The present invention relates to machines for imparting a massaging action to areas of the human body to which the machine is applied.

An object of the present invention is to provide a massage machine for imparting a massaging action to a person's body, which is relatively quiet in its operation.

Another object of the invention is to provide a massage machine for imparting a massaging action to a person's body through the rotation of an eccentric device at one end of the machine, the other end of the machine being permitted to partake of a universal or gyratory motion by a non-rotatable flexible coupling or connection capable of withstanding severe strain, and which has a long life.

A further object of the invention is to provide an improved massage machine for imparting a massaging action to a person's body, which is of strong and sturdy construction, possesses a long, useful life, and which is relatively economical to produce.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of a form in which it may be embodied. This form is shown in the drawings accompanying and forming part of the present specification. It will now be described in detail, for the purpose of illustrating the general principles of the invention; but it is to be understood that such detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawings:

Figure 1 is a longitudinal section, with parts shown in elevation, through a massage machine embodying the invention;

Fig. 2 is a cross-section taken along the line 2—2 on Fig. 1;

Fig. 3 is a cross-section taken along the line 3—3 on Fig. 1;

Fig. 4 is a fragmentary, longitudinal section taken along the line 4—4 on Fig. 1;

Fig. 5 is an exploded isometric projection of a part of the flexible coupling or connection at the left end of the massage machine shown in Fig. 1.

The massage machine disclosed in the drawings is particularly provided for application, either directly or indirectly, to parts of a person's body to impart a massaging action thereon. The machine may also be incorporated in other apparatus or devices to impart its massaging action therethrough. Examples of such other devices are pillows, in which the massage machine is contained, different parts of the person's body being adapted to bear or rest upon the pillows, and similar, in which a person may be seated or reclined, the massaging action being transmitted from the massage machine through the different parts of the chair to the various areas of the person's body. The particular machine illustrated does not impose merely a straight-line, vibratory motion to the person's body, but more in the nature of a circular or gyratory type of motion, so as to actually impart a generally circular massaging action to the various regions of the person's body.

The massage machine includes an electric motor 10 of any suitable type, which may be secured to a motor frame 11, as by means of the screws 12. Actually, the stationary motor casing and the frame constitutes a single functional unit, the motor proper 10 and the frame 11 merely being made separate for convenience of manufacture.

Extending from one end of the motor casing is an armature shaft 13, the extended portion of which is preferably square in cross-section and extends snugly through a companion square bore in an eccentric 14 having the desired degree of eccentricity or throw. The eccentric 14 is made of a synthetic resin so that it can be forced against the armature shaft to provide a snug fit therebetween. Because of its characteristics, the synthetic resin eccentric minimizes the generation and transmission of sound. It has been found that the making of the eccentric from a synthetic resin reduces the noise level of the massage machine to a considerable extent without adversely affecting its operation.

The eccentric 14 is retained upon the armature shaft 13 against endwise displacement therealong in any suitable manner, as by means of a cotter pin 15 adjacent the outer end of the eccentric and extending through a transverse hole 16 in the armature shaft.

Snugly surrounding the eccentric is an inner race 17 of a radial type of roller bearing 18, around which ride ball bearing elements 19, which, in turn, ride upon an outer race 20 surrounding the bearing elements and the inner race. This outer race is disposed within a bearing support 21 encompassing the entire bearing structure 18, the outer race preferably being secured to the bearing support against rotation through the intermediary of a plurality of circumferentially spaced rubber buttons or segments 22, which will permit some relative gyratory motion to occur between the bearing support 21 and the bearing 18, eccentric 14 and shaft 13 disposed therewithin.

The bearing support 21 actually forms one end of a main frame 23 through which the massaging action, resulting from the rotation of the eccentric 14, is transmitted. Extending substantially radially from the bearing support 21 is an arm 24 integral therewith, or otherwise suitably secured thereto, the outer end of this arm being integral with or otherwise suitably secured to a base or shoe plate 25 extending to one side of and generally lengthwise of the electric motor 10 to its opposite end. The other end of the shoe plate 25 is integral with, or is suitably secured to, another generally radial arm 26 which extends inwardly toward the axis of the massage machine, the inner portion of this arm being integral with a cross-piece or bar 27, to which the end of the electric motor frame 11 is attached through the agency of a flexible connection or coupling 28. Extending generally radially from the cross-piece or bar 27 is an arm extension 29 integral therewith.

