

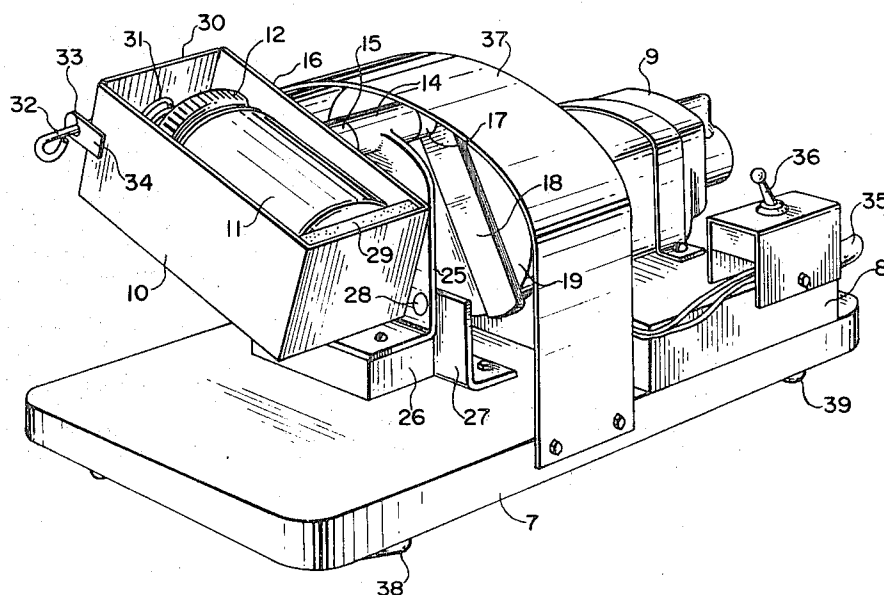
[54] **POWERED MECHANICAL SHAKER
DEVICE**[76] Inventor: **Robert K. Lorenzen**, Box 14, Shir-
land, Ill. 61079[22] Filed: **Feb. 7, 1972**[21] Appl. No.: **223,948**[52] U.S. Cl. **259/75**[51] Int. Cl. **B01f 11/00**[58] Field of Search.....259/13, 29, 48, 56,
259/75[56] **References Cited****UNITED STATES PATENTS**

