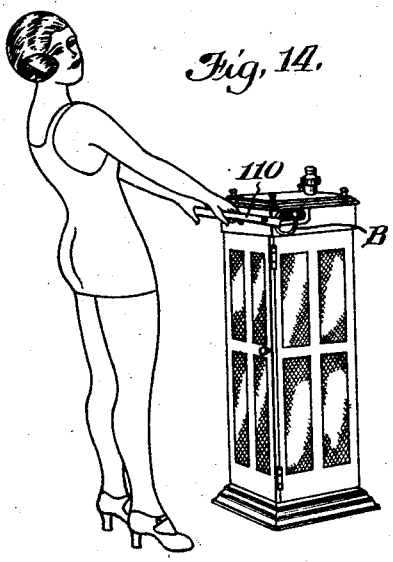

Fig. 14.

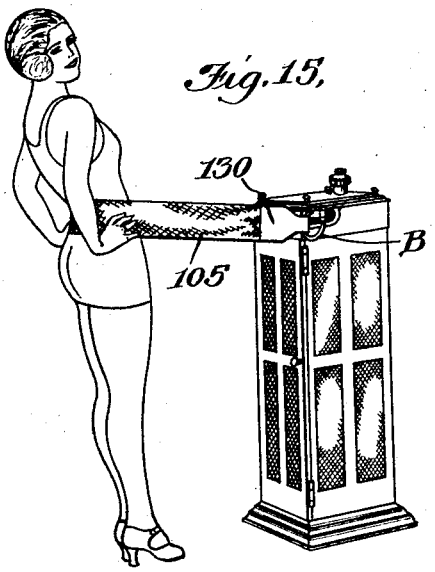

Fig. 15.

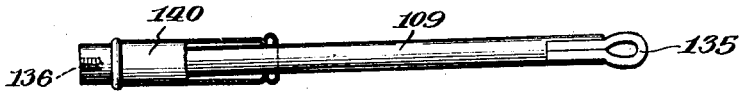

Fig. 11

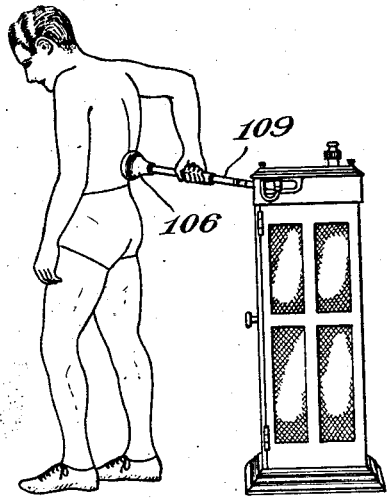

Fig. 13.

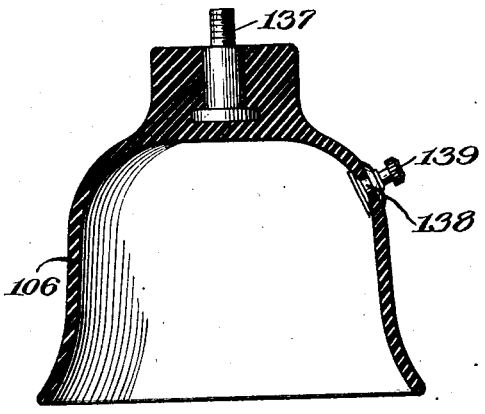

Fig. 12.

Inventor
Fritz A. Anderson
By Williams, Bradbury, McCaleb & Hinkle
Attys.

Patented Nov. 3, 1931 1,830,380

UNITED STATES PATENT OFFICE

FRITZ A. ANDERSON, OF MILTON, WISCONSIN, ASSIGNOR TO THE BURDICK CORPORATION, OF MILTON, WISCONSIN, A CORPORATION OF DELAWARE

MASSAGE AND EXERCISE MACHINE

Application filed April 30, 1928. Serial No. 273,792.

My invention relates to massage and exercise machines.

It is shown embodied in a machine intended and adapted for use either in the home, for general and special application of vibratory forces to the human body, or in hospitals, doctors' offices, gymnasiums, physical culture academies, and the like, where treatment is to be given under the care and direction of a specialist and in cases where the peculiar knowledge of a specialist is essential for intensive or special treatment.

The machine is so constructed that a person without technical knowledge may operate it and make whatever adjustments are necessary to vary the amplitude and speed of the vibratory movement of the applicators.

