Oct. 27, 1931. E. L. FICKETT ET AL 1,829,441

VIBRATOR

Filed Nov. 25, 1929 2 Sheets-Sheet 1

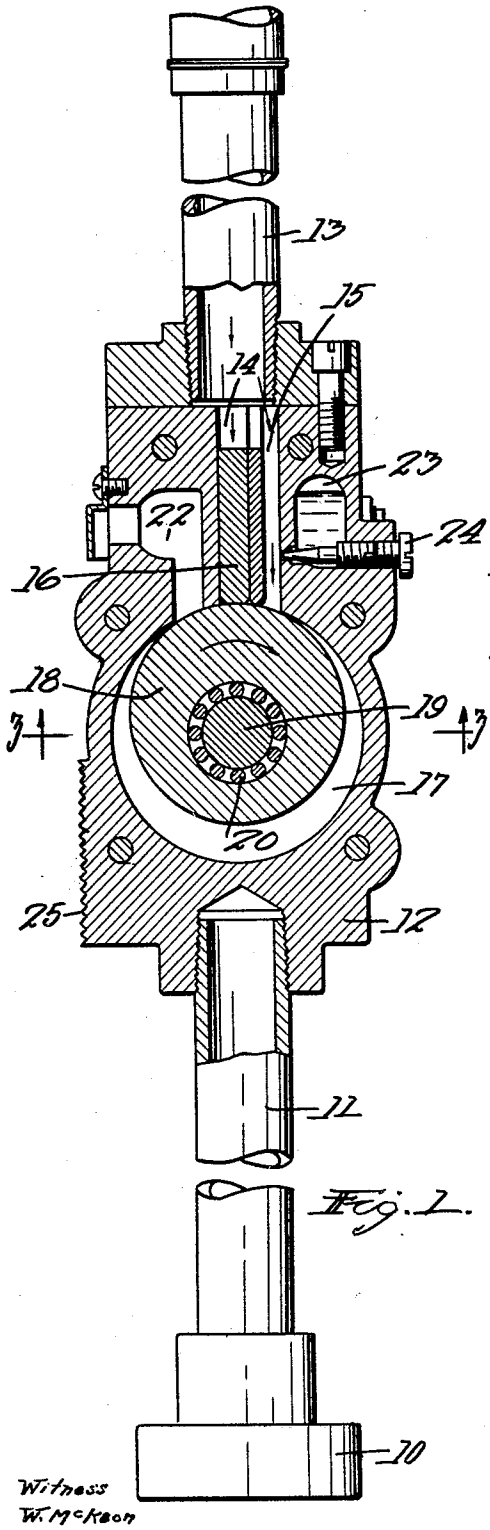


Fig. 1.

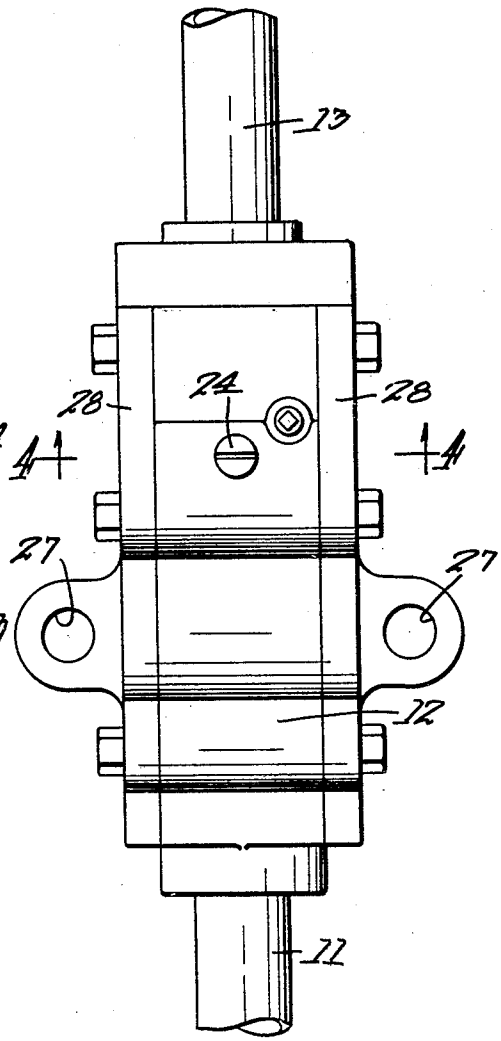


Fig. 2.

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VIBRATOR

Filed Nov. 25, 1929 2 Sheets-Sheet 2

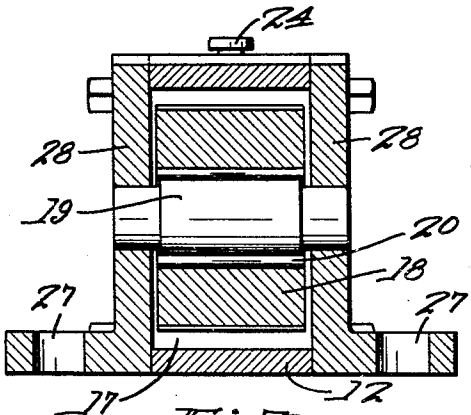


Fig. 3.

