

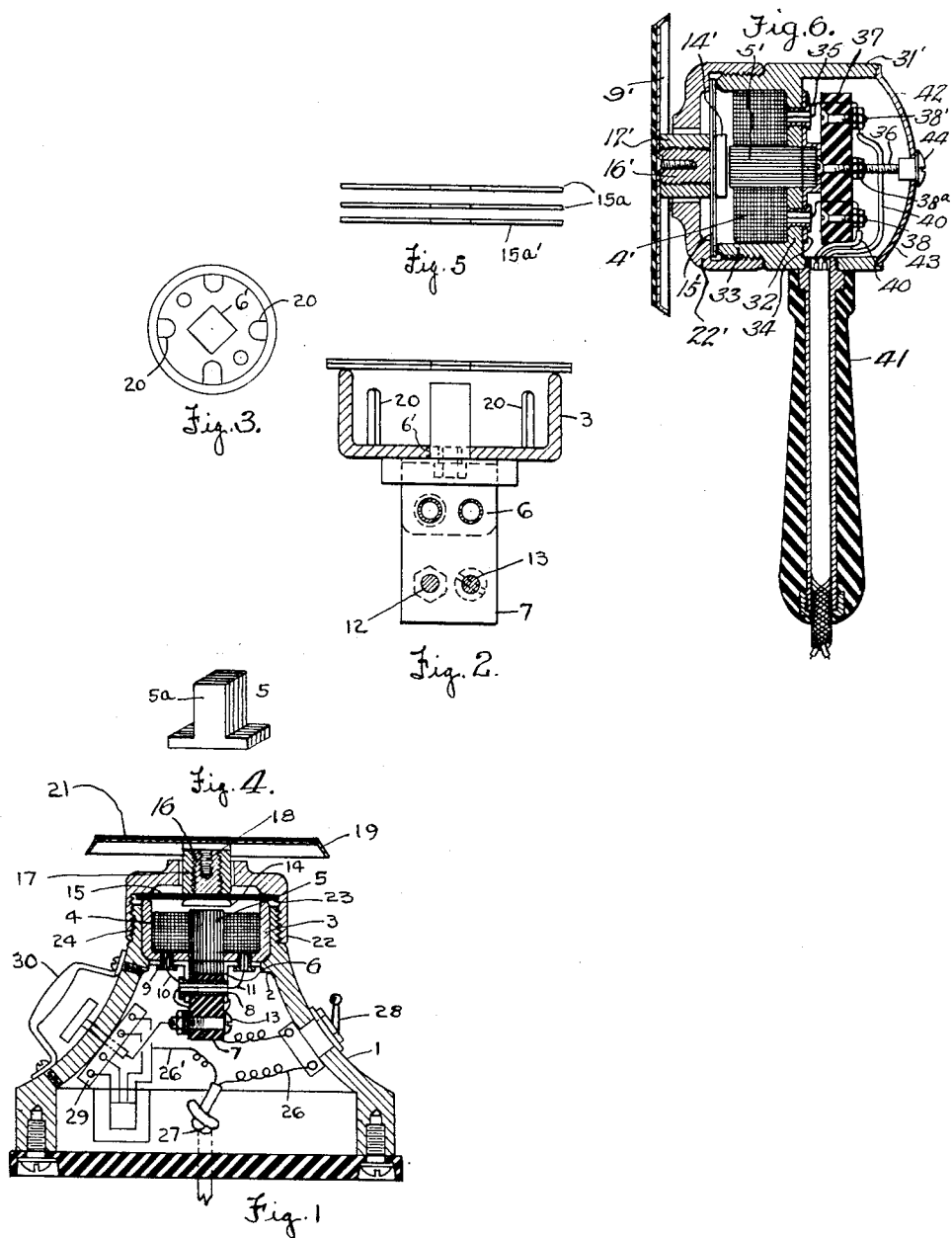
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VIBRATING MECHANISM

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VIBRATING MECHANISM

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This invention relates to a vibrating mechanism of the electro-magnetic type adapted to impart vibratory or reciprocating movements to or upon bodies and/or supports for various purposes as hereinafter set forth.

One object of the invention is to provide an improved mechanism of this character that is relatively simple in construction, permitting economical manufacture and assembly.

Another object of the invention is to provide an improved mechanism of this type in which provision is made to cause relatively rapid vibrations within a short range of movement to a vibrator member, whereby various physical effects may be carried out upon materials and therapeutic operations performed on human bodies to relieve nerve tension and/or congestions.

Another object of the invention is to provide an improved mechanism of this character in which the coil, core, the leads for the coil and the support for these parts constitute a unitary assembly adapted to be readily seated and secured in an enclosing member or support.

