

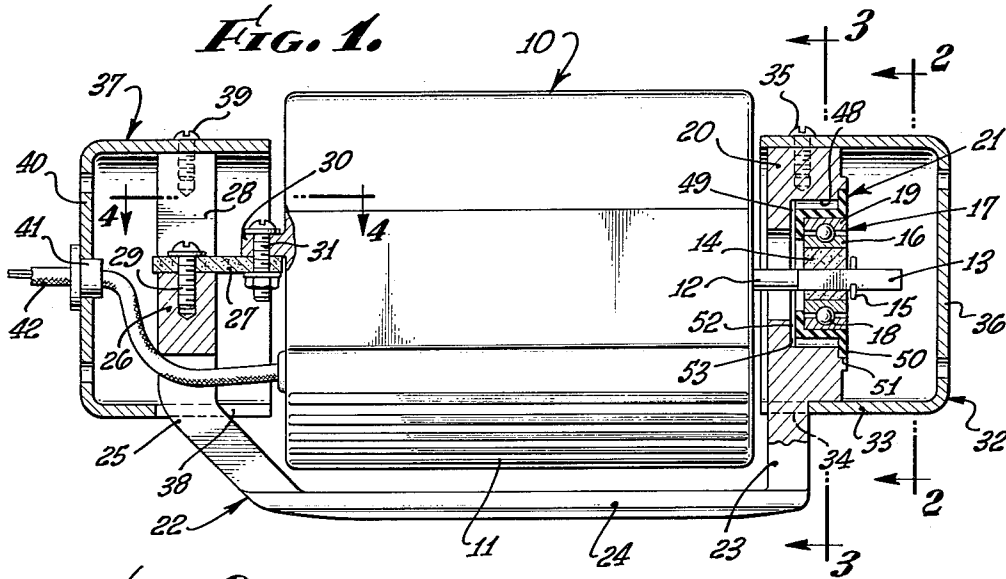
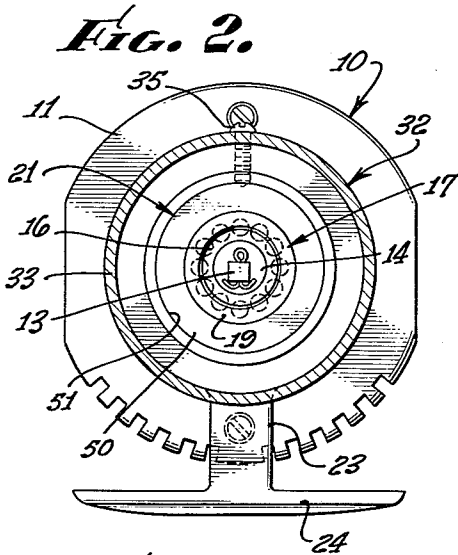
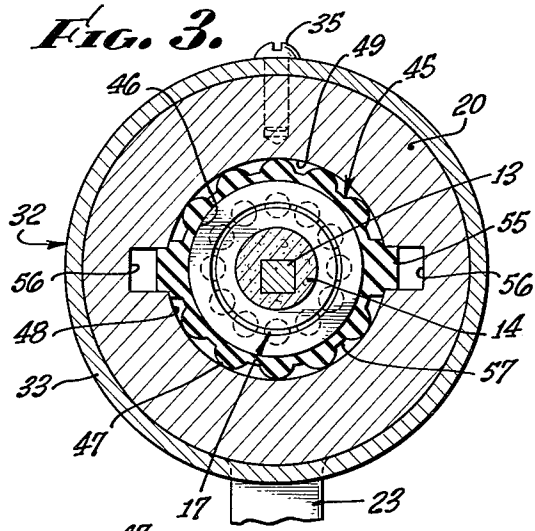
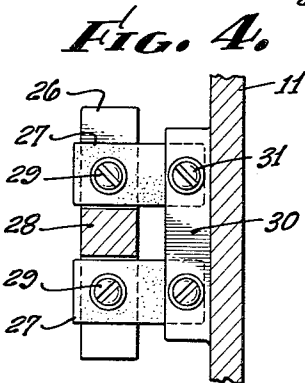
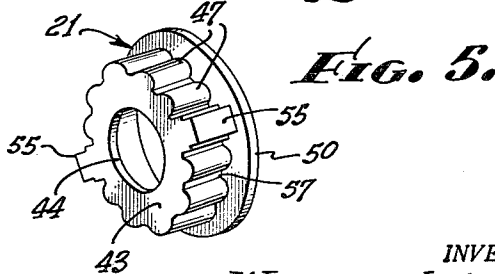
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MASSAGE APPARATUS

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3,050,352

## MESSAGE APPARATUS

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The present invention relates to massage apparatus, and more particularly to apparatus for mechanically imparting an oscillatory or gyratory massaging action to a person's body.

