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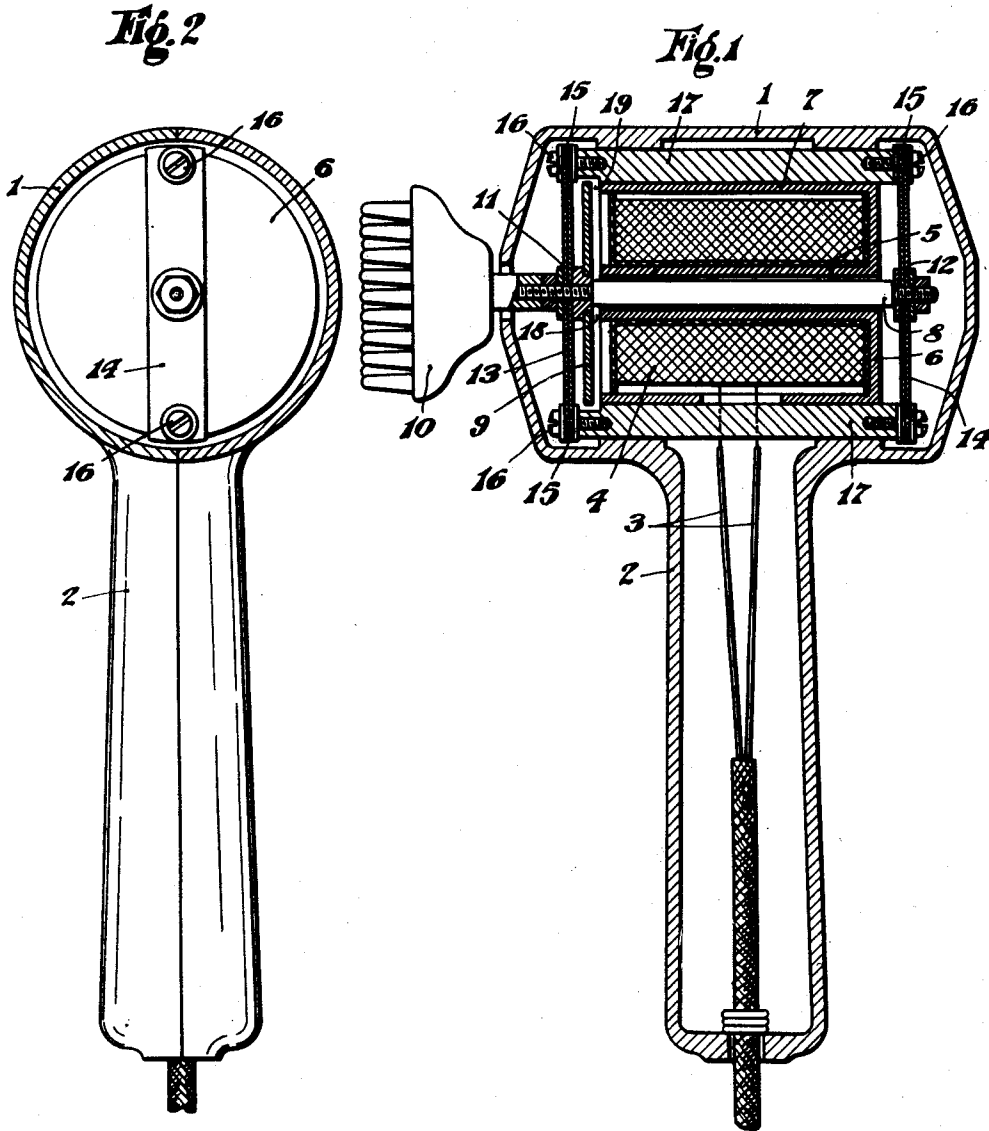
T. DIETRICH