A further object of the invention is to provide in an electro-magnetically operated vibrating mechanism, an improved mounting for the armature, whereby the latter is capable of readily responding to the current impulses the effect of which is to increase the number of vibrations imparted to the vibrator per unit of time, so that the vibrations will keep in step with the magnetic impulses and not lag behind, as is the case when using a heavy armature.

Other objects of the invention will be apparent to those skilled in the art to which my invention relates from the following description taken in connection with the accompanying drawings, wherein

Fig. 1 is a vertical section of a vibrating mechanism embodying my invention (the variable resistance for regulating the current being shown diagrammatically).

Fig. 2 is an enlarged view, partly in section and partly in elevation, showing certain of the parts assembled.

Fig. 3 is a plan view of the coil holder.

Fig. 4 is a perspective view of the magnet core.

Fig. 5 is a view of the armature or resilient member, the parts thereof being separated.

Fig. 6 is a sectional view of a vibrating mechanism showing a different embodiment of the invention.

Referring to Figs. 1 to 5, inclusive, in the drawings, 1 indicates as an entirety a casing, open at

its upper end and preferably hollow and approximately conical in shape. The lower end of the casing is open to permit access to and inspection of parts hereinafter referred to. Interiorly of the casing, below its upper open end is an annular rib 2 forming a seat for a member 3 which is preferably cup-shaped and adapted to serve as a holder for a coil 4 and support for a core 5. The cup member 3 is formed of soft iron so as to provide a magnetic return circuit. The bottom wall of the holder 3 is formed centrally with an opening 6', preferably of polygonal shape, through which the body portion 5a of the core 5 extends. The body portion 5a terminates at a point below the plane of the rim of the side wall of the holder 3 for reasons which will later appear. The core 5 comprises T-laminations suitably connected to form a T-shaped core, the lateral arms or end portions of which are secured to the bottom of the holder 3, to provide magnetic contact therewith, in the following manner: 6, 6, indicate angle plates the vertical walls of which are secured to the opposite faces of a block 7. The block 7 is formed of non-conducting material, such as rubber compound, bakelite or fiber. The horizontal walls of the plates 6, 6, are secured to the bottom of the cup-member 3. In the illustrated form of construction, as shown in Figs. 1 and 2, the arms of the core 5 are positioned on the block 7 between the vertical walls of the plates 6, 6. The securing means for the vertical walls of the plates 6, 6, comprise two hollow tubular members 8, 8, preferably formed of metal extending through registering openings formed in such walls and the block 7, one end of each member 8 being flanged and its opposite end being threaded into the opening in the adjacent wall or riveted thereover. The horizontal wall of each angle plate 6, 6, is secured to the bottom of the cup-member by a tubular member 9 formed of metal and flanged at its outer end and threaded into an opening formed in the bottom of the member 3 or riveted thereover. The members 8 and 9 are made hollow from end to end so that the leads 10, 11, for the coil 4 may extend therethrough from the coil to their terminals 13. The terminals preferably comprise bolts extending through openings formed in the block 7 below the plates 6, 6. By preference, the leads 10, 11, are carried from the coil through the members 8, 8, respectively, and to the opposite sides of the block and each is connected to one of the terminals 13, in a well known manner. 14 indicates an armature supported by means

of a resilient member 15 on the rim or edge of the cup-member 3.

The armature 14 consists of a flat disk formed of solid soft iron and an externally threaded shank 16 extending through an opening formed in the resilient member 15, the latter being clamped to the disk 14 by a nut 17. The outer end of the shank 16 is formed with an inwardly extending threaded opening to removably receive a threaded stem 18 to the head of which is secured a device 19. When the parts above referred to are assembled, they are in fixed relation so that the pulsations or reciprocatory movements of the armature are transmitted to the device 19, whereby the latter is vibrated.

The resilient member 15 comprises a plurality of relatively thin metallic disks 15a' preferably of the same diameter, their edge portions being supported on the rim of the cup-member. The disks 15a' are formed of suitable resilient material and arranged in face to face relation and secured together at their central portions by the nut 17, as already set forth. Throughout their remaining portions, the disks are disconnected so that in flexing under the influence of the magnetic flux upon the armature 14, the outer portions of the disks are free to move or slide relatively to each other. This arrangement provides for the armature a support or mounting of high flexibility so that retardation to the movement of the armature is reduced to a minimum; as a result, the armature vibrates rapidly per unit of time. The rim of the cup-member 3 is preferably rounded to provide edge contact with the resilient member 15.

