This invention relates primarily to the art of casting metals in sand molds, and more particularly to the art of imparting vibrations to match plates, core boxes, and other types of patterns to facilitate their withdrawal from the sand molds or, in the case of core boxes, the withdrawing of the box from around the core sand.

Among the objects of this invention are to provide a molder with simple, easily operated means whereby he may loosen the sand mold from the pattern, whether it be a match plate or any other kind of molding apparatus which needs to be shaken to be separated from sand; to provide an apparatus for the purpose indicated which is inexpensive to manufacture and easy to operate; to provide an apparatus for the purpose indicated which is easy to attach to the structure to which it is to be attached and is just as readily detached therefrom; and such further objects, advantages, and capabilities as will hereafter appear and are inherent in the construction disclosed herein. My invention further resides in the combination, construction, and arrangement of parts illustrated in the accompanying drawings and, while I have shown therein what is now regarded as the preferred embodiment of this invention, together with certain modifications thereof, I desire the same to be understood as illustrative only and not to be interpreted in a limiting sense.

In the drawings annexed hereto and forming a part hereof,

Fig. 1 represents a plan view of this device attached to a match plate, shown fragmentally;
Fig. 2 represents a transverse section substantially along the broken plane indicated by the line 2—2, Fig. 3;
Fig. 3 represents a plan view of this structure with the cap plate removed;
Fig. 4 represents a transverse sectional view substantially along the plane indicated by the line 4—4, Fig. 3;
Figs. 5 and 6 represent fragmentary elevations of a vibrator having a modified form of attachment lug;
Figs. 7 and 8 represent, fragmentarily, in plan and transverse section, respectively, a hollow pattern mounted on a match plate, with a vibrator according to my invention mounted on the match plate, within the pattern, the match plate forming a part of the vibrator;
Figs. 9 and 10 represent, respectively, in plan and edge view, a modified form of vibrator in which the plate constitutes a part of the vibrator;

Fig. 11 represents, in plan view, a vibrator inserted in a match plate;
Fig. 12 represents a section taken substantially along the plane indicated by the line 12—12, Fig. 11;
Fig. 13 is a plan view of a modified form of my new vibrator with the cap plate removed and the attaching bolt therefor in section; and
Fig. 14 represents a transverse section taken substantially along the plane indicated by the line 14—14, Fig. 13.

Reference will now be made in greater detail to the annexed drawings for a more detailed description of this invention. The vibrator of this invention is shown in Fig. 1 as attached to a match plate 1 by means of a bolt 2 passing through a lug 3, projecting from one side of the body 4 of the vibrator. Projecting in a direction opposite from the lug 3 is a lug 5 which has a screw-threaded opening 6 for the attachment of an air hose or other suitable pipe. A smaller opening 7 extends inwardly as a continuation of the opening 6 and opens into the hollow interior of the body 4. A screw 6a is located between the openings 6 and 7. Pitted within the hollow of this body is a wear-resistant ring 8 which serves as a track for the ball 9 to roll upon. Obviously, the rollable body may have a non-spherical form, such, for example, as a cylinder.

A cap 10 has an inwardly projecting part 11 which fits closely inside of the ring 8. As shown at 12 and 13, the body 4 and cap 10 are hollowed out to form an opening in the shape of a torus which serves as a raceway for the ball 9 as it rolls around inside of the body 4 on the ring 8. As shown at 14, there is a hole which cooperates with the hole 1 and extends into the interior of the ring 8. As is clear from Figs. 2 and 4, this hole 14 is offset with relation to the mid-plane 13 of the raceway so that the ball 9 does not strike the same when rolling around, which would tend to close up the opening.

A bolt 15 passes through the cap plate 10 and, at its lower end, screws into the body 4 to hold the two parts together. This bolt is provided with a longitudinal opening 16 and a transverse intersecting opening 17 which, together, serve as a vent for the air entering the opening 6 and causing the rolling of the ball 9 around the raceway.

