Aug. 22, 1950 D. E. MASON 2,520,044

VIBRATING DEVICE

Filed Oct. 21, 1949

FIG. 1.

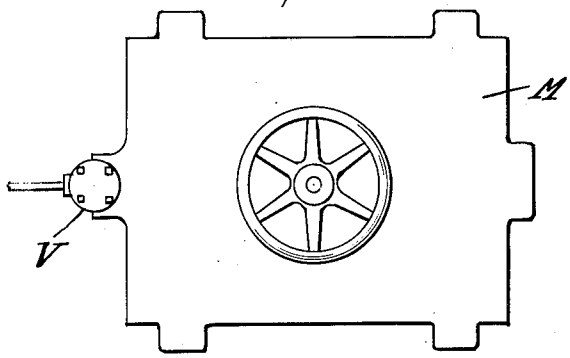


FIG. 2.

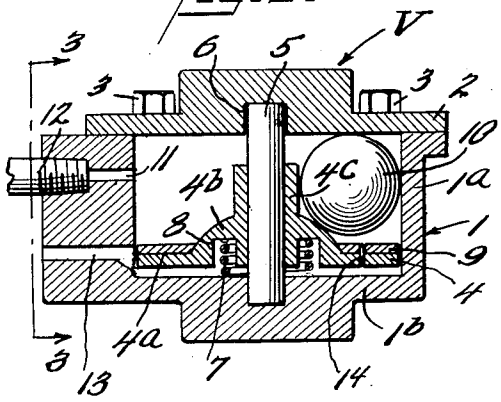


FIG. 3.

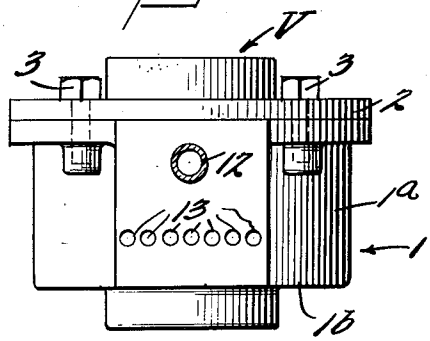
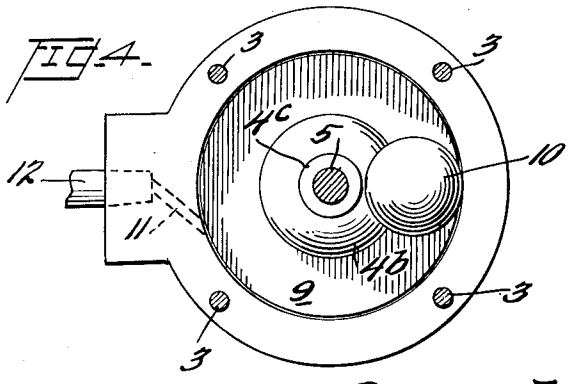


FIG. 4.



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Patented Aug. 22, 1950 2,520,044

UNITED STATES PATENT OFFICE

2,520,044

VIBRATING DEVICE

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Application October 21, 1949, Serial No. 122,711

3 Claims. (Cl. 74—87)

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This invention relates to vibrating devices of general application, such as for use with plate or bench molds for obtaining a clean separation of the match plate from the sand, for attachment to the discharge spouts of storage bins for producing a continuous and uniform flow of powdered or granular material, for use therapeutically as a massaging implement, and for various other purposes. More especially the vibrating device of the invention is of the general type in which a ball travels around a raceway within a closed housing under the propulsion of a jet fluid, such as air, water or other gas or liquid, as exemplified by Patent No. 1,082,285 of Clarence A. Peterson, dated December 23, 1913.

An important object of my invention is to provide in a vibrating device of the above character a brake for normally holding the ball against movement but being automatically releasable upon pressure being admitted to the housing to allow the ball to roll around the raceway under the action of the admitted fluid.

Another object of my invention is to provide in a vibrating device of the above character a dome-shaped ball supporting platform for insuring improved rolling contact of the ball along the raceway.

Other objects and advantages will become apparent from the following detailed description of a preferred embodiment of the invention, reference being had to the accompanying drawing in which:

Figure 1 is a plan view schematically showing a vibrating device attached to a match plate;

Figure 2 is a view in vertical cross-section through the vibrating device of Fig. 1;

Figure 3 is a side view of the vibrating device viewed on the line 3—3 of Fig. 2; and

Figure 4 is a plan view of the vibrating device with its cover removed.

In Fig. 1 of the drawing is shown a match plate M having a vibrating device V attached to the plate thereof to impart a shaking motion to the match plate in accordance with common practice in the metal founding art.

The vibrating device V comprises a cup-shaped housing 1 having a side wall 1*a* of cylindrical inner circumference and a closed bottom 1*b*. The housing is closed at its upper end by a removable flat cover plate 2 secured to the housing by screws 3.

