E. J. BODEY.

ELECTRIC VIBRATOR.

APPLICATION FILED NOV. 18, 1916.

1,316,874.

Patented Sept. 23, 1919.

2 SHEETS—SHEET 1.

Fig. 1

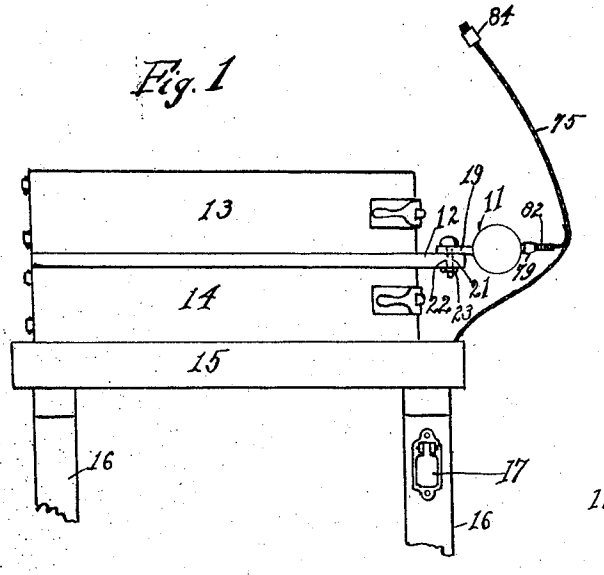


Fig. 2

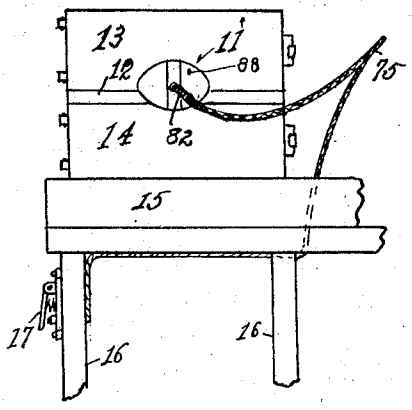


Fig. 3.

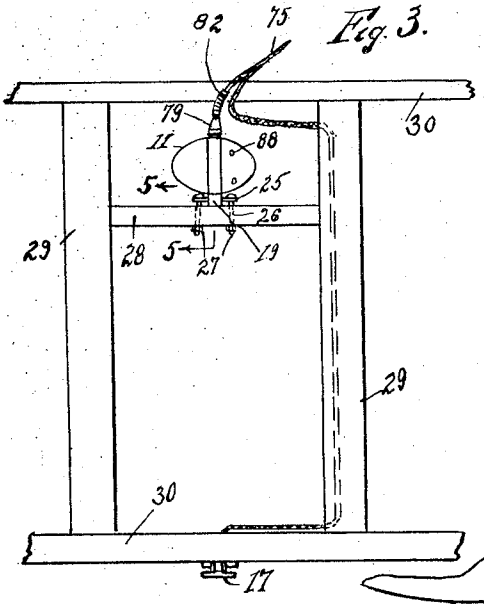
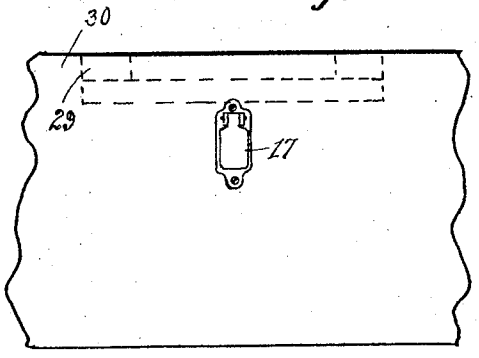


Fig. 4.



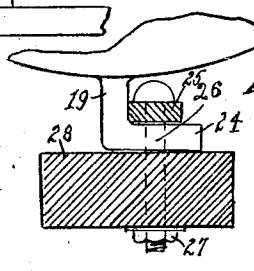


Fig 5.