The walls of the cup-member 3 may be formed with one or more openings 20 (preferably elongated) to admit air thereinto for cooling purposes. As shown in Figs. 2 and 3, the openings 20 are shown formed in the bottom and sides of the member 3. The vibrator device or member 19 may be comprise a flat plate welded to the head for the stem 18 and covered with a layer 21 of suitable non-conducting material.

The upper open end of the casing 1 is closed by a cap 22. The side wall of the cap is preferably cut away to form a shoulder 23 arranged to engage the resilient member 15. By preference the cut away portion of the cap side wall is internally threaded to removably engage the external threads 24 on the casing 1. The side wall of the cut away portion maintains the member 15 on and in concentric relation to the rim of the cup-member 3, whereas the shoulder 23 engages the member 15 to hold it against the rim of the cup-member 3. The cap 22 is formed with an opening through which the nut 17 extends.

The current for the coil 4 is supplied by AC mains 26, 26', in a conductor 27 leading through the side wall of the casing and connected to the terminals 13, one main (26) having interposed in it a cut-out 28 of any desired construction and the other main (26') having interposed in it a suitable variable resistance 29 to regulate the voltage, thereby regulating the strength of the magnetic impulses across the air gap between armature and core.

The side of the casing 1 may be provided with a detachable handle 30. The bottom of the casing may be provided with a pad of soft material, such as rubber, so that when the casing 1 is positioned on a support, danger of sounds, resulting from the vibrations set up in the member 19, being

produced in or transmitted through such support is eliminated.

My invention may be used for various purposes. For example, the member 19 may be applied to various parts of the human body to relieve nerve tension, muscular troubles and congestion and to cause blood circulation. Where liquid, semi-liquid and plastic materials containing relatively heavy ingredients have been stored for a period of time sufficient for these ingredients to settle and become more or less hard, my mechanism may be used to recondition the material.

It will be understood that the vibrating member 19 may be removed and a member of a different shape substituted, depending upon the nature of the operation to be effected.

Fig. 6 shows a different embodiment of the invention. In this view, 31' indicates a casing having a transverse wall 32 and side walls 33 forming a chamber for a coil 4'. The wall 32 is formed with an opening through which the body portion of a core 5' extends. The core 5' is preferably of the same shape and construction as shown in Fig. 4. The arms or end portions of the core 5' are held in magnetic engagement with the wall 32 by a U-plate 34 having lateral arms which are secured to the wall 32 by tubular, metallic members 35. The outer ends of the members 35 are flanged to engage the lateral arms and their inner ends are riveted over. A screw 36 extends through the bottom wall of the U-plate 34 and an insulating block 37 and has threaded on it nuts 38a which rigidly secure the block 37 to the bottom wall of the U-plate 34. The block 37 mounts suitable terminals 38, 38', to which the coil leads (which extend through the members 35) and supply wires 40 are connected. The wires 40 extend through a hollow handle 41 suitably connected to the casing 31'. The casing 31' is shaped to provide a rear annular wall which forms a chamber 42 for the leads, wires and terminal block 37. 43 indicates a cover for the chamber 42, held in place by a flanged screw cap 44 engaging the outer end of the screw 36.

14' indicates an armature having a threaded stem 16' extending through a resilient member 15', which engages the end wall of the casing 31', the armature being secured to the resilient member 15' by a nut 17', and the stem of the armature removably carrying a vibrating member 9'. The resilient member 15' is held in position by a cap 22' threaded on the casing 31'. The parts just described are preferably similar in construction to like parts shown in Fig. 1.

To those skilled in the art to which my invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope thereof. My disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

What I claim is:

1. In a vibrating mechanism, the combination of a support having an open end, a member mounted in said open end and having sides and formed with an opening, an electro-magnet comprising a core having at its inner end portions engaging the said member and its body portion extending through said opening and a coil on said member, an insulating block engaging the inner end of said core, means for securing said block to the bottom of said member, an armature, a resilient device carrying said armature and sup-

ported on the sides of said member, a device fixed to said armature, and electrical supply connections for the leads of said coil.

2. In a vibrating mechanism, the combination of a support having an open end, a member mounted in said open end and having sides and formed with an opening, an electro-magnet comprising a core having at its inner end portions engaging the said member and its body portion extending through said opening and a coil on said member, an insulating block engaging the inner end of said core, plates secured to the bottom of said member and having portions at opposite sides of said block, hollow members extending through openings formed in said plate portions and said block for securing them together and serving as supports for the leads from said coil, an armature, a resilient device carrying said armature and supported on the rim of the side wall of said member, a device fixed to said armature, and electrical supply connections for the leads.