It has been found in practical trials that, with the opening 18 going all the way through the bolt, there is no danger of sand collecting in the raceway and stopping the ball but the sand often blows both ways out of the hole 18 and some of
it may be blown into the face of the molder. However, when the hole 16 opens down only, there is no chance for the sand to be blown into the molder's face. It is also found that, if there is an opening from the raceway upwardly, there is a tendency for the sand to drop into the interior of the body and so clog up the raceway that the ball will not roll freely.

It is preferable to use an aluminum alloy for the body of the vibrator as a light weight metal does not absorb the vibrations to such an extent as would a heavy metal body, such as cast iron. The inlet 7 is shown as being devoid of any valve for controlling the rate of admission of air to the body chamber. It is of course obvious that such a valve could be provided for regulating the flow of air, if considered desirable. In the structures as illustrated in Figs. 9, 11, and 13, there is shown a means 18 for regulating the rate of flow of air into the vibrator. This, or its equivalent, may be used with any of the constructions illustrated herein.

In Figs. 5 and 6 there is shown a modification of this vibrator which is adapted to be attached in either of two positions at right angles to each other. In this case, the lug 3a is recessed, as shown at 19, to fit against the face of the match plate or other structure. It is provided with two holes 20 arranged at a right angle to each other so that the vibrator can be attached to a match plate with its mid-plane parallel to the plane of the plate or at a right angle thereto. Hence, if the two planes are parallel, then the vibration will be entirely in the direction of the plane of the plate but, if the plane of the vibrator is at a right angle to the plane of the plate, then the vibration will be partly at a right angle to the plane of the plate, which is sometimes desirable.

In the structure of Figs. 7 and 8, the match plate is shown as provided with an inlet 7 and an outlet 21 for the actuating air, which enters the raceway tangentially and escapes therefrom through the hole in the bolt 15 and the outlet 21 in the match plate. In these figures, the pattern is represented by the parts 22 upon the two sides of the plate. The match plate is provided with a ring-like depression 12 constituting a part of the raceway, a similar depression 13 being formed in the detachable part 10c of the vibrator. The air vents longitudinally through the bolt 15 and into the cavity 23 surrounding the bolt.

The structures of Figs. 9 to 12 are similar to the structure of Figs. 7 and 8 in that the match plate, itself, forms a part of the vibrator. However, in the structure of Figs. 9 and 10, the inlet is not through the plate but through the detachable part or cap 10b, corresponding to part 10c. In this structure, the bolt 15 is similar to the bolt 15 in the structure of Fig. 2, the hole in the threaded end of the bolt being plugged after the hole 16 is drilled. In this structure, as in that of Figs. 7 and 8, the match plate has a circular groove which serves as a part of the raceway.

In the structure of Figs. 11 and 12, a hole is formed in the extension of the match plate and the ring 8 is inserted therein, caps 10c and 10d being inserted from opposite sides, as shown clearly in Fig. 12. A ball 9 is housed in the raceway between these caps and they are held together by the bolt 15.

In the structure shown in Figs. 13 and 14, the cap 10c is provided with a circular boss 24 having a pair of grooves 25 leading therethrough from the cavity 25 surrounding the bolt 15. These grooves provide venting means for the air and are much more easily formed than the drill holes in the bolt. These grooves 25 are covered by the name plate 21 held in place by the head of the bolt 15a.

Various other modifications of this construction may be made within the scope of the appended claim without departing from this invention as defined by such claim.

Having now described my invention, I claim:

A vibrator for molding apparatus comprising a body member and a removable cover therefor, said body member having an approximately cylindrical opening therein, a metal lining for the cylindrical wall of said opening intended to serve as a track for a rollable body, a heavy metal ball within said opening designed to roll on said track, means for attaching said body to a molding apparatus, means for attaching to said body a conductor of a gaseous fluid, the last mentioned means having an opening therethrough which opens into the body opening in a direction approximately tangential to the internal surface of said body lining, and longitudinally apertured means connecting the body and its cover, the aperture in said last mentioned means extending less than entirely therethrough, said longitudinally apertured means having a transverse opening connecting the longitudinal opening and the body opening and serving as a vent for the gaseous fluid, said gaseous fluid serving as a driving agent to cause said ball to roll along said track.

EDWIN P. PETERSON.

REFERENCES CITED

The following references are of record in the file of this patent:

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