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2 SHEETS—SHEET 2.

Fig.6.

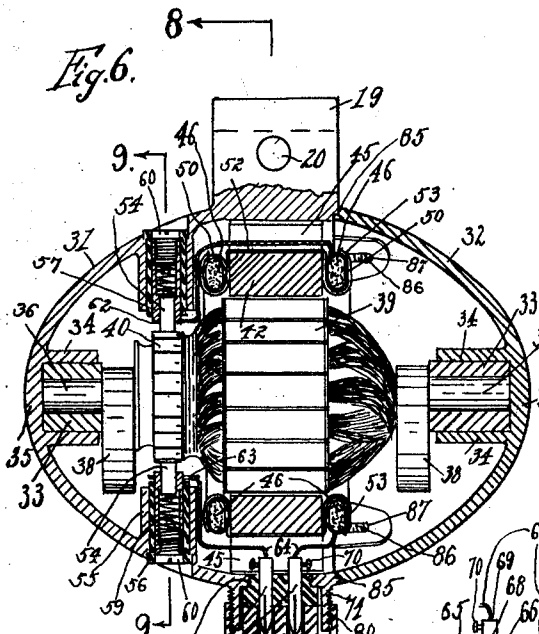


Fig.7.

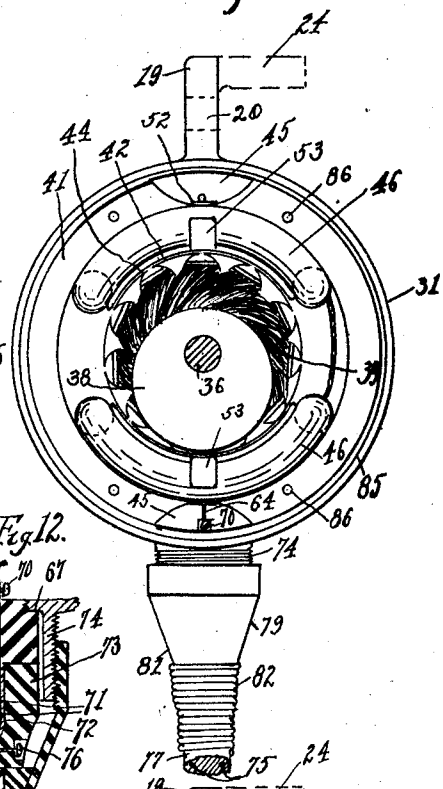


Fig.12.

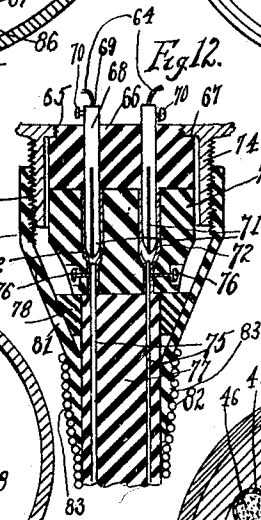


Fig.9.

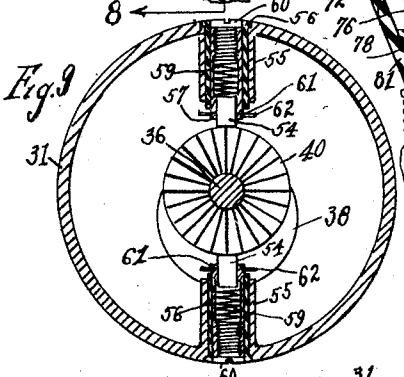


Fig.8.

