Jan. 14, 1941. F. L. RENGA 2,228,675

VIBRATOR

Filed Jan. 30, 1939

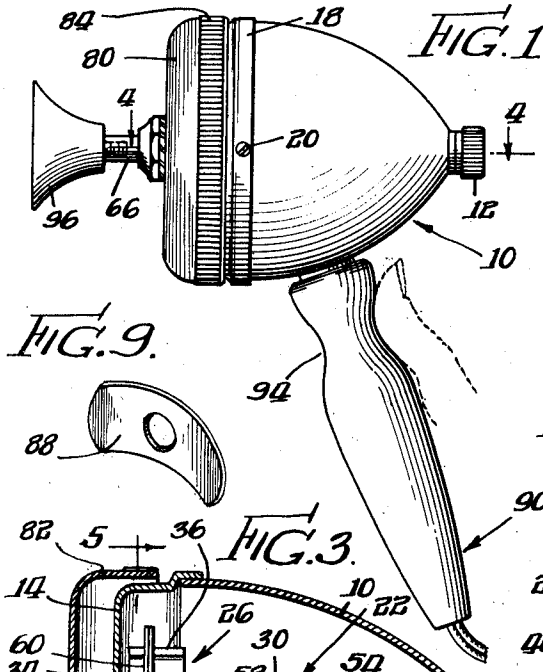


FIG. 1.

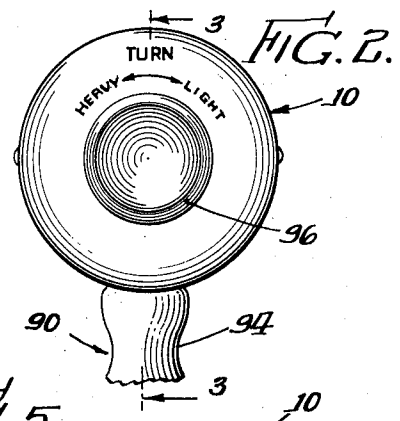


FIG. 2.

FIG. 9.

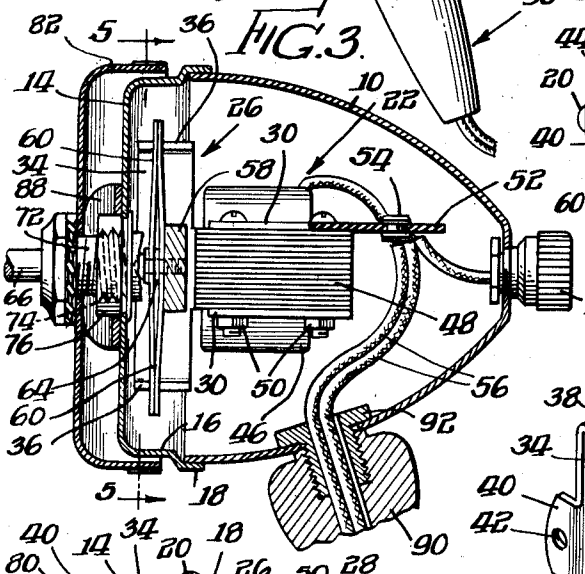


FIG. 3.

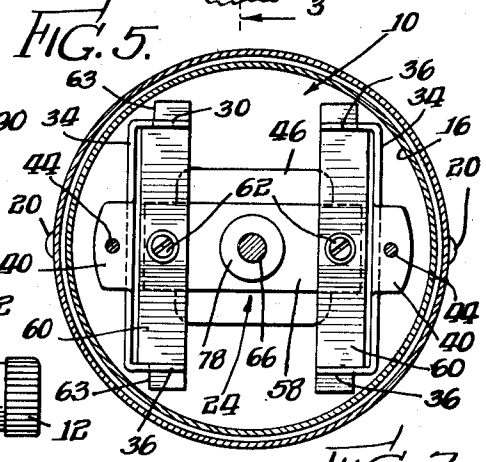


FIG. 5.