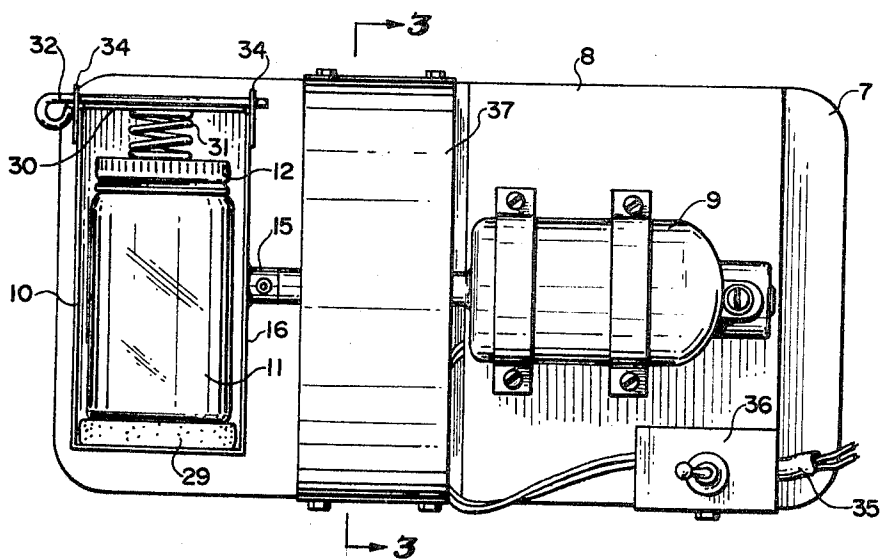
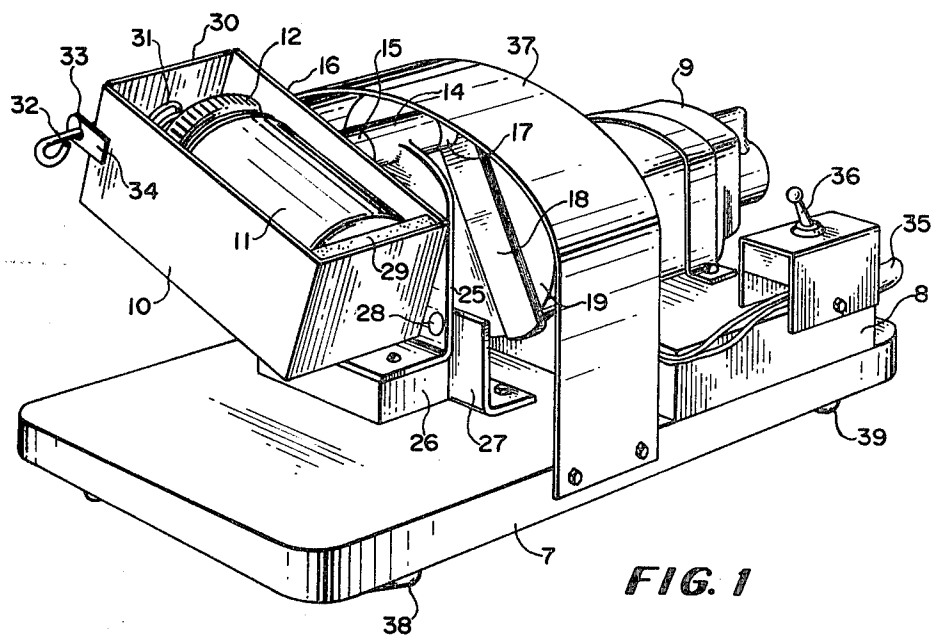
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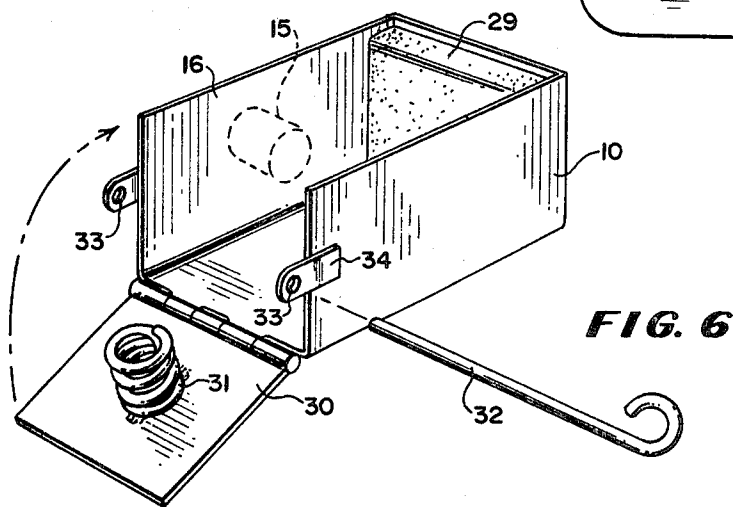
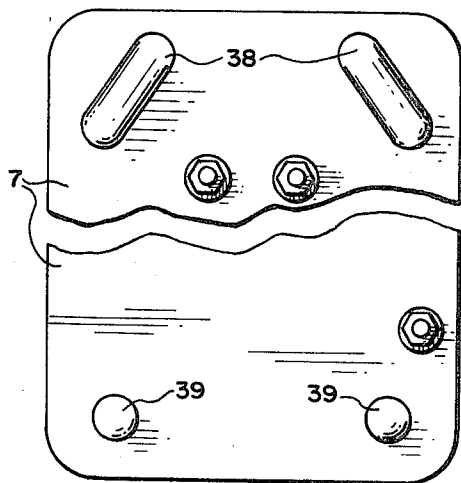
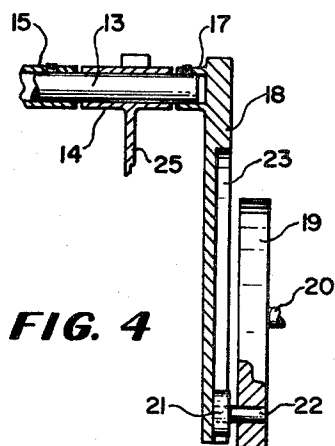
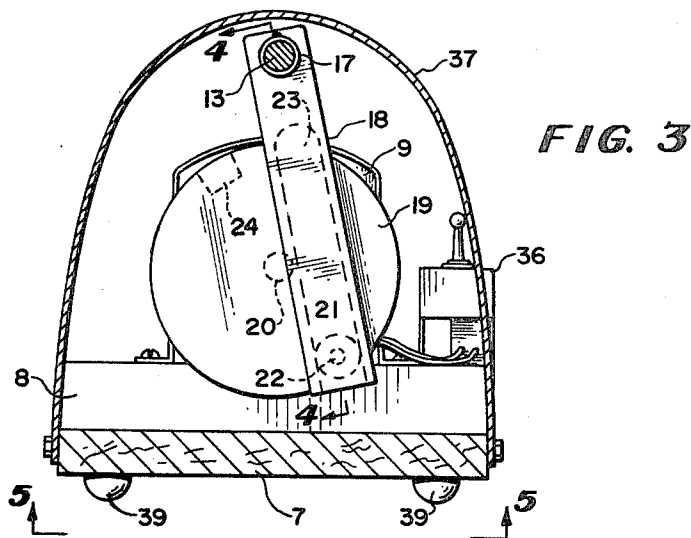
Primary Examiner—Robert W. Jenkins*Assistant Examiner*—Philip R. Coe*Attorney*—Andrew F. Wintercorn[57] **ABSTRACT**