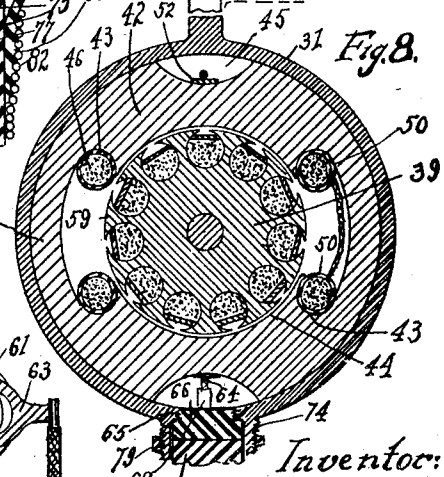


Fig.10.

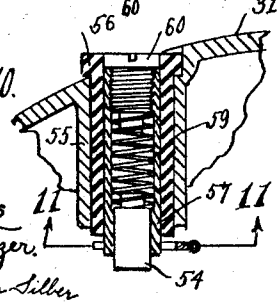
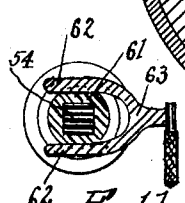


Fig.11.



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ELECTRIC VIBRATOR.

1,316,874. Specification of Letters Patent. Patented Sept. 23, 1919.

Application filed November 18, 1916. Serial No. 132,140.

To all whom it may concern:

Be it known that I, EDWARD J. BODEY, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Electric Vibrators, of which the following is a specification.

My invention relates to vibrators or rapping devices arranged to be connected with a part of a foundry molding apparatus or the support for the same, so as to transmit its vibrations thereto when necessary, and has for its object the provision of means whereby the movement of a rotating member of the vibrator causes the necessary vibrations of the device.

It is a further object of my invention to construct an electrically operated vibrator comprising an eccentrically weighted rotating member, and further to provide a housing for the motor comprising the rotating member adapted to support the same, and so constructed with relation thereto as to form a compact and simple construction.

The invention will be further readily understood from the following description and claim, and from the drawings, in which latter:

Figure 1 is a front elevation of a molder's flask in which a match-plate is employed, mounted upon a suitable bench and having my improved vibrator attached to the match-plate.

Fig. 2 is a side elevation of a similar arrangement.

Fig. 3 is a plan view of a molder's tub with my device attached to the same.

Fig. 4 is a front elevation of a portion of a molder's tub, showing the knee-switch for operating the vibrator.

Fig. 5 is a vertical section on the line 5—5 of Fig. 3.

Fig. 6 is an axial sectional view through the vibrator.

Fig. 7 is an end view of the vibrator with one of the casing members removed.

Figs. 8 and 9 are transverse sections on the lines 8—8 and 9—9 of Fig. 6, respectively.

Fig. 10 is an enlarged vertical section of one of the brushes of the motor and its support.

Fig. 11 is a transverse section on the line 11—11 of Fig. 10; and,

Fig. 12 is an enlarged fragmentary vertical section of the electrical connection.

11 represents the casing for the vibrator, which is adapted to be attached to any convenient part of a molding apparatus, such for example as the match-plate 12 arranged to be received between the cope 13 and the drag 14 of a molder's flask. This construction is exemplified in Figs. 1 and 2, the flask being shown as mounted upon a bench 15 having legs 16, and means being provided for closing a circuit through the vibrator, illustrated as a knee-switch 17, preferably attached to one of the legs of the bench.

In the construction illustrated in Figs. 3 and 4 the vibrator is attached directly to a molder's tub, with the switch 17 secured to the front of the tub. The casing is provided with suitable attaching means for rigidly attaching the vibrator to the part to be vibrated. The attaching means may be an outwardly extending lug 19 having at its outer end a hole 20, adapted to receive a bolt 21 received through said hole and a hole 22 in the match-plate, a nut 23 clamping the parts rigidly together.

The lug 19 may be provided with a hook 24 adapted to be received behind a clamp-plate 25, clamped by bolts 26 and nuts 27 to the part to be vibrated, exemplified as a cross-piece 28 rigid with rests 29 rigid in the tub 30, the usual molder's flask being arranged to be supported by the rests 29, so that, when the tub is vibrated, the flask supported thereby will also have the vibrations imparted thereto.