The purpose of the machine is to massage and exercise portions of the human body so as to stimulate a proper and healthy condition and growth of the body tissues. These results are accomplished by the application of both external friction between the applicator and the surface portions of the body and by internal flexure of the body tissues causing the entire area surrounding the applicator to move therewith. This latter form of treatment is particularly important as a means for reducing excess fatty tissues and in the stimulation of internal organs by heat generated from internal movement.

An object of the invention is to provide an improved massage and exercise machine.

A further object is to provide a massage and exercise machine in which the force translating mechanism is so constructed as to reduce vibration to a minimum regardless of the amplitude of the movement of the applicators.

Another object is to provide a massage and exercise machine in which changes in the amplitude or length of the vibratory movement of the applicators is accomplished by manipulation of a single adjusting mechanism positioned so as to be within easy reach of the patient during treatment and which adjustment may be made during the operation of the machine.

Another object is to provide a massage and exercise machine in which the vibratory movement of the opposite ends of the applicator supporting arm is in a single horizontal plane, the amplitude of movement at opposite ends of the arm remaining at all times the same.

A further object is to provide a massage and exercise machine which is durable in construction and in which the center of gravity is sufficiently low to preclude the necessity of fixing the machine to the floor.

Other objects and advantages of the invention will hereinafter appear.

One embodiment of the invention is illustrated in the accompanying drawings in which:

Fig. 1 is a perspective of my improved vibrating machine;

Fig. 2 is a view similar to Fig. 1 but with the door open;

Fig. 3 is a vertical sectional view through the forward portion of the machine;

Fig. 4 is a vertical sectional view through the center of the machine in a plane transverse to the section illustrated in Fig. 3;

Fig. 5 is an enlarged vertical sectional view through the mid-point of the head of the machine;

Fig. 6 is an enlarged sectional view through the passage of the machine;

Fig. 7 is an enlarged horizontal sectional view through the head of the machine;

Fig. 8 is a sectional view along the line 8—8 of Fig. 7;

Fig. 9 is a sectional view along line 9—9 of Fig. 8;

Fig. 10 is a sectional view along the line 10—10 of Fig. 7;

Fig. 11 is a side elevation of one of the applicator supports, a part thereof in section;

Fig. 12 is a vertical enlarged sectional view of a vacuum cup applicator;

Fig. 13 is a perspective view illustrating the cup type of applicator in use;

Fig. 14 is a perspective view illustrating the gripping bar applicator in use; and

Fig. 15 is a perspective view illustrating the belt applicator in use.

In general, the machine selected for illustration comprises a central and pivotally

mounted rocker arm A having hooks B at its outer ends for attachment of various type of applicators, an electric motor C, speed transmission and control mechanism D for driving a vertical shaft E from motor C and power translating mechanism including an eccentric mechanism F for translating rotational movement of shaft E to oscillatory movement of rocker arm A. The translating mechanism includes an adjusting device G for varying the amplitude of movement of arm A. All of the mechanism except adjusting knob G and the extreme ends of rocker arm A and their hooks are enclosed in a cabinet.

Elements A, B, C, D, E, F and G are supported upon a rigid, upright frame comprising a horizontally disposed base H and a head J interconnected by four upright tubular pillars K. The moving parts of the machine are, therefore, included in a single intimately associated unitary assembly resting directly upon the floor or other supporting surface upon which the machine is placed. An ornamental metal casing or cabinet L having a door M and applicator compartments N within, surrounds the mechanism described, giving a finished and neat appearance to the machine, affording protection to those standing nearby while the machine is in operation and providing a place for storing the applicators when not in use, the unitary supporting frame assembly and metal casing is made the subject matter of a divisional application.

Motor C is supported upon a plate 15 clamped at 16 to the rear pair of pillars K. Shaft 17 of motor C extends vertically upward and has a drive pulley 18 thereon which is connected by a belt 19 with a relatively large driven pulley 20. Pulley 20 (see Fig. 3) is fixed to an idler shaft 21 journaled at 22 and 23 by frictionless bearings within a U-shaped bracket 24. Bracket 24 is supported upon the front left pillar K.

Large and small pulleys 25 and 26 are rotatably mounted by frictionless bearings upon shaft 21 a short distance apart from one another. A clutch disc 27 (see Fig. 6) is feathered to shaft 21 between pulleys 25 and 26. Clutch disc 27 has laterally extending teeth 28 on each side thereof adapted for selective engagement with similar teeth 29 and 30 carried on adjacent sides of plates 34 secured to pulleys 25 and 26 by bolts 35.