2,253,267

ALTERNATING CURRENT VIBRATORY APPARATUS

Filed Nov. 17, 1937

2 Sheets-Sheet 1



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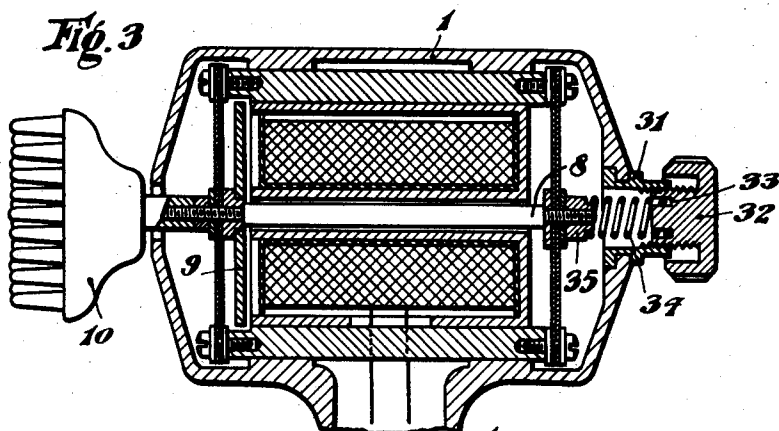
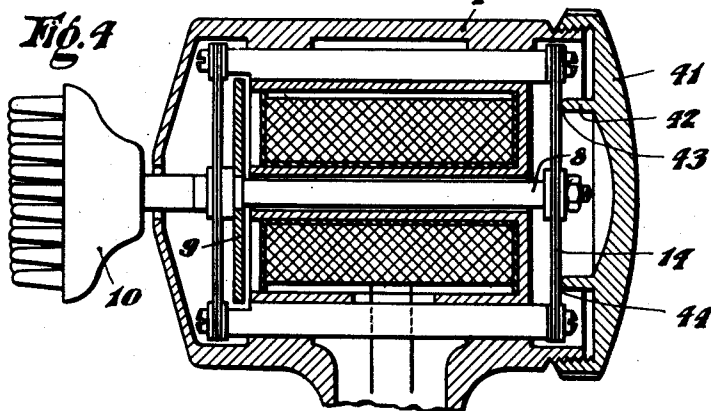
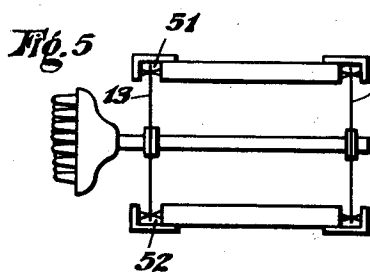
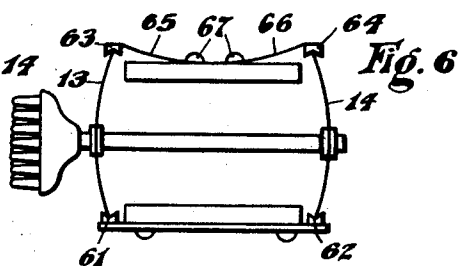
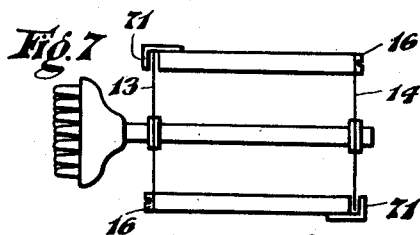
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ALTERNATING CURRENT VIBRATORY APPARATUS

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2 Sheets-Sheet 2



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ALTERNATING CURRENT VIBRATORY APPARATUS

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In Switzerland January 29, 1937

1 Claim. (Cl. 172-126)

The present invention relates to alternating current vibratory massage apparatus of the type comprising an electro-magnet the armature of which is rigidly connected to a rod carrying the massaging tool.

According to the invention there is provided on both sides of the electromagnet at least one blade spring mounted with either of its ends on the frame of the electromagnet and carrying with its middle portion the entire movable part of the apparatus so as to permit a vibratory movement of this latter in axial direction with respect to the electromagnet.

The accompanying drawings represent by way of example several embodiments of a massage apparatus according to the invention.

Figure 1 represents a longitudinal section of the apparatus and Fig. 2 a view from the back.

Figs. 3 and 4 represent each a modification according to which the intensity of the vibrations can be adjusted by a member which is accessible from the exterior of the apparatus.

Figures 5 to 7 diagrammatically represent various modifications concerning the manner of connecting the blade springs to the frame of the electromagnet.

In Fig. 1 the casing 1 of the massage apparatus is shown in section and may consist of metal or of moulded material. The handle portion 2 is hollow and traversed by the conductors 3 which feed alternating current to the coil 4 of the electro-magnet. The fixed part of the magnetic circuit of this latter is constituted by a tubular core 5, an annular back 6 and an exterior cylindrical cover 7.

The electromagnet is traversed in axial direction by a rigid rod 8 which carries the movable armature 9 having the shape of a disk, and an interchangeable massaging member 10. The whole of the movable part thus constituted is resiliently supported at two points 11 and 12, situated on either end of the electromagnet, by means of flat springs 13 and 14 constituted either by a simple blade spring or by a packet of two or more superposed blades, fixed at their ends 15 by screws 16 to columns 17 which are rigidly connected to the frame of the electromagnet. The air-gap comprised between the fixed part of the magnetic circuit of the electromagnet and the movable armature 9 is constituted by two annular spaces 18 and 19 in front of the tubular core 5 and the cylindrical cover 7.