3. In a vibrating mechanism, the combination of a support having an open end, a member mounted in said open end and having sides and formed with an opening, an electro-magnet comprising a core having at its inner end portions engaging the said member and its body portion extending through said opening and a coil on said member, an insulating block engaging the inner end of said core, terminals on said block, plates secured to the bottom of said member and having portions at opposite sides of said block, hollow members extending through openings formed in said plate portions and said block for securing them together and serving as supports for the leads from said coil to said terminals, an armature, a resilient device carrying said armature and supported on the rim of the side wall of said member, a device fixed to said armature, and electrical supply connections for the leads.

4. In a vibrating mechanism, the combination of a support having an open end, a member mounted in said open end and having sides and formed with an opening, an electro-magnet comprising a core having at its inner end portions engaging the said member and its body portion extending through said opening and a coil on said member, an insulating block engaging the inner end of said core, angle plates at opposite sides of said block, a hollow member extending through openings in one portion of each plate and the bottom of said member, hollow members extending through openings in said block and the other portions of said plates, said hollow members forming supports for the leads from said coil, an armature, a resilient device carrying said armature and supported on the rim of the side wall of said member, a device fixed to said armature, and electrical supply connections for the leads.

5. In a vibrating mechanism, the combination of a support having an open end, a member mounted in said open end and having sides and formed with an opening, an electro-magnet comprising a core having at its inner end portions engaging the underside of said member and its body portion extending through said opening and a coil on said member, an insulating block, means for securing said block and end portions of said core to said member, an armature, a resilient device carrying said armature and supported on the sides of said member, a device fixed to said

armature, and electrical supply connections for the leads of said coil.

6. In a vibrating mechanism, the combination of a support having an open end, a member mounted in said open end and having sides and formed between said sides with an opening, an electro-magnet comprising a core having at its inner end portions engaging the under surface of said member, the body portion of said core extending through said opening, and a coil on said member, an insulating block engaging the inner end of said core, means for securing said block to the bottom of said member, an armature, a device carrying said armature and supported on the free ends of said sides, a device fixed to said armature, and electrical supply connections for the leads of said coil.

7. In a vibrating mechanism, the combination of a support having an open end, a member mounted in said open end and having sides and formed between said sides with an opening, an electro-magnet comprising a core having at its inner end portions engaging the under surface of said member, the body portion of said core extending through said opening, and a coil on said member, an insulating block engaging the inner end of said core, means for securing said block to the bottom of said member, an armature, a device carrying said armature and supported on the free ends of said sides, said resilient device comprising a plurality of resilient plates connected at their central portions to said armature, a device fixed to said armature, and electrical supply connections for the leads of said coil.

8. In a vibrating mechanism, the combination of a support having an open end, a member mounted in said open end and having sides and formed between said sides with an opening, an electro-magnet comprising a core having at its inner end portions engaging the underside of said member, the body portion of said core extending through said opening, and a coil on said member, an insulating block provided with terminals, means for securing said block and core end portions to said member, an armature, a device comprising a plurality of resilient plates mounted at their outer ends on said sides, an element for securing the central portions of said plate to said armature, a device removably secured to said element, and electrical supply connections for the leads of said coil.

9. In a vibrating mechanism, the combination of a support having a wall formed with an opening and an annular side, an electro-magnet comprising a core having at its inner end lateral portions engaging said wall at opposite sides of the opening therein, the central portion of said core extending through said opening, and a coil on one side of said wall, an insulating block provided with terminals, means for securing the lateral portions of said core and block in fixed relation to the opposite side of said wall, a resilient member engaging the free edge of said annular side and supporting centrally of the latter an armature, and a member carried by said armature and vibrated thereby.

10. In a vibrating mechanism, the combination of a member having a wall formed with a central opening and provided with sides, a core extending through said opening and having a portion engaging said wall, a U-plate fitting said core below said wall and having lateral arms secured thereto, an insulating block secured to said U-plate and carrying terminals, a coil on said wall

around said core, a resilient member engaging said sides and supporting an armature, and a member carried by said armature and vibrated thereby.

- 5 11. In a vibrating mechanism, the combination of a member having a wall formed with a central opening and provided with an annular side, a core extending through said opening and having a portion engaging said wall, a coil on said wall
10 around said core, a U-plate fitting said core below

said wall and having lateral arms, hollow members extending through openings formed in said arms and wall for securing them together and serving as supports and outlets for the leads from said coil, an insulating block secured to said U-plate and carrying terminals for the leads, a resilient member engaging said annular side and supporting an armature, and a member carried by said armature and vibrated thereby.

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