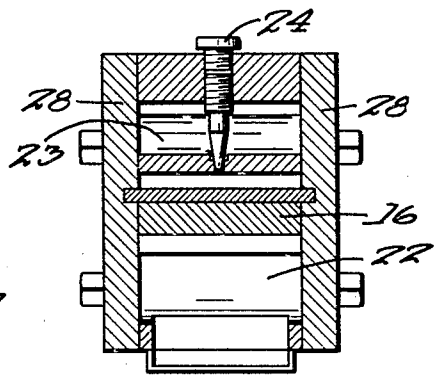


Fig. 4.

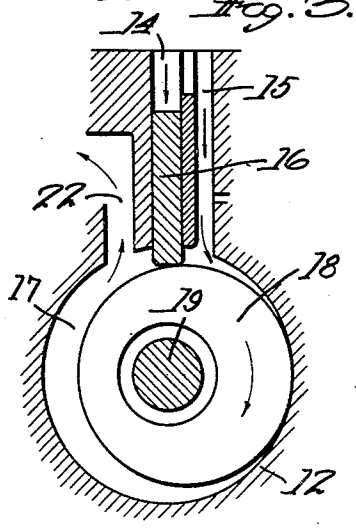


Fig. 5.

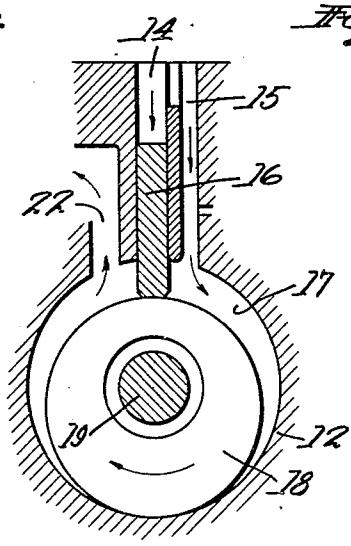


Fig. 6.

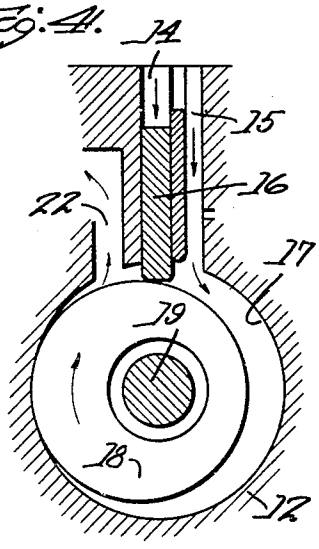


Fig. 7.

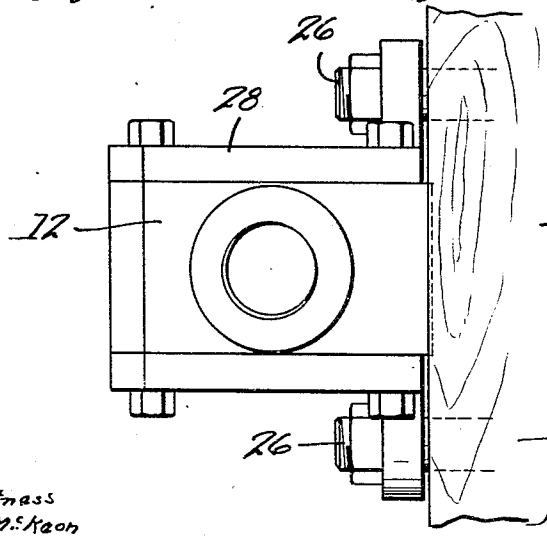


Fig. 8.

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UNITED STATES PATENT OFFICE

ERNEST L. FICKETT, OF FITCHBURG, MASSACHUSETTS, AND ALBERT W. MUNSELL, OF TEANECK, NEW JERSEY, ASSIGNORS, BY MESNE ASSIGNMENTS, TO SAID ALBERT W. MUNSELL

VIBRATOR

Application filed November 25, 1929. Serial No. 409,475.

This invention relates to a vibrator particularly adapted for tamping concrete by vibration and also capable of use for tamping and consolidating other materials, such as molding sand and the like.

The main object of this invention is to provide an effective means for causing the concrete or other granular material to flow into the corners and angles of the forms, patterns or the like in which it is enclosed and to completely imbed any reinforcing steel that may be present by consolidation of the aggregates and cement by the operation of vibration or jarring; also to drive off any excess water or release any entrained air so as to settle the granular material into its densest condition and make it as near as possible an absolute solid and to provide a mechanism adapted to act by compressed air or other fluid to produce rapid vibrations by the utilization of a rotor mounted to rotate on an axis and having its center of gravity arranged eccentrically.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which

Fig. 1 is an end view of a device constructed in accordance with this invention showing the principal parts in section on a plane transverse to the axis of rotation of the rotor;

Fig. 2 is a side view of the same;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view on the line 4—4 of Fig. 2;

Figs. 5, 6 and 7 are sectional views through the casing but showing the rotor in elevation and in three different positions, and

Fig. 8 is a plan showing one way of applying the vibrator to a concrete form.