Inside the housing is a platform 4 of circular outline and of such a diameter as to slidably fit within the interior of the housing. The platform is centrally apertured to encircle a post 5, the

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post being drive-fitted within a recess in the bottom of the housing and extending upwardly therefrom with its upper end loosely received within a socket 6 formed in the cover. The platform 4 is free to slide up and down upon the post and is urged in an upward direction—that is, away from the bottom of the housing—by a coil spring 7 encircling the post and having one end resting against the bottom of the housing and the other end bearing against the bottom of a circular groove 8 formed in the lower face of the platform 4. The upper face of the platform is flat along its outer margin, as indicated at 4*a*, but dome-shaped adjacent its central portion, as indicated at 4*b*, the dome-shaped portion being axially extended in the form of a cylindrical collar 4*c* projecting above the dome and providing additional bearing surface along the post 5. A rubber gasket 9 overlies the flat portion 4*a* of the platform.

The space within the housing 1 between the dome-shaped portion 4*b* of the platform and sidewall 1*a* defines a circular raceway for a metal ball 10 which is of such diameter as to engage the dome and sidewall and be held suspended above the flat portion 1*a* of the platform, as best shown in Fig. 2. The spring 7, which is under a slight compression, urges the platform upwardly and with it the ball 10 so as to clamp the ball between the raceway and the flat cover plate 2. The platform thus serves as a brake for holding the ball against movement.

A port 11 is provided in the sidewall of the housing directed generally tangential to the raceway for delivering a jet of air inside the housing and this port communicates with a tube 12 threaded into the housing and leading from a source of air pressure (not shown). For exhausting air from the housing there is a series of outlet openings 13 through the wall of the housing located in circumferential alignment at an elevation below the port 11. These outlets when the platform is in its elevated position are closed by the peripheral edge of the platform, as shown in Fig. 2. A small bleeder hole 14 is provided in the platform to vent the pressure from above the platform to the outlets 13.

The operation of the vibrating device just described is as follows: With the vibrating device in its inoperative or "at rest" position, the platform 4 under the thrust of the coil spring 7 holds the ball 10 braked against the cover 2 of the housing. Upon admission of air under pressure to the inside of the housing through the port 11 (which can be accomplished by turning a suitable valve

in the air line that includes the tube 12) pressure builds up within the housing forcing the platform 4 downwardly against the spring 7 to uncover the outlet openings 13 and to release the ball 10. The jet of air issuing from port 11 drives the ball around the raceway at high speed and escapes through outlets 13. This unbalancing force about the central axis of the housing imparts vibrations to the housing and to the match plate to which it is attached.

The ball 10 is tipped against the sidewall 1a of the housing by the dome-shaped portion of the platform, and in its travel around the circular raceway the ball makes line contact with the dome and with the sidewall. When it is desired to stop the operation of the vibrating device the air current is cut off; the air pressure in the housing immediately falls allowing the coil spring to raise the platform to close the outlet openings 13 and clamp the ball 10 against the cover. Thus, no time is lost in bringing the vibrating device to a stop.

The vibrating device may be adapted to various types of apparatus in addition to molds by substituting for the ball 8, balls of larger or smaller diameter (and hence of greater and lesser weight) to change the vibrating capacity of the device. Thus, when the vibrating device is used in a smaller massaging implement, balls of small size will be desirable; and when employed as a tapper for compacting cement in large forms, balls of larger size will be required. Such balls may readily be substituted by releasing the screws 3 and removing the cover 2 of the housing.

While the vibrating device has been described as operating by air pressure, other fluids, such as water, may be employed when necessary or desirable, a suitable offtake for the water from the device being provided. When water is used as the propelling medium, a pump for generating the proper pressure will ordinarily be included in the supply line 12.

It may also be found desirable to provide a liner within the interior of the housing to protect the side wall 1a from wear. Such changes as these, as well as others that will readily occur to those skilled in the art to which the invention pertains, are to be understood as falling within the purview of this invention which is defined by the following claims.

I claim:

1. In a vibrating device of the class comprising a housing having an enclosing wall, a port opening through said wall and adapted to be connected to a source of fluid pressure for delivering a jet of fluid non-radially into the housing and a ball rotatable within the housing under the influence of said jet for imparting vibrations to said housing, the combination of a platform snugly fitting the interior of the housing and positioned at one side of the port, an outlet for fluid through the wall of the housing adapted to be closed by the platform in one position of the platform and a spring for urging said platform to outlet-closing position and for clamping the ball against the interior of the housing.

2. In a vibrating device of the class comprising a housing having a cylindrical sidewall and a removable cover, a port opening through said wall and adapted to be connected to a source of fluid pressure for delivering a jet of fluid non-radially into the housing and a ball rotatable within the housing under the influence of said jet, the combination of a circular platform snugly fitting the interior of the housing and positioned at one side of the port, an outlet for fluid through the sidewall adapted to be closed by the platform in one of its positions and to uncover the outlet in another of its positions to afford a continuous flow of fluid from the housing and a spring for urging said platform to outlet-closing position and for clamping the ball against the cover.

3. In a vibrating device of the class comprising a housing having an enclosing wall and a removable cover, a port opening through said wall and adapted to be connected to a source of fluid pressure for delivering a jet of fluid non-radially into the housing and a ball rotatable within the housing under the influence of said jet, the combination of a circular platform snugly fitting the interior of the housing and positioned at one side of the port, an outlet for fluid through the sidewall adapted to be closed by the platform in one of its positions and to uncover the outlet in another of its positions to afford a continuous flow of fluid from the housing, and a spring for urging said platform to outlet-closing position and for clamping the ball against the cover, said platform having a dome-shaped central portion for supporting the ball and a flat marginal portion.

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No references cited.