Pulleys 25 and 26 are connected by belts 42 and 43 to small and large pulleys 44 and 45 respectively, each of which is keyed to shaft E. Shaft E is journaled by a frictionless bearing at 50 at its lower end upon a bracket 51 carried by the right rear pillar K (see Fig. 6) and at its upper end by a frictionless bearing 52 disposed within head plate J.

The elements thus far described constitute the power and speed transmission parts of the machine by means of which the speed of rotation of shaft E may be varied. To facilitate operation of clutch 27 in effecting a change of the speed of shaft E a hand lever 36 is mounted in compartment N of casing L and is connected by a rod 37 with a pivotally mounted finger 38 having parts engageable with a circumferential groove 40 on clutch disc 27. To change the speed of shaft E the operator need only open door M and manipulate, in one direction or the other, the lever 36 which is in a convenient position extending towarl the front of the casing.

The upper end of shaft E extends above head plate J and within a depressed portion 55 formed in the top thereof. The upper end of shaft E is externally threaded at 54 to receive an internally threaded bore 57 in a circular body 58 forming a part of the eccentric mechanism F. Body 58 has a deep groove 59 extending diammetrically across the top 60, which groove is formed with inwardly extending guide lugs 61 upon and between which a counterweight 62 is seated and free to slide longitudinally of the groove.

Counterweight 62 is substantially U-shape in cross section (see Fig. 8). A top plate 63 is secured to body 58 at 64 so as to confine the counterweight against lateral or vertical movement.

The eccentric mechanism further includes head 65 slidably mounted within an inner and enlarged portion 66 of a groove 67 extending through substantially the entire length of plate 63 and in vertical alignment with groove 59. Head 65 has a vertically extending tubular shaft 68 encompassed by a sleeve 69 for connection with a driving pitman for interconnecting the eccentric mechanism F and rocker arm A as hereinafter described. Sleeve 69 has at its base a radially extending flange 70, the lower face of which is serrated, as shown at 71, which serrations are engageable with complementary serrations 72 formed on the upper surface of plate 63. A compression spring 73 serves normally to maintain the serrated portions of flange 70 and plate 63 apart during adjustment of the eccentric mechanism. A guide pin 74 is carried by flange 70 and extends through slot 67 and within a socket 75 in the adjacent upper wall of head 65, serving to maintain serrations 71 and 72 in alignment while out of engagement as during adjustment.

Means for locking head 65 and sleeve 69 against movement with respect to rotatable body 58 to maintain them in adjusted position, comprises a hand grip 89 concentric with shaft 68 and carried upon the upper end of an internally threaded sleeve 88 that is engageable with an external threaded part 87 of shaft 68. A relatively strong compression spring 77 is mounted concentric with

shaft 68 between the adjacent ends of sleeve 88 and sleeve 69. Spring 77 is stronger than spring 73, hence tightening of hand grip 89 will cause sleeve 69 to move toward plate 63, and head 65 will be simultaneously drawn upward so as to tightly lock the parts with respect to body 58.

The mechanism for adjusting head 65 and hence sleeve 69 with respect to the vertical axis of rotating body 58 comprises a shaft 78 rotatably mounted within the bore of shaft 68 with one end 79 extending below head 65. A bevelled gear 80 is carried by end 79 of shaft 78 in mesh with a bevelled pinion 81 fixed to a shaft 82 which is rotatably mounted upon a plate 83 secured at 84 to head 65. A flange 85 formed on shaft 82 rests against one side of plate 83 and the end of pinion 81 bears against the other side of the plate so as to prevent longitudinal movement of the shaft. Shaft 82 has a threaded portion 86 engageable with an internally threaded sleeve 63*a* supported upon a depending part 63*b* of top plate 63 and within groove 58. Rotation of shaft 78 will cause screw 86 to turn and propel head 65 along groove 66—67.

I have provided by the movable counterweight 62 of eccentric mechanism F a means for maintaining a substantially uniform distribution of weight with respect to the axis of shaft E throughout the various adjusted positions of head 65. Counterweight 62 has a rack 62*a* formed on one wall of a grooved part 62*b* thereof, the teeth of which are in mesh with a pinion 78*a* carried upon end 79 of shaft 78. When shaft 78 is turned to move head 65 to the right (see Fig. 9) counterweight 62 will slide to the left, and vice versa, compensating for the change in the distribution of weight caused by movement of head 65. I consider this feature of the machine of particular importance since it makes possible the use of relatively high speed at various amplitudes of movement of the rocker arm without damage to the force translating parts due to internal vibration.