The machine itself, as shown, comprises a tamper foot 10 attached by a suitable length of pipe 11 to a main casing or frame 12. Into the top of this casing extends a pipe 13 through which compressed air or other operating fluid can be introduced. The air enters the casing 12 in what may be considered two passages 14 and 15. The passage 14 applies the pressure of the actuating fluid at all times, and of course directly, to a sliding abutment 16. Through the passage 15 the air enters a space or chamber 17 in the interior of the casing, which is shown circular and preferably cylindrical in form. In this casing is the rotor 18 mounted to rotate on a shaft 19 which is centrally located in the chamber 17 but the rotor is eccentrically located therein so that it will substantially contact with the surface of the space 17 at one point, advancing around the same as the rotor rotates. For the purpose of enabling the rotor to revolve freely and maintain alignment it is provided with an anti-friction bearing 20 on the shaft 19.

It will be observed that on account of the air pressure on the abutment 16, it will be kept in contact with the rotor by yielding but strong pressure at all times. The passage or port 15 is the admission port. The exhaust port 22 is provided on the opposite side of the abutment valve 16. An oil reservoir 23 is also provided in the casing 12 which is filled and closed by any suitable means such as a pipe plug. The oil in this reservoir is transferred to the inlet passage 15 and regulated by a needle valve 24 so as to follow all around the parts that have been described.

The device can be used in two ways. It can be manually operated, so to speak, by holding it in the hands with the tamper foot 10 against the concrete form, mold, blank, or the like. On the other hand the casing 12 is shown as provided with serrations 25 along one side and the casing is clamped against the structure of the form containing the concrete or the like in such position that the points of the serrations impinge on a wooden member thereof. Rods or other suitable clamps 26 are passed through holes 27 in a pair of opposite cover plates 28 and attached to the concrete form in any desired way. Then the vibrations produced by the rotor will be transmitted directly and positively without holding the machine manually.

The operation will be understood by reference to Figs. 5, 6 and 7. In the position shown in Fig. 5 air is being admitted through the intake port and is pressing on the abutment valve, of course, at all times. Therefore

it will be seen that no air can pass in a counter-clockwise direction and escape through the exhaust port. The space on the exhaust side is all open through the exhaust port to atmospheric air. The rotor clears the inside of the inner wall of the space 17 by a few thousandths of an inch and being lubricated, it practically touches it. Now the air presses in all directions and the effective surface of the rotor in the small space at the right of the abutment valve 16 is presented at right angles to the axis of the shaft 19 upon which surface the air pressure is free to act, thereby producing a turning moment on the rotor.

When the parts get to the position shown in Fig. 6 this moment is increased. It is still present in the position shown in Fig. 7. Therefore the rotor will operate until it comes to a dead center and the parts are so designed that the rotor will have sufficient inertia to carry it over the dead center and then the process is repeated. Of course, when the rotor gets to the position shown in Fig. 1 the exhaust port is beginning to open to allow the air to escape that has been used in running the rotor and practically no projecting area is on the intake side. This is a dead center. If the device is stopped at this point it is necessary to jar it from the outside so that the rotor will fall into a position by gravity from which it can be started again. The center of mass of the rotor is outside its center of rotation. In other words it is an eccentric. Therefore the desired vibrations are produced and transmitted to the article upon which it is operating.

This constitutes a very simple device without any moving inlet or outlet valves except the rotor itself, without any springs for holding the abutment valve 16 against the rotor and practically without friction. It can be used by hand or clamped to the container for the granular material as desired. It is readily portable. Ordinarily it is used in vertical position as shown but that is not essential.

Although we have illustrated and described only a single form of the invention and two ways of using it, we are aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claim. Therefore we do not wish to be limited in this respect but what we do claim is:—

In a vibrator for the purpose described, the combination of a casing having serrations along one side, means for securing the casing to the surface of a concrete form and forcing the serrations into said surface for transmitting the motion of the casing thereto, said casing having a circular chamber therein, a rotor mounted to rotate about a horizontal axis in said chamber parallel with said surface but eccentrically located thereon and having its edge, at the greatest distance from its center of rotation, substantially in contact with the wall of the chamber, whereby the rotor in its rotation moves toward and from said surface, an abutment in contact with the rotor to prevent passage of fluid backwardly around it and means for introducing fluid under pressure on one side of the abutment for turning the rotor.

In testimony whereof we have hereunto affixed our signatures.

ERNEST L. FICKETT.
ALBERT W. MUNSELL.