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K. P. BILLNER

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VIBRATOR

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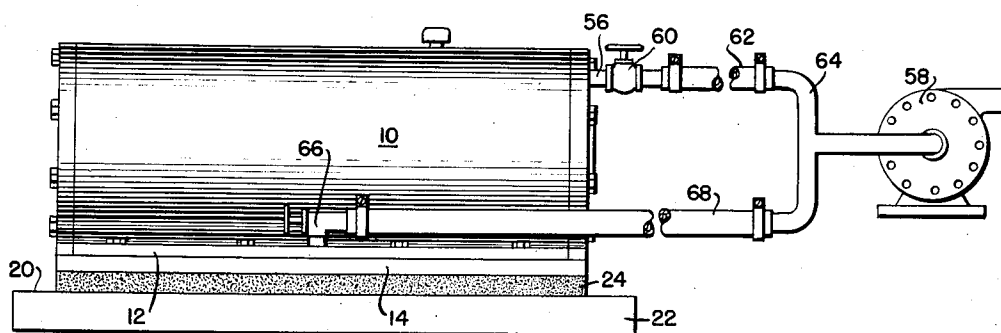


FIG. 1.

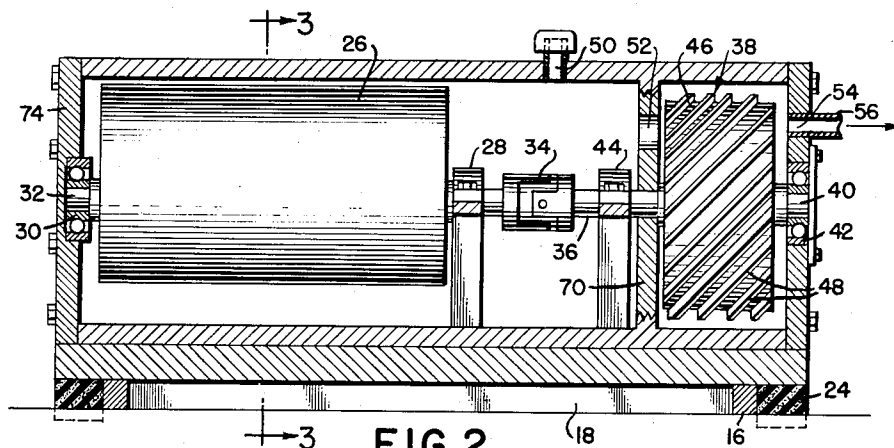


FIG. 2.

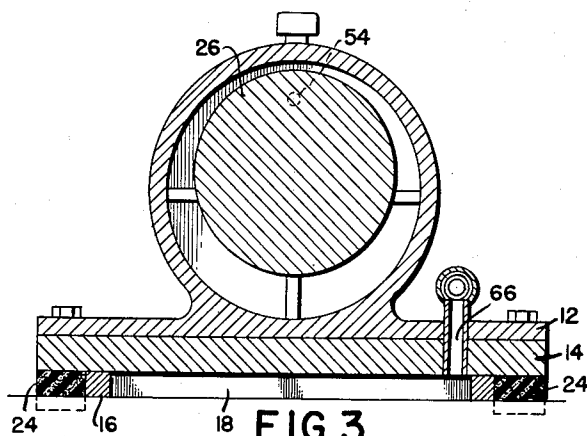


FIG. 3.

INVENTOR
Karl P. Billner

BY *Raymond W. Colton*
ATTORNEY

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2,749,097

VIBRATOR

Karl P. Billner, Philadelphia, Pa., assignor to Vacuum Concrete, Inc., a corporation of Pennsylvania

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5 Claims. (Cl. 259—1)

This invention relates to a vibrator intended to be actuated by a vacuum pump so as to be readily adaptable for use wherever a vacuum pump is available.

The vibrator of the present invention is eminently suited for use wherever the excess water is removed from concrete mixes by the use of subatmospheric pressures. Under such conditions, it is entirely unnecessary to have a compressor on the job since the source of subatmospheric pressures can be employed for the removal of such excess water and also for actuation of the vibrator.

As is well known, vibrators are commonly used for compacting concrete mixes in forms or molds by vibrating the reinforcing steel or the forms themselves. Vibrators are also employed for many other purposes for which the structure of the present invention is likewise suitable.

The use of subatmospheric pressures for the actuation of vibrators is also advantageous in reducing the noise appreciably below that experienced with compressed air devices for the purpose. Moreover, the use of vacuum has a cooling effect upon the apparatus with which it is used as compared with the heating almost invariably encountered with compressed air. Thus, the apparatus is much easier to handle and the life of rubber hose lines and other parts is substantially extended.

It is among the objects of the present invention to provide a vibrator comprising a frame, an unbalanced rotor journaled in the frame, a rotary fluid motor mounted on the frame connected in driving relationship with the rotor, the motor having an inlet port open to atmosphere and a suction port for connection with a source of subatmospheric pressure. The motor is preferably of the bladed rotor type employing either a radial or axial flow or combination thereof. The frame may be provided with a recessed surface defining a chamber open at one end and a deformable sealing gasket coextensive with the end and extending therebeyond may be employed so that the chamber may also be connected with a source of subatmospheric pressure for securing the frame to a surface to be vibrated. The recessed surface is preferably bounded by an axially projecting flange and the gasket is located adjacent to the flange and is deformable axially of the flange to a thickness no greater than that of the flange. In this manner, the frame will attach itself to the surface to be vibrated whereupon a rigid portion of the frame will engage the surface to be vibrated so that there will be no damping of the vibrations transmitted. The gasket is preferably composed of a cellular elastomer such as sponge rubber.