The operation of the apparatus is the following: The entire movable part 8, 9, 10 being supported by the blade springs 13 and 14, can axially

move without being subjected to any friction and its movement is limited in both directions by the tension of the springs owing to the effect of the axial movement only and not by any rigid or resilient stops. The flat springs also prevent any lateral displacement of the movable part as also any inclination and any rotation of the rod 8 with respect to the fixed part of the electromagnet. Under the effect of the alternating magnetical field created by the alternating current traversing the coil 4, the movable armature 9 is subjected by the fixed part to a pulsatory attraction and the movable part as a whole effects a vibratory movement in synchronism either with the frequency of the current or with a submultiple of this frequency. The springs 13 and 14 can be disposed in such manner, that in the position which they occupy when the armature is at rest, they are flat and are not subjected to any tension. They could however also be disposed so that in the position of rest of the armature they are flat but stretched between their points of fixation, or in the contrary, arched and subjected to an effort of flexion exerted by their points of fixation.

In the example represented as modification in Figure 3, the casing 1 of the apparatus is provided at its rear end with a threaded sleeve 31, in which screws a button 32 accessible from the exterior of the apparatus. This button is provided with an annular slot 33 in which is engaged one end of a coiled spring 34 the other end of which bears axially on the movable part 8, 9, 10 (see Fig. 1) by the intermediary of a nut 35. The coiled spring 34 acts in opposition to the attractive force exerted by the electromagnet on its armature 9, and the retracting force of the spring is adjustable owing to the milled button 32 which can be screwed at will more or less into the sleeve 31 and decreases the intensity of vibration of the movable part. It can be easily recognized that the more the button 32 is pushed inwardly, the stronger is the tension of the spring 34, and the smaller is the intensity of vibration of the massaging member 10, and reciprocally.

Such as represented in Fig. 3, the spring 34 acts by compression and against the attraction of the electromagnet on the movable armature 9. The regulating device constituted by the spring 34 and button 32 could as well be disposed on the other side of the electromagnet, or the spring could work by tension, so that it would have the effect to increase the attraction of the electromagnet on its movable armature.

In the example represented as modification in

Fig. 4, the casing 1 of the apparatus is closed at its rear end opposite the massaging member by a cover 41 screwing with friction on the casing 1. This cover comprises an internal rib 42 of annular shape which bears on the spring blade 14 at two points 43 and 44 comprised each between the center and one end of the spring. By screwing the cover 41 more or less on the casing 1, the rib 42 acts more or less on the spring 14, which is thus initially tensioned and this tension is adjustable at will, permitting an adjustment of the intensity of the vibrations of the movable part of the apparatus. The rib 42 could also have spiral shape, so that the points 43 and 44 move along the spring 14 when the cover is turned, and thus increase or decrease the free length of the oscillatable part of the spring and modify the intensity of the vibrations.

Figure 5 diagrammatically represents an attaching device for the ends of the springs 13 and 14 according to which the springs are maintained in lodgements 51 and 52 provided in the frame of the electro-magnet. The ends of the springs are held against lateral displacement in these lodgements; they can incline themselves in the lodgements and slightly move in the direction of the axis of the blade.

Figure 6 diagrammatically represents another modification of an attaching device for the ends of the springs 13 and 14 according to which the springs are maintained with one of their ends in lodgements 61 and 62 provided in the frame of the electromagnet, and with their opposite ends in lodgements 63 and 64 provided in resilient members 65 and 66 secured to the frame of the electromagnet at 67. In this case, even when the apparatus is at rest, the flexible members 65 and 66 press on the blade springs 13 and 14 in longitudinal direction and these springs, are then subjected to compression and to an effort of flexion which imparts to them the arched shape represented in Fig. 6.

In Figure 7, the springs 13 and 14 are rigidly fixed by one of their ends to the frame of the electromagnet by means of screws 16, and at the

opposite ends they are engaged with longitudinal play in lodgements 71 provided in the frame and disposed in such manner, that the springs are not able to move laterally nor to incline themselves in these lodgements, but can slightly slide in the direction of the axis of the blade.

It is understood that the described apparatus could be provided with an electric regulating device constituted for instance by a variable resistance inserted in the circuit of the coil of the electromagnet and such an electric regulating device could work alone or in conjunction with the mechanical adjustment as represented in Figures 3 or 4. Moreover the coil could be subdivided in two or more windings adapted to be connected by a coupling device so as to enable the apparatus to operate at different alternating voltages.

I claim:

Vibratory electric motor comprising in combination a casing, a hollow handle formed integral with said casing and transversed by the lead wires to the motor, a frame mounted within said casing, an electro-magnet having a tubular core carried by said frame, transversely extending blade springs disposed on either side of said electromagnet and having their ends connected to said frame, a reciprocating rod passing through said core and projecting therefrom at both ends, said rod being fixed to and resiliently supported and limited in its movement in both directions by means of said blade springs, an armature secured to one end of said rod and disposed between one of said blade springs and said core, a pressing coil spring bearing upon the other end of said rod on the outer side of the other of said blade springs, said coil spring being adapted to oppose the attractive force of the electromagnet, and an operating member threaded into said casing and bearing against said coil spring to regulate its pressure for adjusting the tension of both said blade springs and varying the air gap and consequently the attractive force of the electromagnet.

THEODORE DIETRICH.