An object of the invention is to provide massage apparatus in which the massage action is developed by an eccentric device rotating within the frame of the apparatus, and in which the eccentric device is rotatably supported in the frame through a pliant, elastic cushioning member that enables the axis of rotation of the eccentric to shift radially of the frame, to tilt with respect thereto, and to move axially thereof, so as to insure effective transmission of the eccentric action to the frame and long life of the apparatus.

Another object of the invention is to provide massage apparatus in which the massaging action is developed by an eccentric device rotating within the frame of the apparatus, the eccentric device being rotatably mounted in a bearing which, in turn, is supported in a pliant, elastic member mounted in the frame in such manner as to prevent arcuate bodily shifting of the member in the frame, but to permit yieldable gyratory motion and axial shifting of the eccentric device relative to the frame.

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 side elevational view, with parts shown in longitudinal section, through a massage apparatus embodying the invention;

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

FIG. 3 is an enlarged cross-section taken along the line 3—3 on FIG. 1;

FIG. 4 is a cross-section taken along the line 4—4 on FIG. 1;

FIG. 5 is an isometric projection of the cushioning member employed at the eccentric end of the apparatus.

The massage apparatus shown in the drawings is particularly adapted for application either directly or indirectly to parts of a person's body for the purpose of imparting a massaging action thereto. The apparatus may be applied directly to the person's body, or may be incorporated in other apparatus or devices to impart its massaging action therethrough to the person's body. Examples of such other devices are pillows in which the massage apparatus can be contained, different parts of a person's body being adapted to bear or rest upon the pillow; chairs in which persons may be seated or reclined, a massaging action being transmitted from the machine through different parts of the chairs to the various areas of the bodies of the persons; and tables on which persons may rest to have the massaging action transmitted from the apparatus to them. The particular apparatus 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 motion to actually impart a generally

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circular massaging action to the various regions of the person's body.

The massage apparatus includes an electric motor 10. Extending from one end of the motor casing 11 is an armature or rotor shaft 12, the extended portion 13 of which is preferably square in cross-section and fits snugly through a companion square bore in an eccentric 14 having the desired degree of eccentricity or throw. The eccentric is preferably made of a synthetic resin so that it can be forced upon the armature shaft to provide a snug fit therewith. 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 of synthetic resin reduces the noise level of the massage apparatus 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 to the outer end of the eccentric and extending through the armature shaft.

Surrounding the eccentric is an inner race 16 of a radial type of rollable bearing 17, around which ride ball bearing elements 18. These elements, in turn, ride upon an outer race 19 surrounding the bearing elements and the inner race. This outer race 19 is disposed within a bearing support 20 encompassing the entire bearing structure, the outer race 19 being fitted within a pliant, elastic cushioning member 21 of rubber or rubber-like material received within the bearing support.

The bearing support 20 actually forms one end of a main frame 22 through which the massaging action, resulting from the rotation of the eccentric 14, is transmitted. Extending substantially radially from the bearing support 20 is an arm 23 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 24 extending to one side of or generally lengthwise of the electric motor 10 to its opposite end. The other end of the shoe plate 24 is integral with or is suitably secured to another generally radial arm 25 which extends inwardly towards the axis of the massage apparatus, the inner portion of this arm being integral with a cross-piece or bar 26 to which the rear end of the electric motor casing 11 is attached through the agency of flexible connections 27. Extending generally radially from the cross-piece or bar 26 is an arm extension 28 integral therewith.

The flexible connections or couplings 27 will permit the left-hand or rear portion of the electric motor 10 and of the main frame 22 to have a relatively gyratory or universal motion, to permit appropriate operation of the rotatable eccentric 14 in imparting a circular or gyratory action to the main frame of the machine. As disclosed the flexible coupling includes plates or strips 27, preferably made of the fibrous material, disposed in a plane substantially parallel to the motor axis. The fibrous or flexible strips of a suitable thickness extend across the inner surface of the cross-piece or bar 26, being secured to the latter by screws 29. The inner portion of the flexible plates or strips 27 are disposed under a transverse flange 30 integral with and extending axially of the rear end wall of the motor housing or casing 11. This flange lies substantially parallel to the crosspiece or bar 26 and bears against the flexible strips 27, the latter being firmly secured to the motor housing flange by bolts 31.

