Aug. 30, 1938. W. G. G. BENWAY 2,128,555

VIBRATOR

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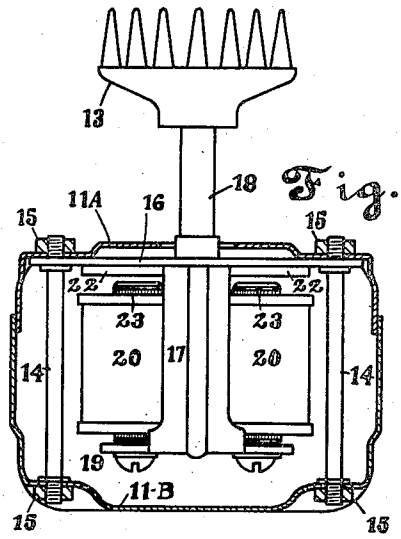


Fig. 2

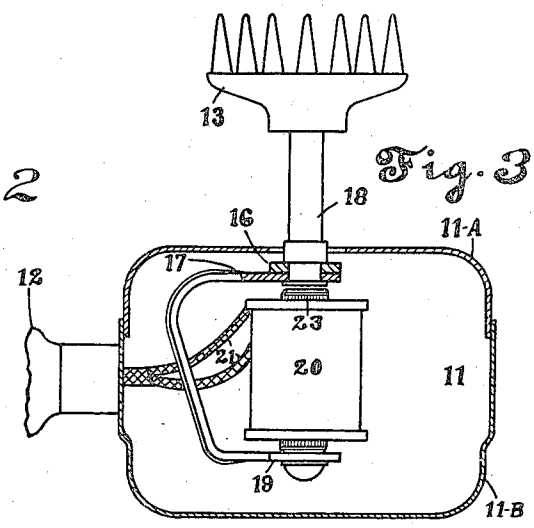


Fig. 3

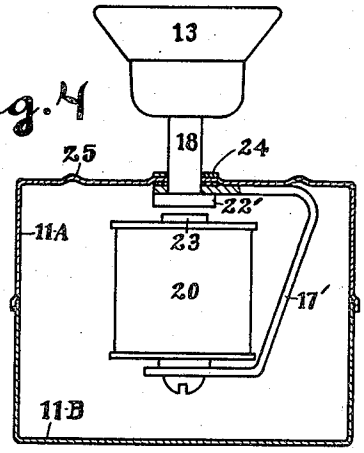


Fig. 4

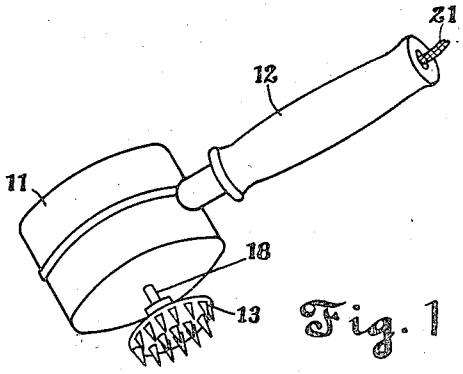
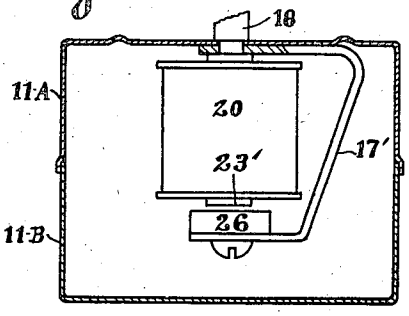


Fig. 1

Fig. 5



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VIBRATOR

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7 Claims. (Cl. 128—49)

This invention relates to massage devices and more particularly to an improved method and means for actuating electrical vibrators.

The object of the invention is to provide a driving mechanism for a vibrator of the hand type in which the pressure applied against the applicator does not tend to vary the driving impulse or stall the device.

A further object of this invention is to so mount the driving elements of the vibrator that heat will not be readily transmitted to the casing or applicator of the vibrator.