A connecting rod 92 is journaled by frictionless bearing at 93 upon sleeve 69 and at the other end at 94, similarly by a frictionless bearing as shown in Fig. 10, to rocker arm A to a point at one side of the pivotal axis 95 of the rocker arm. Rotational movement of shaft E is therefore translated into oscillatory movement of arm A and substantially rectilinear vibratory movements of such applicators as may be attached to hooks B thereof.

In order to facilitate adjustment of head 65 with respect to body 58 a hand knob 90 is secured to the upper end of shaft 78 and immediately above hand grip 89. Knob 90 has a skirt 91 at its lower edge upon which indicia relative to the amplitude of the vibratory movement is inscribed so that the operator may accurately adjust the eccentric mechanism to the desired length of stroke.

Journals 22, 23, 50, 52, 93 and 94 all have suitable lubricating passages, as also have the bearings for pulleys 25 and 26. This construction greatly adds to the efficient and smooth transmission and translation of power from motor C to oscillating rocker arm A.

A front panel 100 within casing L serves to enclose that portion of the casing below compartment N when door M is open. This panel has a knob 101, which may be gripped to lift the panel out of its place, affording access to motor C and the speed transmission and control parts D.

Compartment N has a shelf 103 dividing the compartment into two parts for storing the various types of applicators with which the machine is intended to operate, such as broad and narrow belt applicators 104 and 105, vacuum cup applicator 106 and pad applicator 107. Door M has clips 107 and pins 108 for supporting an applicator rod 109 and a bar applicator 110 as shown.

An upper casing 115 supported upon head plate J entirely surrounds that portion of the mechanism carried above head plate J except for the outer ends of rock shaft A and the adjusting mechanism G which must necessarily extend without the casing.

A removable plate 116 covers the top of upper casing 115 and is secured thereto by thumb screws 117. This plate need only be removed for the lubrication of eccentric mechanism F and bearing 94.

A switch 119 is mounted upon the front wall of upper casing 115 for the purpose of controlling the circuit to motor C.

In order to facilitate accurate alignment of the internal assembly of parts supported upon frame H—K—J pillars K are connected with base plate H and head plate J by extending the lower and upper ends respectively of the pillars in sockets 120 in the base plate and head plates respectively, all of which have set screws 121 permitting relative movement for the purpose of permanent adjustment between plates and pillars during assembly. This arrangement also permits the correcting of any warping of the parts through abuse, though this condition is not apt to occur because of the inherent sturdy construction of the parts as described.

Belt applicators 104 and 105 consist of a length of woven fabric having leather end pieces 130 at their opposite ends fashioned to form an elongated loop or eyelet which may be passed over hooks B so as to secure the opposite ends of the belts to opposite ends of vibrating rocker arm A. This type of applicator (see Fig. 15) may be used by passing the belt partially about the body of the patient so that the entire surrounding area is moved with the belt to vigorously knead the adjacent body tissues. By this use of the

applicator excess fatty portions of the body may be reduced without injury to the patient Belt applicators may also be used by securing but one end of the belt to one of the hooks B and wrapping the belt about the body or limbs while the patient holds the opposite end of the belt in his or her hand.

Pad applicator 107 and vacuum cup applicator 106 are supported upon rod 109. This rod (see Fig. 11) has a leather eyelet 135 at one end through which one of the hooks B is passed and a screw-threaded socket 136 at its opposite ends, upon which pad 107 or cup 106 is mounted by inserting stud screws 137 embedded therein within screw socket 136. In order that the patient may guide and hold the applicator to various parts of the body while the device is in use a sleeve 140 encompasses rod 109 and is slidably mounted thereon so that the rod is free to move through the sleeve when the sleeve is gripped in the hand (see Fig. 13). Fig. 18 illustrates a patient applying the vacuum cup applicator to the back and guiding rod 109 by gripping sleeve 140.

In Fig. 12, I have illustrated an enlarged sectional view of the vacuum cup applicator. This cup is constructed of soft rubber and has an air valve 138 in the side wall thereof with an adjustment screw 139 for controlling the ingress and egress of air to and from the interior thereof. In use this valve permits the patient to control the atmospheric depression within the cup and is particularly useful in adapting the device for use by patients having different characteristics as to the tenderness of the outer fleshy tissues. A child, for instance, having quite tender flesh would require but slight atmospheric depression within the cup to bring about intense surface circulation.