An open top, open end cradle for the jar containing

the material to be mixed by shaking has a resilient pad in one end cooperating with a coiled compression spring on a hinged closure at the other end that is suitably secured in closed position, as by a cross-in, is subjected to vigorous oscillation with minimum vibration of the support on which the electric drive motor furnishing the power is mounted, suitable cushioning friction pads and feet secured to the bottom of the base, reducing likelihood of creeping relative to a table top or the like on which the shaker may be set. A supporting boss centrally located on one side of the cradle assures good balance as the axis of oscillation extends substantially through the center of the load being oscillated, which accounts for the small vibration involved in the operation of the device, and the horizontal drive shaft extending from the boss is carried in a bearing fixed to and extending upwardly from the base, so that a radius arm attached to the driven end of the shaft can be operated directly by a roller carried on a driven disk mounted on the end of the armature shaft of the aforesaid motor, the roller operating lengthwise of a groove provided in one side of the aforesaid radius arm to give simple harmonic motion with quiet and smooth operation and substantially a minimum number of parts required and the maximum compactness. A generally U-shaped inverted guard carried on the base encloses the aforesaid disk and radius arm for safety in operation.

10 Claims, 6 Drawing Figures





POWERED MECHANICAL SHAKER DEVICE

This invention relates to a powered mechanical shaker device especially designed for use in the shaking of ceramic glaze, hitherto a laborious task done by hand and often not effectively enough.

The principal object of my invention is to provide a fairly light weight and compact, also inexpensive, powered shaker device of the kind described, into the cradle of which a jar containing the ceramic glaze to be shaken can easily be loaded and securely held for the duration of the shaking operation, the device operating with simple harmonic motion, smoothly and quietly with a minimum of vibration so that it can be safely left on a table top or other convenient support while the operation is being performed, a guard provided on the base of the shaker enclosing the driven parts so that there is no danger of anyone being injured by coming into accidental contact with the device while it is operating.

The substantially direct drive connection is so constructed that the required mechanical advantage is provided so that a small fractional horsepower electric motor, very economical to run, and low in cost at the outset is fully capable of giving the container and its cradle a vigorous shaking as required to do a good job, and do it smoothly and quietly and with a minimum wear and tear on any of the working parts.

The invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view of the device ready to operate with a jar shown placed in the cradle for shaking;

FIG. 2 is a plan view;

FIG. 3 is a vertical cross-section on the 3—3 of FIG. 2;

FIG. 4 is a detail on the line 4—4 of FIG. 3;

FIG. 5 is a bottom view with an intermediate portion of the base broken away to conserve space but showing the pads and feed for cushioning action and frictionally resisting creeping of the device during operation, and

FIG. 6 is a perspective view of the cradle with the hinged closure at one end shown open and illustrating the retaining cross-pin in aligned relationship to the two registering holes in the lugs that receive it.

The same reference numerals are applied to corresponding parts throughout these views.

Referring to the drawings, the reference numeral 7 designates a generally rectangular portable base on which is carried another generally rectangular motor base 8 supporting a small fractional horse-power electric motor 9 that furnishes the power for vigorously oscillating a generally rectangular cradle 10 with a transparent glass jar 11 locked securely therein and containing a liquid mixture that requires shaking, as for example, a ceramic glaze, a screw on cap 12 providing a reliable seal for the open end of the jar 11. Simple harmonic motion is given the cradle 10 by virtue of the fact that the horizontal drive shaft 13 oscillatable in a horizontal bearing 14 has one end fixed in a boss 15 welded or otherwise secured to one side wall 16 of the cradle 10 centrally thereof and has the other end secured in a boss 17, welded or otherwise secured to the upper end of a vertically disposed radius arm 18 that extends downwardly from the shaft and oscillates in a vertical plane close to a flywheel 19 secured to the end of the armature shaft 20 of the motor 9 and carries a roller 21 on a crank pin 22 arranged to run freely in a