These and further objects of this invention will become apparent from the following specification taken in connection with the accompanying drawing.

In accomplishing the object of this invention, the two driving elements of the vibrator are so mounted that a pressure applied through the applicator will act equally upon the two elements relative to the casing and will not tend to displace these elements relative to each other.

Attention is invited to the accompanying drawing in which Fig. 1 is a perspective view of a vibrator comprising the present invention,

Fig. 2 is a cross-section of a vibrator constructed in accordance with this invention,

Fig. 3 is a second cross-section of the same vibrator, said cross-section being taken at right angles to that shown in Fig. 2,

Fig. 4 is a cross-section of a modification of the vibrator shown in Figs. 2 and 3, and,

Fig. 5 is a cross-section of a second modification of the vibrator shown in Figs. 2 and 3.

Referring now more particularly to Fig. 1, the vibrator includes a casing 11, suitably mounted upon a handle 12, an applicator 13, which may be of any of a number of types, the details of which constitute no part of this invention, and a driving mechanism which will now be described.

Figs. 2 and 3 illustrate a driving mechanism suitable for a vibrator of the type shown in Fig. 1. In Fig. 2 the casing 11 is composed of two parts, 11A and 11B, which are detachably connected by means of the bolts 14 and nuts 15.

Secured between the heads of the bolts 14 and the upper portion 11A of the casing 11 is a connection member or strap 16, to which is suitably secured a resilient supporting bracket or yoke 17. Secured rigidly to the connection member 16, and to one end of the supporting bracket 17, is the applicator stem 18, upon which is detachably mounted the applicator 13. The supporting bracket 17 is generally U-shaped and its lower or free end is provided with a cross portion 19, upon which are mounted two electro-magnets 20. Electrical connections 21 are provided for actuating the electro-magnets by any suitable source of alternating current.

In operation, the alternating current impulses excite the electro-magnets intermittently and cause them to be attracted to the armature bar portion 22 of the supporting bracket 17. This results in a motion of the magnets and the applicator rod 18 relative to each other. The magnets being of considerable mass, the impulse transmitted to the applicator is correspondingly great. However, it can be readily seen that pressure upon the applicator 13 will not tend to lessen the gap between the poles 23 of the electro-magnets and the armature bar 22, which would tend to vary the impulse produced by the vibrator. Furthermore, the length of the metallic path between the coils of the electro-magnets and the applicator and casing greatly reduce the amount of heat transferred from the electro-magnets to the casing and applicator.

In the modification shown in Fig. 4, in which corresponding parts are designated by the same reference characters, a single electro-magnet 20 is provided, mounted on a supporting bracket 17'. In this form of the invention the entire assembly is supported by the casing 11 to which it is fixedly secured at 24. An annular corrugated ridge 25 is provided between the center or supporting portion of the casing 11 and the remainder thereof for the purpose of permitting a freer vibration of the applicator relative to the casing 11. The operation of this type of vibrator is exactly the same as that shown in Figs. 2 and 3.

Fig. 5 shows a second modification of the invention. In this arrangement in which corresponding parts are designated by the same reference characters, the electro-magnet 20 is attached directly to the applicator stem 18. The supporting bracket 17' supports an armature mass 26 adjacent to the lower pole 23' of the electro-magnet 20. This mass can be made of any desired amount to provide vibrations of the desired strength. For proper operation, the mass of the armature 26 should be comparable to that of the applicator plus the actuating electro-magnet although it need not necessarily be as great.

In this form of the invention the heat produced by the electro-magnet is transmitted more readily to the applicator and casing than in the form shown in Figs. 1–4, but pressure upon the applicator will not tend to vary the gap between the electro-magnet and the armature and a much

more uniform operation will be obtained than with the usual type of vibrator.

It is to be noted that in the form of the invention shown in Figs. 2 and 3, the magnetic circuit includes the cores of both the electro-magnets **20**, the cross portion **19** of the supporting bracket **17**, and the armature bar **22**. The main body of the supporting bracket **17** is not included in the magnetic circuit. On the other hand, in the forms of the invention shown in Figs. 4 and 5, the magnetic circuit includes the entire supporting bracket **17'**, the core of the electro-magnet **20** and the armature **22'** or armature mass **26** respectively.

