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2,470,660

ELECTRIC VIBRATOR

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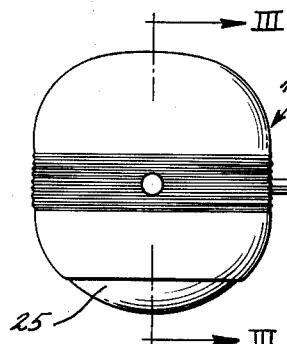


Fig. 1

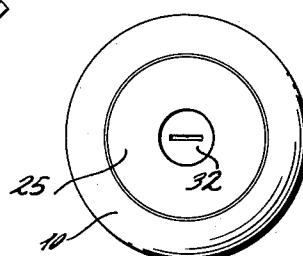


Fig. 2

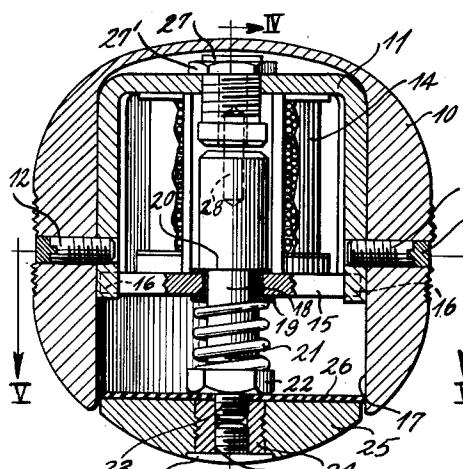


Fig. 3

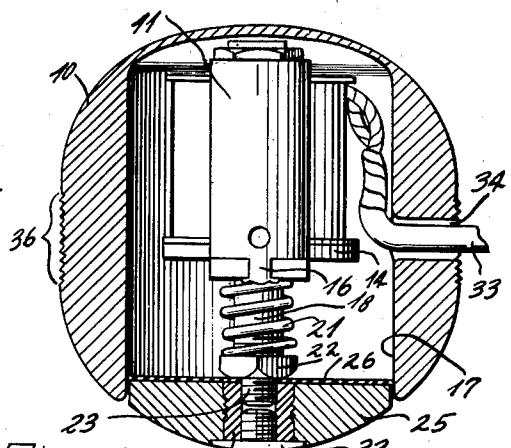


Fig. 4

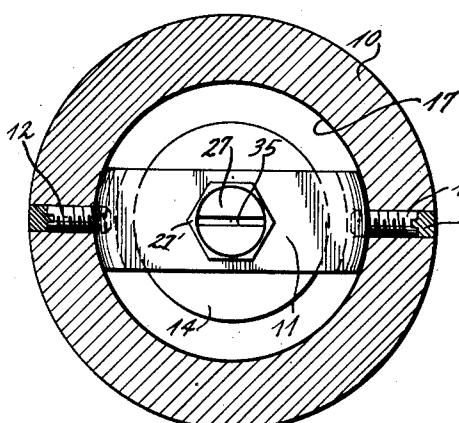


Fig. 5

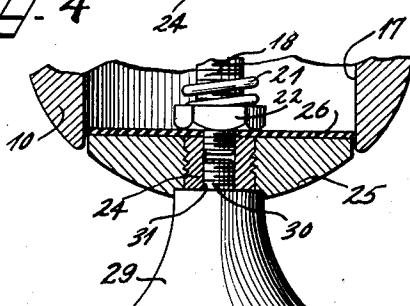


Fig. 6

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UNITED STATES PATENT OFFICE

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ELECTRIC VIBRATOR

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This invention relates to electric vibrators of the class used as massaging devices. A general object of the invention is to provide an electric massage vibrator which eliminates the need for a separate handle by constructing the casing in which the mechanism is housed so that it may be gripped in the palm of the hand of the user.

Another object of the invention is to provide a vibrator construction in which a casing for gripping with the hand houses the vibrator mechanism and serves to electrically insulate the hand of the user.

Another object of the invention is to provide, in an electric vibrator for massaging, a casing serving as a hand grip constructed to protect the hand of the user against injury from the moving mechanical parts.

Another object of the invention is to provide a device of the character described which is so designed as to be easily and economically assembled and adjusted and having no exposed parts which might contribute toward the device getting out of adjustment during ordinary and prolonged usage.

Another object of the invention is to provide a vibrator to which operating heads having different functions may readily be attached with the maximum of convenience.

Other and further objects of the invention will be apparent to those skilled in the art from the following detailed description of the annexed sheet of drawing which, by way of example only, illustrates a preferred embodiment of the invention.

On the drawing:

Figure 1 is a side elevation of a massaging device embodying my invention;

Figure 2 is a bottom plan view of the same device;

Figure 3 is a vertical central sectional view on the line III—III of Figure 1, with parts in elevation;

Figure 4 is a sectional view on the line IV—IV of Figure 3 partly in elevation;

Figure 5 is a view partly in section on the line V—V of Figure 3 and partly in elevation; and

Figure 6 is a sectional detail view showing the manner of attaching a massaging tool to the device.

As shown on the drawing:

The casing 10 serves both to house the operative parts and to constitute a handle for the device. This casing is preferably made of a molded plastic material of suitable nature con-

stituting at one and the same time a casing having good electrical insulating properties, good wearing characteristics and providing an attractive outside appearance for the article.