A more complete understanding of the invention will follow from a description of the accompanying drawings wherein:

Fig. 1 depicts a vibrator in accordance with the present invention applied to a surface to be vibrated and connected with a vacuum pump;

Fig. 2 is a sectional elevation on an enlarged scale of a portion of the apparatus shown in Fig. 1; and

Fig. 3 is a section taken along line 3—3 of Fig. 2.

The vibrator 10 shown in the drawings has a frame 12

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having a base 14 to the undersurface of which is secured a rigid bead or projecting flange 16 defining a chamber 18 open at its bottom for engagement with an exposed surface 20 of a member 22 to be vibrated. Completely surrounding the flange 16 there is a cellular elastomer gasket 24 normally extending beyond the flange 16 as depicted in Fig. 1 and by broken lines in Figs. 2 and 3, but which is deformable to a thickness not greater than that of the flange 16 when the chamber 18 is subjected to a subatmospheric pressure so that the flange 16 will enter into abutment with the surface 20 to be vibrated so that there will be no damping of the vibrations such as would occur were the gasket 24 not capable of such deformation.

Within the frame 12, an unbalanced rotor 26 is rotatably supported in suitable bearings 28 and 30 so that rotation of the rotor will produce vibrations of a frequency desired by use of the proper speeds. The shaft 32 of the rotor has one end connected by means of a flexible coupling 34 with the shaft 36 of a fluid motor 38 whose shaft 40 is journaled in suitable bearings 42 and 44. The rotor 46 of the fluid motor 38 is provided with blades 48 so that rotation is produced when atmospheric air is drawn into the frame or housing through an opening 50 and an inlet port 52 and exhausted through the suction port 54 provided with a nipple 56 for communication with a vacuum pump 58. A valve 60 is preferably provided intermediate the nipple 56 and vacuum pump 58 and the connections are completed by suitable flexible lines 62 and fittings 64.

As depicted in Fig. 1 the vacuum pump is also connected with a valved fitting 66 through a hose line 68 for evacuation of the chamber 18 when it is desired to attach the vibrator to the surface of a body 22 to be vibrated.

The body 22 may be a form, vertical or horizontal, into which concrete is to be poured. The vibrator will first be applied to the exposed surface of such a form in much the manner depicted in Fig. 1 whereupon the vacuum pump 58 will be operated and the valve of the fitting 66 opened so that the closed chamber defined between the vibrator and the body 22 will become evacuated and the gasket 24 deformed until it is coplanar with the exposed surface of the peripheral bead 16. At this time, the valve 60 will be opened to the desired extent drawing atmospheric air through the vanes or blades 48 of the rotor 46, producing rotation at a desired speed which is transmitted through the flexible coupling 34 to the eccentrically mounted rotor 26 whose operation will produce vibrations which are transmitted to the body 22 through the bead or flange 16. When it is desired to discontinue operation of the device, the valve 60 can be closed to terminate rotation and the valve of the fitting 66 can be closed to discontinue the subatmospheric pressure condition within the chamber 18. At this time, air can be admitted to the chamber 18 in any suitable manner to facilitate removal of the vibrator from the form.

As depicted in Fig. 2, one end of the chamber housing the rotor 46 can be closed by a threaded disk 70 containing the inlet port 52 while the other end is closed by a plate 72 bolted to the frame and containing the bearing 42 and suction port 54.

The outer end of the shaft 32 of the eccentrically mounted rotor has its bearing 30 supported in a closure plate 74 suitably secured to the frame 12.

Whereas only one form of the invention has been illustrated and described, modifications contemplated will suggest themselves to those skilled in the art and accordingly, the invention should not be restricted to any specific form beyond the scope of the appended claims.

I claim:

1. A vibrator comprising a frame, an unbalanced rotor journaled in said frame, said frame providing a recessed surface defining a chamber open at one end, a deformable sealing gasket coextensive with said end and extend-

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ing therebeyond, a fluid motor mounted on said frame connected in driving relationship with said rotor, and fluid ports connecting said motor and chamber with a source of subatmospheric pressure for securing rigid engagement between said frame and another surface and imparting vibration thereto.

2. A vibrator as set forth in claim 1 wherein said recessed surface is bounded by an axially projecting flange and said gasket is located adjacent said flange and is deformable axially of said flange to a thickness no greater than that of said flange.

3. A vibrator as set forth in claim 1 wherein said gasket is composed of a cellular elastomer.

4. A vibrator comprising a frame defining a chamber open at one end and having a surface at said open end for sealing engagement with another surface, said chamber having a port for connection with a source of sub-

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atmospheric pressure, an unbalanced rotor journaled in said frame, a rotary fluid motor mounted on said frame connected in driving relationship with said rotor, said motor having an inlet port open to atmosphere and a suction port for connection with a source of subatmospheric pressure.

5. A vibrator as set forth in claim 4 wherein said motor has a bladed rotor.

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