In Fig. 14 I have illustrated the bar type of applicator 110. This applicator has leather terminal members 150 having loops or eyelets fashioned therein through which hooks B may be passed. The major portion of the bar is parallel with rocker arm A and in use the patient grips the bar, preferably with both hands, with the hands in front or in back, and vibratory movement is thus imparted through the arms to the entire upper portion of the body. Exercise with the bar applicator is particularly useful in inducing general cellular massage and in overcoming a weak or feeble blood circulation with its attendant skin disorders.

In operation the massage and exercising machine preferably rests directly upon the floor in such position as to allow sufficient space in front of the machine for the patient to stand or sit upon a chair or bench. Prior to starting motor C or while clutch 27 is disengaged and in its neutral position, an applicator is selected from the various types herein described and attached to hooks B. If one of the belt applicators or bar applicator 110 is selected the opposite ends of the applicator are attached with each end engaged with a hook B. If the pad or vacuum cup applicators are used then rod 109 which supports the pad or cup is attached to one of hooks B. When the applicator has been so attached motor C is started by turning switch 119 at the front of the machine. Power from motor C is transmitted to rotating shaft D at a speed determinable by the position of clutch 27. This rotational movement of shaft D is translated by eccentric mechanism F to an oscillatory movement of rocker arm A and to substantially rectilinear movement of the end of the applicator.

Should the patient desire to alter the speed of the vibratory movement door M is opened and lever 36 moved to its opposite position. Thus reducing or increasing the speed of shaft D depending upon the initial position of lever 36.

If, however, the length or amplitude of the vibrating movement of the applicator is to be changed hand grip 89 is first turned to the left so as to relieve spring 77 of its thrust against sleeve 69 and to permit spring 73 to raise the sleeve and disengage the complementary serrations on its lower face and on plate 63. During this operation motor C should be turned off or clutch 27 moved to neutral position although this is not absolutely essential.

Rotation of hand grip 90 while the parts are in the position thus described will cause head 65 together with sleeve 69 to move with respect to the axis of shaft E to vary the stroke of connecting rod 92 and thus vary the amplitude of oscillatory movement of rocker arm A. As head 65 moves in one direction, counterweight 62 will be driven in the opposite direction to compensate for the variation in the distribution of the mass of head 65 and its associated mechanism. The moving parts of eccentric mechanism F are thus maintained at all times in a condition of equilibrium as to distribution of their weight thereby eliminating internal vibration during use.

When the adjustment has been made hand grip 89 is turned to the right to cause spring 77 to become compressed and move sleeve 69 toward plate 63. If the serrations on flange 70 and plate 63 do not at once engage they will do so upon operation of the device and spring 77 will serve to maintain further engagement against the force of the weaker spring 73.

One of the important advantages possessed by my improved vibrating machine is that the amplitude of the vibratory movement imparted to the various applicators may be predetermined by adjustment mechanism G in the manner described. This is accomplished without altering or changing in any way the

relative movement as between the opposite ends of the rocker arm so that the movement of the opposite ends of the rocker arm is at all times complementary, thus inducing uniform movement of such applicators as are connected with the opposite ends thereof.

What I claim and desire to secure by Letters Patent is:

1. In a massage and exercise machine a movable arm for supporting an applicator thereupon, a driven shaft, means including a connecting rod having a variable eccentric connection with said shaft for translating rotational movement of the shaft to oscillatory movement of the arm and for varying the amplitude, of said oscillatory movement at will and other means associated with said eccentric connection for compensating for the shifting of mass in the eccentric connection as the connection is varied, thereby eliminating inherent vibration in the connection.

2. In a massage and exercise machine, a pair of spaced apart movable applicator supports, power driven means for moving the supports in a common plane to impart vibratory movement to an applicator applied thereto, means for varying the amplitude of movement of said power driven means and means for compensating for the shifting of mass in said amplitude varying means.

3. In a massage and exercise machine, a pair of spaced apart movable applicator supports, power driven means for moving the supports in a common plane to impart vibratory movement to an applicator attached thereto, means for varying the amplitude of movement of said power driven means, means for compensating for the shifting of mass in said amplitude varying means, and a single operating means for controlling said amplitude varying means and for shifting said compensating means.