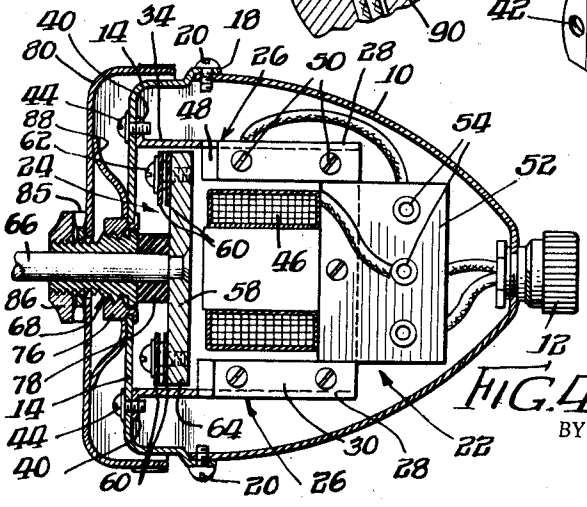


FIG. 4.

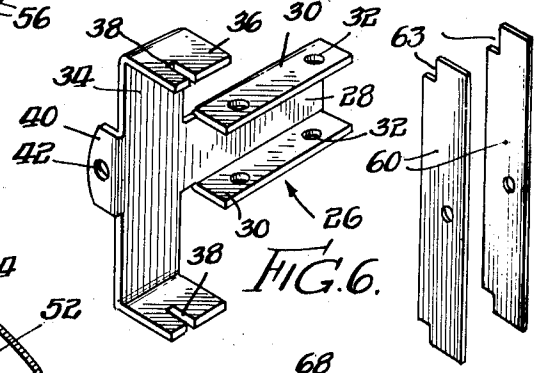


FIG. 6.

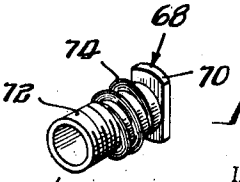


FIG. 8.

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Patented Jan. 14, 1941 2,228,675

UNITED STATES PATENT OFFICE

2,228,675

VIBRATOR

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Application January 30, 1939, Serial No. 253,565

11 Claims. (Cl. 128—52)

The present invention relates to a vibrating or massaging device.

It is an object of the present invention to provide a vibrator which is light and compact, as well as simple and rugged in construction, which may be readily assembled.

The present invention more particularly contemplates the provision of an electric vibrator which is manually adjustable as to the character of the vibrating action produced and which is, accordingly, capable of being arranged to exert the desired degree and force of vibration to satisfy the particular use or user. To this end the present invention provides an electrically vibratable device having relatively movable, manual control parts which are adjustable to damp the effect normally produced and producing a varying damping effect in accordance with the degree of adjustment.

It is therefore an object of the present invention to provide electromotive vibrating means in combination with a resilient damping device adjustably movable against the vibrator for limiting and damping the movement thereof.

Another object of the present invention is to provide a vibrating control device as above which is actuable longitudinally by relatively moving a member providing an end wall or cover for the device.

Among other objects of the invention are to provide improved mounting and supporting means for supporting an electromotive driving member, as well as vibrator supporting members, and adapted to permit assembly of said parts into a unit with a minimum of positive fastening means; to provide a vibrating device in which the vibrator is supported resiliently at two points spaced equally with respect to the vibrating member and adapted to exert a balanced axial force upon the vibrator member to prevent wear of reciprocating parts; and to provide an improved cooperating handle member manually engageable on all sides for facilitating support and control during use.

Numerous other objects and advantages of the present invention will be apparent throughout the course and progress of the following specification, wherein:

Figure 1 is a side elevational view of a vibrator constructed in accordance with the present invention;

Figure 2 is a front elevational view of the device shown in Figure 1;

Figure 3 is a sectional view taken centrally through the vibrator shown in Figure 2 on the line 3—3 thereof;

Figure 4 is a sectional elevation taken through the device shown in the figures on the line 4—4 in Figure 1;

Figure 5 is a sectional view taken vertically through the construction on the line 5—5 in Figure 3;

Figure 6 is a perspective view of one of the mounting brackets;

Figure 7 is a perspective view of the vibrator spring-leaf supports;

Figure 8 is a perspective view of a sleeve forming part of the adjustment assembly; and

Figure 9 is a perspective view of a resilient spring retainer constructed in accordance with the present invention.

Referring to the drawing, wherein one illustrative embodiment of the present invention is disclosed more in detail, in Figures 1 to 5 there are shown a vibrator comprising an outer shell or casing 10 having a somewhat parabolic section in an axial direction, at the apex or relatively narrow extremity of which is mounted a control switch 12 of any conventional type. The opposite face or wide extremity of the shell 10 is closed by a wall 14 forming part of a cap or cover plate and having an annular, laterally extending flange or wall portion 16 terminating in a shell-embracing portion 18. As clearly shown in Figure 2, the annular flange or shell-embracing portion 18 is ultimately assembled positively in position, as shown in Figures 1 and 4, by means of machine screws 20.