The flexible connection or coupling 28 will permit the left-hand portion of the electric motor and of the main frame 23 to have a relative gyratory or universal motion, so as to permit proper operation of the rotatable eccentric 14 in imparting the circular or gyratory action to the main frame of the machine. As specifically disclosed, the flexible coupling comprises a plate 30, preferably made of a fibrous material, extending in a plane substantially parallel to the motor axis. The fibrous or flexible plate, of a suitable thickness, includes a body portion 31, extending across the inner surface 32 of the cross-piece or bar and bears against this surface. In order to increase the bearing area of the plate 30 against the cross-piece or bar 27 and the effective cross-section
of the flexible plate, to withstand the gyratory action, the arm extension 29 is provided with a groove 33 to permit the body portion 31 of the flexible plate to be disposed under the extension 29 against a greater area of the surface 32 of the cross-piece. During the flexing of the arm extension 29 and the other parts of the figure, the arm extension 29 is a pair of outer arms 34 of the plate that lie snugly against the sides of the extension. These arms have holes 35 therethrough through which screws 36 may pass into companion threaded holes 37 in the cross-piece 27, the heads 38 of the screws preferably being against washers 39 engaging the outer surface of the plate 30, in order to firmly secure the flexible plate to the cross-piece or bar.

The inner portion of the flexible plate 30 is disposed within or under a transverse flange 40 integral with and extending axially of the motor housing or frame 11. This flange lies substantially parallel to the surface 32 of the cross-piece or bar 27 and bears against the flexible plate 30. The latter plate is firmly secured to the motor housing flange 40 by bolts 41 extending through holes 42, 43 in the flange and flexible plate, the heads 44 of the bolts bearing against washers 45 engaging the outer surface of the flange 40, whereas the nuts 46 threaded on the bolts may bear against washers 47 engaging the opposed surface of the flexible plate 30, in order to clamp the plate firmly against the inner surface of the transverse flange 40.

As the eccentric motor shaft 13 rotates, the eccentric 14 imposes a gyratory action to the right end of the main frame 23 (as seen in Fig. 1), in which the eccentric, bearing 18, and rubber pillow blocks 22 are carried. During such eccentric rotation, the flexible plate 30 can deflect to a sufficient extent as to permit the gyratory action to take place. The flexible plate 30 may be made of fiber, leather, or similar material. In view of its arrangement and coaction with the motor frame 11 and the arm 26 of the main frame 23 of the apparatus, it possesses a long and effective life, without breakage or tearing.

The massage action, due to the rotating eccentric 14, is imparted to a cup-shaped closure member 50, the skirt portion 51 of which is adapted to slide and fit snugly over the bearing support 21, this skirt having a notch or groove 52 through which the radial arm 24 of the main support 23 can extend. This cup-shaped member 50 is secured to the bearing support 21 by circumferentially spaced screws 53, the gyration or massage action imparted by the eccentric to the bearing support 21 being transmitted to the cup-shaped closure member. It preferably has an imperforate end wall 54, so that other devices (not shown), such as rubber members, may be fitted readily over the cup-shaped member 50 for application to different parts of a person's body, the massaging action being transmitted through such other devices to the desired region or regions of a person's body.

A cup-shaped closure member 60 is also provided at the other end of the main frame 23, this cup-shaped closure member fitting snugly over the outer end of the arm extension 29 and around the outer circular surfaces 61 of the cross-piece or bar 27. This cup-shaped member 60 also is provided with a groove or notch 66 through which the radial arm 26 can pass. The cup-shaped closure member 60 is firmly secured to the arm by means of screws 62 threaded into the extension 29 and cross-piece 27. The end wall 63 of the closure member 60 has a bushing 64 therein through which an electric line or cord 65 passes, that runs to the electric motor 10, to deliver the required current thereto.

With the apparatus described, a massage action can be imparted to different parts of the body, the machine being relatively quiet running, because of the synthetic resin or plastic eccentric 14, and its snug fit upon the squared armature shaft 13, the eccentric motion being transmitted through the ball bearing 18, and the circumferentially spaced rubber pillow blocks 22 to the bearing support 21, from which it is imparted to the main frame 23, including the arms 24, 26 and shoe plate 25. It is also transmitted to the cup-shaped closure members 50, 60 at opposite ends of the machine. Such closure members, disposed on opposite sides of the arm extension 29 and to the arm extension 27. It is found that such flexible plate and its mode of connection to its companion members provides a flexible or universal connection between the motor and its supporting structure or frame having an exceedingly long life.