As the electric motor shaft 12 rotates, the eccentric 14 imposes a gyratory action to the right or forward end of the main frame 22 in which the eccentric bearing 17 and rubber or rubber-like cushioning member 21 is carried. During such eccentric rotation the flexible strips 27 deflect to a sufficient extent to permit the gyratory ac-

tion to occur. The massage action due to the rotating eccentric is imparted to a cup-shaped closure member 32, the skirt portion 33 of which is adapted to slide and fit snugly over the bearing support 20, this skirt having a notch or groove 34 in which the radial arm 23 of the main support or frame can extend, the cup-shaped member being secured to the bearing support by circumferentially spaced screws 35. The gyratory or massaging action imparted by the eccentric 14 to the bearing support 20 is transmitted to this cup-shaped member 32, which preferably has an end wall 36, so that other devices (not shown), such as rubber members, may be fitted readily thereover for application to different parts of a person's body, a massaging action being transmitted through such other devices to the desired region or regions of the person's body.

A cup-shaped closure member 37 is also provided at the other or rear end of the main frame 22, this cup-shaped member fitting snugly over the outer end of the extension 28 and around the outer circular surfaces of the cross-piece or bar 26. This cup-shaped member 37 also is provided with a notch or groove 38 through which the radial arm 25 can pass and it is firmly secured to the arm structure by screws 39 threaded into the extension 28 and cross-piece 26. The end wall 40 of the closure member has a bushing 41 therein, through which an electric line or cord 42 passes, which runs to the electric motor 10 for the purpose of delivering the required current thereto.

The pliant, elastic cushioning member 21 includes a central base portion 43 having an opening 44 therethrough so as to permit the extended portion 13 of the armature shaft and the eccentric 14 to pass therethrough and be disposed within the inner race 16 of the ball bearing 17. The base 43 is integral with a side wall 45 the inner portion 46 of which is circumferentially continuous, and which embraces the periphery of the outer race 19. The side wall has an outer, interrupted portion forming a plurality of circumferentially spaced protuberances 47 which engage the inner wall 48 of a counterbore 49 in the bearing support 20 in which the cushioning member is received. The side wall 45 merges into an outer end wall 50 constituted as a flange that extends into a recess 51 into which the counterbore 49 opens, the outer flange 50 fittingly snugly into such recess.

The motion of the eccentric 14 is transmitted through the bearing 17 to the cushioning member 21 and from the side wall 45 of the latter and its interrupted protuberances 47 to the side wall 48 of the bearing support 20 defining the counterbore. The cushioning member 21 deforms or deflects sufficiently to permit the eccentric 14 to move in a generally gyratory fashion, a result incident to the rotation of the eccentric and the fact that the rear portion of the motor is flexibly connected to the main frame 22 of the massage apparatus. Thus, the armature shaft 12, in effect, tilts with respect to the main frame 22 and its bearing support 20, and such tilting action is permitted by the elasticity of the rubber or rubber-like cushioning member 21. During the tilting action the shaft 12 also partakes of some axial movement and such axial movement is permitted in yieldable fashion by the cushioning member 21, since the outer bearing race 19 rests against the base portion 43 of the cushioning member. A greater extent of yieldability with respect to both axial movement and tilting motion resulting from the rotation of the eccentric 14 is secured if an initial space 52, which can be relatively small, remains between the outer surface of the base 43 and the bottom 53 of the counterbore. Thus, as disclosed in FIG. 1, the distance from the inner end of the outer flange 50 and the outer end of the base 43 is slightly less than the length of the cylindrical wall 48 of the counterbore 49, which will permit the entire cushioning member 21 to yield axially in a comparatively easy manner, since the main resisting force to such axial movement toward the bottom 53 of

the counterbore is the rubber-like flange portion 50, which bears against the bottom of the recess 51 in the bearing supporting member 20.

As stated above, the inner side wall portion 46 of the cushioning member snugly engages the outer race 19 and resists turning of the outer race with the inner race 16. The cushioning member 21 itself is yieldably prevented from rotating within the bearing support 20 of the main frame 22 by providing one or a plurality of key portions 55 extending outwardly from the side wall 45 of the cushioning member and fitting within companion longitudinal keyways or slots 56 in the bearing support. The key and slot relationship 55, 56 will preclude substantial turning of the cushioning member 21 within the bearing support 20, but will permit a slight yieldable relative motion between the cushioning member and the bearing support to occur.