The aforesaid shell or casing accommodates an interior mechanism comprising a magnetic actuating means 22 and a resiliently supported actuator assembly 24, which is reciprocated thereby. The foregoing interior assemblies are rigidly supported within the shell by means of a pair of brackets 26 the individual construction of which is shown more in detail in Figure 6. Each of the brackets 26 comprises a rearwardly extending arm 28 flanged inwardly as at 30 adjacent its upper and lower edges for embracing the core of the magnetic coil, as will hereinafter appear. Suitable apertures 32 are provided for fastening the coil positively thereto. Laterally upwardly and downwardly extending arms 34 in the plane of the arm 28 terminate in opposed, parallel, inwardly projecting flanges or lugs 36, which are slotted as at 38 to accommodate the vibrator supporting springs, as will hereinafter appear more in detail. The brackets are each provided at their forward end with an outwardly projecting flange

or lug 40 apertured as at 42 for attachment to the forward wall 14 of the vibrator housing by means of machine screws 44, Figure 4. The magnetic actuator coil is designated by the numeral 46 and has a generally E-shaped core 48 of preferably laminated construction, which is rigidly mounted within the pair of opposed brackets 26 by means of machine bolts 50, see Figures 3 and 4. An insulating block or panel 52 secured to the rearward, laterally extending portion of the core provides a support for a plurality of distributing contacts or terminals 54, it being understood that conduits 56, supplying the incoming electric current, are, together with other suitable conduits, connected to the coil 46 and control switch 12 through the control panel in a known manner so that the switch 12 may control the operation of the magnet coil.

The means 24 for initiating the mechanical vibration comprises a bar 58 having magnetic properties and extending across and being coextensive with the free extremities of the E-shaped core 48. The bar 58 is secured adjacent either extremity to a pair of leaf spring members 60 through the agency of a machine screw 62. In the instant embodiment, it should be noted that a washer 64 spaces the spring leaves against the clamping action of the machine screws to minimize frictional resistance between the leaves of the spring as well as to resiliently retain the spring members in the brackets, as will hereinafter more fully appear.

Referring to Figure 3, it will be seen that the extremities of the spring laminations 60 reside within the recesses 38 formed in the inwardly projecting flanges 36 of the brackets 26, and it should be noted (see Figure 7) that the spring leaves are shouldered at either end as indicated by the reference numeral 63 to further engage and position the parts. It should be noted that while the present structure may be easily assemblable, the parts are positively and firmly positioned, that is to say, the springs are positively maintained in the supporting recesses 38 by their securement to the ends of the bar 58, while at the same time lateral displacement is prevented by means of the interengagement of the shoulders 63 of the leaf spring members in the vicinity of the supporting recesses.

A vibrator bar or shaft 66 is rigidly secured to the center of the bar 58 and extends outwardly of the housing through a sleeve 68. This sleeve, shown in detail in Figure 8, is provided with a laterally extending, retaining flange 70 at one extremity and a threaded portion 72 adjacent the other extremity and separated by an intermediate threaded portion 74 of relatively greater diameter and having relatively large threads. The sleeve 68 is rotatably and threadedly supported by a collar 76 which is mounted in a central aperture in the front wall 14 of the housing, being peened over to be secured fixedly in place. A rubber collar or washer 78 is interposed between the inner end or flange portion 70 of the sleeve and the magnetically responsive bar 58 as a cushioning element. It will be evident, therefore, that as and when the sleeve 68 is relatively adjusted axially of the shaft 66 by rotation with respect to its supporting collar 76 the relative freedom of movement of the movable parts of the vibrator is variably controlled, the rubber member 78 serving as a resilient buffer.

Axial adjustment of the sleeve 68 is effected by movement of a control cap 80 located opposite the wall 14 of the housing and having a rearwardly extending annular flange 82 about the said portions of the housing. The flange 82 has a knurled, milled or otherwise roughened periphery 84 for facilitating manual engagement. The control member or cap 80 is rigidly fixed to the sleeve 68 by means of a lock washer 85 and cooperating locking nut 86, whereby it will be apparent that relative rotation of the cap 80 results in rotation of the sleeve and axial adjustment thereof. A curved spring 88, shown in detail in Figure 9, embraces the sleeve 68 and oppositely engages against the wall 14 and the inner surface of the cap 80 at its central portion and termini, respectively, to oppositely tension the parts.