The vibrations imparted to the match-plate or the flask act to release the match-plate and the patterns thereon or the patterns in the flask from the surrounding sand for ready separation of the mold-parts. The vibrations imparted are rapid without being violent so that the pattern-impressions in the sand are not varied or enlarged by the vibrations, resulting in true molds.

The casing 11 is also provided with connecting means to be hereinafter described, for electric wires leading to the knee-switch and a source of electrical energy.

The casing of the vibrator is of such shape as to compactly house the vibrating means, the armature and its shaft, the magnetic field and the contact brushes therefor, and in the present exemplification of my invention is shown as comprising cup-shaped members 31, 32, adapted to be secured together rim to rim.

Within each of these members is a bearing-block 33, for instance, of treated wood, forming a bearing requiring no oiling, held securely in inner pockets 34, the walls of which are shown cast integral with the casing-members, the ends thereof being formed by closed webs 35 for closing the casing adjacent the pockets. The ends of a shaft 36 are journaled in the bearings 33.

The shaft 36 is adapted to be rotated and at the same time vibrated to transmit vibrations to the casing 11 and thence to the attaching lug 19 and the object to be vibrated. The vibration of the shaft is preferably caused by so constructing the same, that its center of gravity is at the side of its axis of rotation, and in the present exemplification of my invention this is accomplished by securing weighted disks 38 upon the shaft eccentrically thereto, at each end of the shaft adjacent the bearings 33 and concentric one with the other, so that the center of gravity of the disks will be at one side of the axis of rotation of the shaft, and thereby cause vibration of the same when rotated.

The shaft 36 is rotated by electrical means and in the present exemplication of my invention the shaft is shown as the armature-shaft of a motor, an armature 39 and a commutator 40 being fixed upon the shaft.

The armature is surrounded by a field-winding supported upon the inner face of the casing. The support is shown as consisting of a ring 41 secured within the casing-member 31, and in the construction shown, is provided with inwardly extending cores 42 having under-cut sides 43 and having their inner ends 44 curved to conform to the curve of the armature, but spaced therefrom so as to permit of rotation of the armature. The ring 41, in rear of the cores, is preferably cut away as shown at 45, to provide a space for clamping bands adapted to hold the field-windings upon the cores, as will be explained.

The field-winding is exemplified as consisting of insulated wire coils 46 wrapped with suitable insulating material 50 and surrounding each of the cores, and held thereon by engagement with the undercut sides of the cores. The means provided for holding the ends of the windings in position upon the cores consist in the present instance of a spring-strip 52 passing under each core through the space 45 and having its ends 53 bent up over the edge of the coil to securely engage the same.

The brushes 54 adapted to contact with the commutator 40, are supported by the inner wall of casing-member 31. In the present exemplification, this is accomplished by forming inwardly extending lugs 55 integral with the casing, and in such position that the brushes mounted in the same will contact with the commutator at the desired points when the parts are assembled for operation. The mounting for the brushes consists preferably of a thimble 56 of insulating material, within an opening extending longitudinally through each of the lugs, and separating a second thimble 57 forming an electrical conductor, from the casing. This second thimble forms the holder for the brush 54. The brush is shown square in cross-section and sliding within the thimble 57 and in electrical contact therewith. The brush is held in engagement with the commutator, preferably by a coiled spring 59 secured to the brush. The spring is held under the necessary tension to force the brush against the commutator, by a screw 60 threaded into the outer end of thimble 57 and engaging the said spring. The screw forms a dust-proof connection with the casing.

A detachable electrical connection is made between thimble 57 and a wire of the motor circuit, exemplified as being accomplished by forming transverse grooves 61 in the thimble, in which the prongs 62 of a contact-piece 63, secured to the wire, are removably held.