The supporting brackets **17** and **17'** are designed to be somewhat resilient to permit a slight relative motion of the armature and the electro-magnet, which comprise the elements of the electro-magnetic driving device of the vibrator.

I claim:

1. In a vibrator, a generally cylindrical supporting casing having a substantially flat end wall or head, an armature rigidly secured to said casing and located adjacent the inner face of said wall, an electro-magnet including two electro-magnetic coils, means for resiliently supporting said electro-magnet from said casing with its poles facing said armature in spaced relation thereto so that said electro-magnet vibrates said armature as alternating current traverses said coils, and an applicator having a stem secured rigidly to said armature adjacent said end wall and projecting out of the casing.

2. In a vibrator, an electro-magnet adapted to be supplied with alternating current, an armature structure secured at one end to a pole of said magnet and having its other end adjacent but spaced from a second pole of said magnet, a supporting casing enclosing the magnet and armature structure, said casing being secured to the spaced end of said armature structure, and an applicator secured to the spaced end of said armature structure whereby as said vibrator is used, pressure on the applicator will not alter the spacing of the armature structure and magnet to affect the operation of the vibrator.

3. In a vibrator, an electro-magnet adapted to be supplied with alternating current, a supporting casing, an armature rigidly secured to said supporting casing, means for resiliently mounting said electro-magnet with one of its poles adjacent but spaced from said armature, means for completing the magnetic circuit, said means comprising said resilient mounting means, and an applicator secured to the armature whereby as said vibrator is used, pressure upon the applicator will not alter the spacing of the armature and magnet to affect the operation of the vibrator.

4. In a vibrator, a generally cylindrical supporting casing having an end wall or head disposed substantially perpendicularly to the axis of said casing, an armature plate within said end wall, a strap element by which said armature plate is rigidly secured in position at the inner face of said wall, an electro-magnet including two electro-magnetic coils having their axes substantially parallel to the casing axis, a spring yoke having one end rigidly secured with relation to said armature plate and having its other end secured to the ends of said coils and supporting said coils from said casing with their poles facing said armature plate in spaced relation thereto whereby alternating current traversing said coils vibrates said armature plate, and an applicator having a stem in fixed relation to said strap and armature plate and projecting therefrom exteriorly of the casing.

5. In a vibrator, a casing, an applicator having a stem rigidly attached to the casing, a resilient supporting yoke within the casing having one end disposed adjacent the applicator stem and rigid with the casing and the other end free for vibratory movement within the casing, and an alternating-current electro-magnetic device comprising a solenoid supported on the free end of said yoke and an armature member spaced from said solenoid and rigid with the casing and disposed adjacent the base of said applicator stem.

6. In a vibrator, a casing of generally cylindrical shape having an end wall substantially perpendicular to its axis, a handle secured to the side wall of said casing, an applicator having a stem projecting exteriorly of the casing adjacent said end wall and rigid with the casing, a resilient supporting yoke within the casing having an end secured to said stem, the other end of said yoke being free from the casing and handle and adapted to oscillate within the casing, and an alternating-current electro-magnetic device having an armature plate disposed at the base of the applicator stem and rigid with the casing and a solenoid facing the armature plate and supported at one end by and from the free end of said yoke and in fixed relation to said free end.

7. An alternating-current massage vibrator comprising a generally U-shaped resilient supporting yoke, a solenoid member rigidly secured at one end to one end of the yoke and disposed transversely within the yoke, an applicator stem in rigid relation to the other end of the yoke and projecting laterally therefrom, an armature plate adjacent the base of the stem and in rigid relation to said stem and facing an end of said solenoid member in spaced relation thereto, a casing from which said stem projects and within which the other parts are disposed and having an end wall adjacent said armature plate in rigid relation to said plate and to the stem-attached end of said yoke, and a handle secured to the side wall of the casing.

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