The foregoing unit is mounted upon a supporting handle 90, shown more in detail in Figures 1 and 3, which is axially bored to accommodate the electrical supply conduits 56. A clamping bushing 92 threadedly engages the extremity of the handle 90, as shown in Figure 3, for rigidly locking the handle to the casing 10.

Attention is particularly directed to the fact that the instant handle is provided adjacent its upper end with an annular recess or indentation 94 adapted to receive the thumb of the user in the position shown in Figure 1. Since the recess extends completely about the periphery of the handle, the vibrator unit may be turned freely in any direction while being grasped in the foregoing approved manner. It will be seen that this greatly facilitates the use and action of the unit.

A massaging fitting 96 which is mounted on the end of the vibratable shaft 66 has a bell-shaped conformation, but this constitutes merely one illustrative form of a device adapted to be contacted by the portions under treatment, and it will be understood that this element may be substituted and replaced by any suitable equivalent treatment devices.

It will be obvious from the foregoing that in operation alternating current is supplied under the control of the switch 12 through the magnetic coil 46 so that the magnetically responsive bar 58 and the shaft 66 and fitting 96 commence to reciprocate toward and away from the core pieces 48 in accordance with the electrical alternations. It is important to note that the reciprocation of vibration is restricted by the free ends of the core pieces 48 and the position of the rubber buffer 78. Assuming that the operator desires to reduce the severity of the vibration, the knurled portions 84 of the cap are grasped and rotated in a right-hand direction relative to the casing 10 to force the sleeve 68 and the rubber collar 78 axially inwardly to yet further restrict the action of the bar 58. Amplification of the vibratory action occurs when the cap is rotated in the opposite direction. The present invention provides a vibrator construction which is simple and yet readily adjustable by simple manipulation and under the control of the operator at all times. It has been found, in accordance with the present invention, that it is preferable to provide left-hand threads on the portion 72 of the sleeve 68 with a reversely extending thread on the portion 74 to insure against unauthorized disassembly.

It is thought that the invention and numerous of its attendant advantages will be understood from the foregoing description, and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention or sacrificing any of its

attendant advantages, the form herein described being a preferred embodiment for the purpose of illustrating the invention.

The invention is claimed as follows:

1. In a massaging device comprising a massaging fitting for application to the body, a casing having an annular side wall portion, an end cap extending transversely across one end of said casing and having a manually manipulatable annular flange outwardly overlying said annular wall portions in embracing relationship, a vibratable portion comprising a resiliently supported armature in the casing and a shaft operatively connected with said armature extending axially of the casing and outwardly of the casing through said cap, said outer extremity of the shaft comprising means for receiving a massage fitting, said cap being rotatably mounted with respect to said shaft and said casing, resilient buffer means between the armature and cap, and means operable in response to rotation of said cap for shifting said buffer member toward the armature for restricting the amplitude of vibration.

2. In a massaging device comprising a massaging fitting for application to the body, a casing having an annular side wall and an enclosing end wall, a vibrator motor in said casing comprising a resiliently mounted vibratable armature, and a shaft operatively connected therewith and extending axially of the casing and through said end wall, means associated with the outer extremity of said shaft for engaging a massaging fitting, an adjustment cap disposed outwardly beyond said end wall and extending parallel with said end wall, said cap being mounted for axial rotation relative to said shaft and said end wall, resilient buffer means in said casing and shiftable axially in response to the relative rotation of said cap for restricting the vibratory movement.

3. In a massaging device comprising a massaging fitting for application to the body, a casing having an annular side wall and an enclosing end wall, a vibrator motor in said casing comprising a resiliently mounted vibratable armature, and a shaft operatively connected therewith and extending axially of the casing and through said end wall, means associated with the outer extremity of said shaft for engaging a massaging fitting, an adjustment cap disposed outwardly beyond said end wall and extending parallel with said end wall, said cap being mounted for axial rotation relative to said shaft and said end wall, resilient buffer means in said casing and means shiftable axially in response to the relative rotation of said cap for moving said resilient buffer means toward said armature for restricting the vibratory movement, said casing having side walls tapering axially from said end wall to a central, apexial, portion and a control switch control knob substantially axially disposed at said apexial portion.