A circuit is formed through the field-winding and armature, exemplified as leading from one terminal 64 through the wire-coils 46, to one of the brushes in contact with the commutator, and by means of the latter through the armature and the other brush to the other terminal 64.

The means for connecting the terminals 64 of the motor-circuit with a source of electrical energy will next be described. In the form of my invention illustrated, this is accomplished by forming an internally threaded opening 65 in the casing 31 into which is threaded an insulated plug 66. The plug is exemplified as provided with a shoulder 67 adapted to engage the casing, to limit the inward movement of the plug, and further provided with electrical contact fingers 68 extending through the same, and preferably terminating at their inner ends in apertures 69 in which the terminals 64 are adapted to be secured by set-screws 70. The outer ends of the fingers 68 may be longitudinally split as shown at 71 to form spring fingers adapted to frictionally and removably engage suitable thimbles 72 to form an electrical connection.

The thimbles 72 extend through an insulated plug 73 received in the bore of an annular flange 74 extending from the casing. Wires 75 leading to a source of electrical energy are adapted to be secured in the rear ends of the thimbles, preferably by set-screws 76. The wires 75 are part of an insulating cable 77. Means are provided for holding the insulating plug 73 in place, exemplified as comprising a ring 78 of resili-

ent material, preferably soft rubber and shown of frusto-conical form, adapted to surround the cable 77 and to abut against the rear of the plug 73.

A cap 79 surrounds the cable and has threaded connection 80 with the annular flange 74. The cap has a contracting part 81 in which the ring is located. When the cap is screwed on the annular flange its longitudinal movement will compress the ring, so that the latter will exert pressure upon the cable and against the plug and hold them firmly in place.

If desired, the cable 77 carrying the wires 75 may be protected by a wire 82 coiled about the cable and extending a sufficient distance lengthwise of the cable to form a resilient protector for preventing breaking of the wires in the cable. The protector is connected to the cap 79 in any suitable manner, as by having its end threaded over the threaded end 83 of the cap.

In practice, the wires 75 leading from the casing 11, will be suitably connected with the knee-switch 17 and a standard screw-plug 84 adapted to fit any usual screw-socket in a usual lighting or power circuit, electric connections being provided so that upon closing the switch, the vibrator will be operated. The motor of the vibrator will preferably be universally wound, so as to be rotated by either alternating or direct currents of a given voltage.

The parts are so arranged that they may be readily assembled by axial movement of the armature-shaft into the casing-member 31 and the bearing therein, and axial movement of the casing-member 32 and the bearing therein about the armature-shaft. When so assembled, the brushes may be put in place.

After the parts of the vibrator have been assembled within the casing 11, the cup-shaped members 31, 32, are secured together so as to form a dust-proof joint. In the present exemplification of my invention this is accomplished by forming coöperating lips 85 upon the rims of the casing-members, by providing the members with means for securely fastening the same together. The fastening means preferably comprise bolts 86 secured to the ring 41 carried by casing 31, and extending through openings 87 in the casing 34, and adapted to be engaged at their outer ends by nuts 88.

My improved device provides an extremely simple means for accomplishing the purposes stated, and one which is economically made, and is compact and dust-proof. It further provides a device which obtains its vibrating or rapping effects solely by rotating means, and whose cost of operation is extremely low, as it takes but a small amount of electric current for minimum lengths of time, to accomplish the proper rapping of the patterns for releasing them from the sand.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

In a vibrator of the character described, the combination of an electric motor comprising a casing, an armature-shaft, separated bearings in said casing in which the respective ends of said armature-shaft are journaled, an armature on said armature-shaft, separated eccentric weight-members on said armature-shaft respectively located between said armature and said respective bearings, and attaching means for said casing rigid with said casing and located in a plane perpendicular to the axis of rotation of said armature-shaft between the separated planes parallel therewith in which said eccentric members are located.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

EDWARD J. BODEY.

Witnesses:
THERESA M. SILBER,
CHARLES E. WEBER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."