This application is a continuing-in-part of application Serial No. 523,486, filed July 21, 1955.

The inventor claims:

1. In a massage machine: a frame having a base and spaced arms extending inwardly from said base; a bearing support integral with one of said arms; an electric motor between said arms extending lengthwise of said base, said motor including an armature shaft extending from one end thereof having a portion polygonal in cross-section; a non-metallic eccentric disposed snugly on said polygonal portion; a bearing on said eccentric; a pliant, elastic means engaging said bearing and bearing support for yieldably transmitting the action of said eccentric to said frame; and flexible means providing a universal support between the other end of said motor and the other of said arms.

2. In a massage machine: a frame having a base and spaced arms extending inwardly from said base; a bearing support integral with one of said arms; an electric motor between said arms extending lengthwise of said base, said motor including an armature shaft extending from one end thereof having a portion polygonal in cross-section; a non-metallic eccentric disposed snugly on said polygonal portion; a bearing on said eccentric; a pliant, elastic means engaging said bearing and bearing support for yieldably transmitting the action of said eccentric to said frame; and flexible means providing a universal support between the other end of said motor and the other of said arms.

3. In a massage machine: a frame having a base and spaced arms extending inwardly from said base; a bearing support integral with one of said arms; an electric motor between said arms extending lengthwise of said base, said motor including an armature shaft extending from one end thereof having a portion polygonal in cross-section; a non-metallic eccentric disposed snugly on said polygonal portion; a bearing on said eccentric; a pliant, elastic means engaging said bearing and bearing support for yieldably transmitting the action of said eccentric to said frame; a cross-piece secured to said other of said arms extending transversely of the axis of said motor; a flange fixed to and extending from said motor; a substantially flat fibrous member extending between and engaging said frame and flange; and means securing said fibrous member to said cross-piece and flange.

4. In a massage machine: a frame having a base and spaced arms extending inwardly from said base; an electric motor between said arms extending lengthwise of said base, said motor having a rotatable shaft extending from one end thereof; eccentric means connecting said shaft to one of said arms; a cross-piece secured to the other of said arms and having a surface extending transversely of the axis of said motor; a flange fixed to and extending from said motor; a relatively flat fibrous member extending between and engaging said surface and flange; and means securing said fibrous member to said cross-piece and flange.
5. In a massage machine: a frame having a base and spaced arms extending inwardly from said base; an electric motor between said arms extending lengthwise of said base, said motor having a rotatable shaft extending from one end thereof; eccentric means connecting said shaft to one of said arms; a cross-piece secured to the other of said arms and having a surface extending transversely of the axis of said motor; a flange fixed to and extending from said motor; a substantially flat fibrous member extending between and engaging said surface and flange and disposed on opposite sides of a plane radial of said motor axis and normal to said fibrous member; and means securing said fibrous member to said cross-piece and flange on opposite sides of said plane.

6. In a massage machine: a frame having a base and spaced arms extending inwardly from said base; an electric motor between said arms extending lengthwise of said base, said motor having a rotatable shaft extending from one end thereof; eccentric means connecting said motor shaft to one of said arms; a cross-piece secured to the other of said arms and having a surface extending transversely of the axis of said motor; an extension secured to said cross-piece and extending generally radial thereof, said extension defining a groove with said surface; a relatively flat fibrous member extending between and engaging said surface and flange and disposed in said groove; means securing said member to said flange; and means on opposite sides of said extension securing said member to said cross-piece.

7. In a massage machine: a frame having a base and spaced arms extending inwardly from said base; a bearing support integral with one of said arms; an electric motor between said arms extending lengthwise of said base, said motor including an armature shaft extending from one end thereof and having a portion polygonal in cross-section; a non-metallic eccentric disposed snugly on said polygonal portion; a bearing on said eccentric; a pliant, elastic means engaging said bearing and bearing support for yieldably transmitting the action of said eccentric to said frame; a cross-piece secured to the other of said arms and having a surface extending transversely of the axis of said motor; a flange fixed to and extending from said motor; an extension secured to said cross-piece and extending generally radially thereof, said extension defining a groove with said surface; a relatively flat fibrous member extending between and engaging said surface and flange and disposed in said groove, said fibrous member extending on opposite sides of a plane radially of said motor axis and normal to said member; means securing said member to said flange; and means on opposite sides of said extension securing said member to said cross-piece.

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