With the cushioning member 21 disclosed, it is found that the massaging action imparted to the main frame 22 by the rotating eccentric 14 and to the person's body is considerably enhanced. The cushioning member permits the eccentric 14 to appropriately accommodate itself to different angular positions relative to the main frame 22 of the apparatus during rotation of the eccentric. The spaces 57 between the protuberances 47 allow room into which the rotuberances can deform as the eccentric 14 and the bearing 17 move in gyratory fashion with respect to the bearing support 20, the cushioning member 21 always providing an elastic or yieldable eccentric motion transmitting connection between the eccentric device 14 and the bearing support 20. Such gyratory motion is enhanced in view of the ability of the base portion 43 to move toward and away from the bottom 53 of the counterbore, from which it is initially spaced.

The inventor claims:

1. In combination: a bearing support having a counterbore therein; rotatable eccentric means; a bearing on said rotatable eccentric means; a pliant, elastic cushioning member comprising a side wall engaging the bearing and the side wall of said bearing support defining said counterbore, a flange integral with said side wall of said cushioning member and extending outwardly beyond the support side wall for engagement with said bearing support, and a base integral with said side wall of said cushioning member and engaging an end of said bearing and closely adjacent to but spaced from the base of said counterbore.

2. In combination: a bearing support having a generally cylindrical bore therein; rotatable means; a bearing on said rotatable means; a pliant, elastic cushioning member comprising a circumferentially continuous inner side wall engaging the periphery of said bearing and an interrupted outer side wall engaging the cylindrical side wall of said bearing support defining said bore to provide circumferentially spaced void regions around said outer side wall bounded outwardly by said cylindrical side wall; a flange integral with at least one of the side walls of said cushioning member and extending outwardly beyond the support side wall for engagement with an end face of said bearing support adjacent to said bore, and a base integral with said inner side wall and engaging an end of said bearing.

3. In combination: a bearing support having a counterbore therein; rotatable means; a bearing on said rotatable means; a pliant, elastic cushioning member comprising a side wall engaging the bearing and the side wall of said bearing support defining said counterbore, a flange integral with said side wall of said cushioning member and extending outwardly beyond the support side wall for engagement with said bearing support, and a base integral with said side wall of said cushioning member and engaging an end of said bearing and closely adjacent to but spaced from the base of said counterbore; and a key and slot connection between said member and support preventing substantial relative arcuate movement therebetween.

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4. In combination: a bearing support having a generally cylindrical bore therein; rotatable means; a bearing on said rotatable means; a pliant, elastic cushioning member comprising a circumferentially continuous inner side wall engaging the periphery of said bearing and an interrupted outer side wall engaging the cylindrical side wall of said bearing support defining said bore to provide circumferentially spaced void regions around said outer side wall bounded outwardly by said cylindrical side wall; a flange integral with at least one of the side walls of said cushioning member and extending outwardly beyond the support side wall for engagement with an end face of said bearing support adjacent to said bore, and a base integral with said inner side wall and engaging an end of said bearing; said support having a keyway opening into said bore; and a key integral with said side wall disposed in said keyway.

5. In combination: a bearing support having a counterbore therein; rotatable eccentric means; a bearing on said rotatable eccentric means; a pliant, elastic cushioning member comprising a side wall engaging the bearing and the side wall of said bearing support defining said counterbore, a flange integral with said side wall of said cushioning member and extending outwardly beyond the support side wall for engagement with an end face of said bearing support, and a base integral with said side wall of said cushioning member and engaging an end of said bearing and closely adjacent to but spaced from the bottom of said counterbore.

6. In combination: a bearing support having a generally cylindrical counterbore therein; rotatable means; a bearing on said rotatable means; a pliant, elastic cushioning member comprising a circumferentially continuous inner side wall engaging the periphery of said bearing and an interrupted outer side wall engaging the cylindrical side wall of said bearing support defining said counterbore to provide circumferentially spaced void regions around said outer side wall bounded outwardly by said cylindrical side wall; a flange integral with said side wall

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of said cushioning member and extending outwardly beyond the support side wall for engagement with an end face of said bearing support adjacent to said counterbore, and a base integral with said inner side wall and engaging an end of said bearing; said support having a keyway opening into said bore; and a key integral with said side wall disposed in said keyway.

7. In combination: a bearing support having a generally cylindrical counterbore therein; rotatable means; a bearing on said rotatable means; a pliant, elastic cushioning member comprising a circumferentially continuous inner side wall engaging the periphery of said bearing and an interrupted outer side wall engaging the cylindrical side wall of said bearing support defining said counterbore to provide circumferentially spaced void regions around said outer side wall bounded outwardly by said cylindrical side wall; a flange integral with said side wall of said cushioning member and extending outwardly beyond the support side wall and disposed within a recess in said bearing support adjacent to said counterbore, and a base integral with said inner side wall and engaging an end of said bearing and spaced from the bottom of said counterbore; said support having a keyway opening into said bore; and a key integral with said side wall disposed in said keyway.

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