5 A metal shield or yoke 11 is supported in the casing by means of the screws 12 and 13, whose outer ends are recessed within the casing to avoid contact with the hand of the operator. A solenoid whose coil is indicated at 14 is secured with 10 in the yoke between its upper end and a cross member 15 which is notched at its opposite extremities to receive depending reduced portions 16 of the yoke, the lower ends of these portions then being swaged over to lock the cross member 15 in place. As indicated in Figures 3 and 5, the solenoid and yoke are positioned within a cylindrical recess 17 of the casing, being held therein simply by means of the screws 12 and 13, which obviously constitute an assembly of utmost simplicity.

The solenoid herein shown is intended to be operated on an alternating current circuit and to have a spring-loaded iron plunger 18 reciprocating in accordance with the changes of magnetic flux resulting from the alternating current flow.

25 A brass bushing 19 surrounds the plunger where the latter passes through the cross member 15, magnetically insulating these two members.

A shoulder 20 on the plunger serves to limit the reciprocation of the plunger in an outward direction, as it engages the cross member 15. A spring 21 surrounding the reduced portion of the plunger is held under compression between the cross bar 15 and a nut 22 which is engaged with 30 threads on the outside of the plunger. By means of this nut, the compression on the spring may be adjusted.

35 A second reduced portion 23 of the plunger extends beyond the nut and is threaded into a bushing 24, the latter being preferably molded into the vibrating head 25. This head is preferably made of the same plastic material as is the main casing.

40 A rubber washer 26 having a diameter slightly larger than the diameter of the head 25 engages the side walls of the recess 17 and serves to prevent rattling or chattering of the device when in operation, and excludes dust and other foreign matter from the casing interior.

45 A stud 27 is screwed into the top of the yoke, constituting an extension of the core formed by the yoke, and is adjustable to vary the air gap between it and the plunger, and for establishing 50 a limit to the movement of the plunger in that

direction. Reciprocable in a suitable recess in this stud but fixed in the top end of the plunger, is a brass guide pin 28, serving to guide the reciprocation of the plunger.

The head 25, either shaped as shown or having some other suitable configuration, is itself employed as a massaging tool, while various other tools or devices well known in the art may be attached readily to the head. For example, in Figure 6, I have shown a suction cup 29 having a threaded shank 30 which may be threaded into the internally threaded recess 31 of the bushing 24. Whenever the head 25, which is preferably shaped to conform to the contour of the casing, is being employed as the massaging tool itself, a plastic screw 32 may be inserted in the end of the head in order to complete the rounded surface thereof. However, by withdrawing this screw, any other massaging tool such as a suction cup or flexible fingers or any other such tool may be readily attached.

The cord for supplying current to the solenoid coil as indicated at 33 is readily brought out to the outside of the casing through an opening 34 located where it will not interfere with the hand grip on the device.

For adjusting the air gap and the length of the stroke of the plunger, the stud 21 is provided with kerf 35. A lock nut 21' will retain the adjustment of the stud. Ordinarily, the air gap and the compression of the spring 21 will be adjusted before assembly of the solenoid into the casing. A distorting squeeze applied to nut 22 will suffice to lock it when adjusted.

To improve the hand grip, a grooved area such as 36 may be molded on the surface of the casing.

It will now be apparent that this invention provides a massage vibrator of extreme simplicity of construction. No separate handle is required. A molded plastic one-piece casing serves as a handle, electrically insulates the device, and encloses all moving parts. The casing has only one major opening, that is, the open end of the recess defined therein, and this opening is utilized for final assembly and as the aperture in which the vibrator massage head moves. The casing is thin for lightness at the opposite end where no strain is imposed, and is thickened at the sides of the recess where the solenoid is supported on screws extending through the casing wall. Preferably a plug 31 of sealing wax or some suitable plastic material having electrical insulating properties will be used to cover the recessed ends of these screws.

The spring loaded plunger, having a straight line movement, moves freely into and out of the solenoid coil to impart the vibrations to the massaging device or tool. The readily adjusted air gap regulates the intensity of the magnetic inward pull of the coil, while an adjustable compression spring determines the force of the outward thrust of the massaging tool. By varying and correlating these two adjustments, various degrees or intensities of vibrating force may be obtained.

Although I have shown and described one particular embodiment of my invention, I do not desire to be limited to the exact details of con-

struction herein shown and described. It should be understood that the invention comprehends all variations and modifications within the scope of the appended claims.

5 I claim as my invention:

1. An electric vibrator comprising a hollow casing having a rounded exterior contour suitable for gripping with the palm and fingers of the user, said casing being open at one end, a

10 solenoid coil insertable through said open end and secured within said casing, a plunger extending axially of said casing and coil toward the open end of said casing, a resilient seal member mounted on said plunger and movable therewith and engageable with the interior walls of said casing to seal said open end of the casing, said resilient seal member having an exterior surface protruding out of said casing to constitute a massaging tool, and means carried by said seal member for attachment thereto of other massaging devices.

2. An electric vibrator comprising a one-piece molded plastic casing having a centrally extending recess, said casing being open at one end thereof and the exterior surface of said casing

25 being shaped to constitute a hand grip for the vibrator during use, a solenoid coil insertable into said casing through said open end, means electrically insulated from the outer surface of the 30 casing for mounting said solenoid coil within said recess, a plunger reciprocable axially of the coil and extending toward said open end of the casing, means substantially closing the open end of said recess and operatively connected with the plunger to vibrate therewith, said casing and said

35 closing means being composed of insulating material serving to completely enclose and electrically insulate the current carrying portions and all metallic portions of the solenoid mechanism, 40 said closing means having an exterior surface protruding out of said casing to constitute a massaging tool, and means carried by said closing means for attachment thereto of other massaging devices.

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