4. In a massaging device comprising a massaging fitting for application to the body, a casing having an annular side wall and an enclosing end wall, a vibrator motor in said casing comprising a resiliently mounted vibratable armature, and a shaft operatively connected therewith and extending axially of the casing and through said end wall, means associated with the outer extremity of said shaft for engaging a massaging fitting, an adjustment cap disposed outwardly beyond said end wall and extending parallel with said end wall, said cap being mounted for rotation relative to said end wall, resilient buffer means in said casing and means shiftable axially in response to the relative rotation of said cap for moving said resilient buffer means toward said armature for restricting the vibratory movement, said cap having a manually manipulatable annular flange outwardly overlying said annular side wall portions in embracing relationship for facilitating rotation, and resilient frictional means disposed between said cap and end wall for yieldably holding the cap in any relative rotational position.

5. In a massaging device comprising a massaging fitting for application to the body, a casing of generally parabolic form having annular side wall portions converging to an apexial portion at one extremity of the casing and a transverse end wall disposed adjacent the other end of the casing, a vibrator motor within the casing and comprising an armature, a shaft operatively connected with said armature and extending through said end wall, the outer end of said shaft comprising means for receiving a massage fitting and a control member disposed outwardly of said end wall and journaled for rotation about said shaft, said control member being operatively connected to means within the casing for restricting the vibration of said armature upon relative rotation of said control member.

6. In a massaging device comprising a vibratable massaging fitting for application to the body, a casing of generally parabolic form having annular side wall portions converging to an apexial portion at one extremity of the casing and a transverse end wall disposed adjacent the other end of the casing, a vibrator motor within the casing and comprising an armature, a control shaft operatively connected with said armature and extending through said end wall, the outer end of said shaft comprising means for receiving a massage fitting and a control member disposed outwardly of said end wall and journaled for rotation about said shaft, said control member being operatively connected to means within the casing for restricting the vibration of said armature upon relative rotation of said control member, a control switch knob axially disposed substantially at said apexial portion and a radially projecting handle intermediate of the end portions of said casing.

7. In a massaging device comprising a vibratable massaging fitting for application to the body, a casing, a shaft extending through said casing and comprising means on its outer extremity for receiving a massage fitting, a vibratory motor within said casing comprising an armature operatively connected with said shaft, bracket means for supporting said motor within the casing, said bracket means comprising pairs of spaced spring receiving members, leaf spring units supported between each pair of members operatively connected with said armature adjacent their central portions.

8. In a massaging device comprising a vibratable massaging fitting for application to the body, a casing, a shaft extending through said casing and comprising means on its outer extremity for receiving a massage fitting, a vibratory motor within said casing comprising an armature operatively connected with said shaft, bracket means for supporting said motor within the casing, said bracket means comprising pairs of spaced spring receiving members, leaf spring units supported between each pair of members operatively connected with said armature adjacent their central portions, each spring unit

comprising a pair of spring members spaced adjacent their central portions and oppositely embraced adjacent their extremities by said members.

9. In a massaging device comprising a vibratable massaging fitting for application to the body, a casing, a shaft extending through said casing and comprising means on its outer extremity for receiving a massage fitting, a vibratory motor within said casing comprising an armature operatively connected with said shaft, bracket means for supporting said motor within the casing, said bracket means comprising pairs of spaced spring receiving members, spaced leaf spring units supported between each pair of members operatively connected with said armature adjacent their central portions, said spring units being disposed on either side of the axis of said shaft and said shaft being operatively connected to said armature at a point substantially intermediate between said spring units.

10. In a massaging device comprising a vibratable massaging fitting for application to the body, a casing, a shaft extending through said casing and comprising means on its outer extremity for receiving a massage fitting, a vibratory motor within said casing comprising an armature operatively connected with said shaft, bracket means for supporting said motor within the casing, said bracket means comprising pairs of spaced spring receiving members, leaf spring units supported between each pair of members operatively connected with said armature adjacent their central portions, and a control sleeve embracing said shaft and journaled for rotation thereabouts, said sleeve being axially shiftable in response to relative rotation for restricting vibration of said armature.

11. In a massaging device comprising a massaging fitting for application to the body, a casing having enclosing annular side wall portions and a transverse end wall disposed adjacent one end of the casing, a vibrator motor within the casing and comprising an armature, a shaft operatively connected with said armature, and extending through said end wall, the outer end of said shaft comprising means for receiving a massage fitting and a control member disposed outwardly of said end wall and journaled for rotation about the axis of said shaft, said control member being operatively connected to means within the casing for restricting the vibration of said armature upon relative rotation of said control member.

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