4. In a massage and exercise machine, a pair of spaced apart movable applicator supports, power driven means for moving the supports in a common plane to impart vibratory movement to an applicator attached thereto, means for varying the amplitude of movement of said power driven means, means for compensating for the shifting of mass in said amplitude varying means, operating means for said amplitude varying means, and means for automatically shifting said compensating means upon movement of said operating means.

5. In a massage and exercise machine, a movable arm for supporting an applicator thereupon, a driven shaft, means including a connecting rod having a variable eccentric connection with said shaft for transmitting rotational movement of the shaft to oscillatory movement of the arm and for varying the amplitude of said oscillatory movement at will, a counter weight associated with said eccentric connection, operating means for simultaneously shifting said amplitude varying means and said eccentric weight in opposite directions.

6. A massage and exercising machine comprising a movable arm for supporting an applicator thereon, a power driven shaft, a body member on said shaft rotatable on the axis thereof, a shiftable eccentric member on said body, means operatively connecting said eccentric with said arm, means for shifting said eccentric member in a direction laterally of said axis, and a counterweight in said body shiftable in a direction opposite to the shifting of said eccentric.

7. A massage and exercising machine comprising a movable arm for supporting an applicator thereon, a power driven shaft, a body member on said shaft rotatable on the axis thereof, a shiftable eccentric member on said body, means operatively connecting said eccentric with said arm, means for shifting said eccentric member in a direction laterally of said axis, a counterweight in said body shiftable in a direction opposite to the shifting of said eccentric, and common operating means for controlling the shifting of said eccentric and said counterweight.

8. A massage and exercising machine comprising a movable arm for supporting an applicator thereon, a power driven shaft, a body member on said shaft rotatable on the axis thereof, a shiftable eccentric member on said body, means operatively connecting said eccentric with said arm, said eccentric member comprising a head, a depending arm on said head, a longitudinally movable shaft engaging said depending arm for shifting said depending arm and said head laterally of said axis, means for moving said shaft longitudinally and means for compensating for the shifting of mass of said eccentric member.

9. A massage and exercising machine comprising a movable arm for supporting an applicator thereon, a power driven shaft, a body member on said shaft rotatable on the axis thereof, a shiftable eccentric member on said body, means operatively connecting said eccentric with said arm, said eccentric member comprising a head, a depending arm on said head, a longitudinally movable shaft engaging said depending arm for shifting said depending arm and said head laterally of said axis, means for moving said shaft longitudinally, means for compensating for the shifting of mass of said eccentric member, and manually operable means for simultaneously controlling the shifting of said eccentric and said compensating means in opposite directions.

10. A massage and exercising machine comprising a movable arm for supporting an applicator thereon, a power driven shaft, a body member on said shaft rotatable thereon on the axis thereof, an adjustable eccentric

member rotatable with said body member, a connecting rod operatively connecting said arm with said eccentric member, a depending arm on said eccentric member, a longitudinally movable, rotatable shaft engaging said depending arm, for adjusting said eccentric, means engaging said shaft adapted to move the same longitudinally when said shaft is rotated, means for rotating said shaft, and a counterweight in said body shiftable in a direction opposite to the longitudinal movement of said shaft.

11. A massage and exercising machine comprising a movable arm for supporting an applicator thereon, a power driven shaft, a body member on said shaft rotatable thereon on the axis thereof, an adjustable eccentric member rotatable with said body member, a connecting rod operatively connecting said arm with said eccentric member, a depending arm on said eccentric member, a longitudinally movable, rotatable shaft engaging said depending arm, for adjusting said eccentric, means engaging said shaft adapted to move the same longitudinally when said shaft is rotated, means for rotating said shaft, compensating means in said body to maintain the distribution of mass in said body substantially constant, and means for shifting said compensating means.

12. A massage and exercising machine comprising a movable arm for supporting an applicator thereon, a power driven shaft, a body member on said shaft rotatable thereon on the axis thereof, an adjustable eccentric member rotatable with said body member, a connecting rod operatively connecting said arm with said eccentric member, a depending arm on said eccentric member, a longitudinally movable, rotatable shaft engaging said depending arm, for adjusting said eccentric, means engaging said shaft adapted to move the same longitudinally when said shaft is rotated, intermeshing gears for rotating said shaft, compensating means in said body to maintain the distribution of mass in said body substantially constant, said compensating means comprising a weight having a rack thereon, a pinion intermeshing with said rack, and means for simultaneously operating said intermeshing gears and said pinion.

In witness whereof, I hereunto subscribe my name this 25 day of April, 1928.

FRITZ A. ANDERSON.