groove or runway 23 provided in the adjacent side of the radius arm 18 and extending lengthwise thereof. The flywheel 19 is preferably of aluminum for lightness and may be provided with a counterweight 24 in diametrically opposed balanced relation to the crank pin 22 and roller 21, as seen in FIG. 3, to insure freedom from vibration by virtue of the evenly balanced flywheel 19. A bracket 25 fixed on a base 26 carried on base 7, supports the bearing 14 and shaft 13 at a suitable elevation with respect to the base 7 so that there is nothing to interfere with the oscillation of the cradle 10. A second bracket 27 fixed to the base 7 is suitably secured, as at 28, to the lower end portion of bracket 25 to brace the same and reduce vibration in the operation of the device. Of course, the motor 9 is supported at the correct elevation below the level of the shaft 13 so that the roller 21 that transmits drive to the radius arm 18 can operate the full length of the runway groove 23, as should be clear from FIG. 3, thus giving the cradle 10 the simple harmonic motion mentioned before, there being one complete oscillation per revolution of the flywheel 19.

The box-like cradle 10, as seen to best advantage in FIG. 6, has a soft rubber cushion pad 29 provided in one end for abutment with the closed end of the jar 11. The other end of the cradle has a hinged closure 30 on the inside of which is welded or otherwise suitably secured at the center one end of a coiled compression spring 31 that is long enough to require a certain amount of compression in the closing of the hinged closure 30 with the spring 31 bearing against the center of the screw cap 12 on the jar 11, so that when a retaining pin 32 is entered through registering holes 33 in a pair of outwardly projecting lugs 34 provided on the opposite side walls of the open end of the cradle, the spring 31 serves both to lock the jar 11 securely in place in the cradle 10 during the shaking operation, while at the same time frictionally gripping the pin 32 against drifting from its locked position. Another advantage with the spring 31 is that it serves as a means for accommodating different lengths of jars in the cradle.

In operation, an extension cord 35 can be plugged into any convenient outlet receptacle and the current turned on by means of a switch 36 to operate the shaker device for as long as may be necessary to get the mixture in the jar 11 thoroughly mixed. The inverted generally U-shaped sheet metal guard 37 that is carried on the base 7 encloses the working parts 18 and 19 makes for the desired safety of operation and at the same time greatly improves the general appearance of the device. The device, being fairly light and so compact, can be placed wherever it can find sufficient support on a reasonably flat surface, as for example, on a table or bench. When so placed the outwardly converging elongated rubber suction pads 38 fixed under one end of the base 7 and the rubber feet 39 fixed under the other end, together serve to absorb most of the small amount of vibration involved in the operation of the device to insure as quiet an operation as possible and at the same time afford frictional resistance against slippage so as to reduce any likelihood of the device creeping.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. While a preferred embodiment of the invention has been illustrated and described, this is only for the purpose of illustration, and it is to be under-

stood that various modifications in structure will occur to a person skilled in this art.

I claim:

1. In a powered mechanical shaker device a substantially horizontal base, a single elongated bearing supported rigidly in parallel spaced fixed relation to said base, a drive shaft oscillatable in said bearing and extending from opposite ends thereof, an elongated radius arm fixed to one end of said shaft and having a longitudinally extending runway thereon, an electric motor mounted on said base operating a crank pin in a circle at a predetermined radius relative thereto operable lengthwise of said runway to transmit simple harmonic motion substantially, directly to said shaft in its oscillation, and a substantially horizontal cradle fixedly mounted on the other end of said shaft for oscillatory motion and having means for securing therein a container of material to be shaken continuously for a given length of time as for mixing of the material.

2. In a powered mechanical shaker device, a substantially horizontal base, a single elongated bearing supported rigidly in parallel spaced fixed relation to said base, a drive shaft oscillatable in said bearing and extending from opposite ends thereof, an elongated radius arm fixed to one end of said shaft and having a longitudinally extending runway thereon, an electric motor mounted on said base having a flywheel fixed to the armature shaft thereof and carrying a crank pin operating in a circle at a predetermined radius relative thereto operable lengthwise of said runway to transmit simple harmonic motion substantially, directly to said shaft in its oscillation, and a substantially horizontal cradle fixedly mounted on the other end of said shaft for oscillatory motion and having means for securing therein a container of material to be shaken continuously for a given length of time as for mixing of the material.

3. A powered mechanical shaker device as set forth in claim 1 wherein said crank pin carries a roller freely rotatable relative thereto and operable in said runway with rolling friction.

4. A powered mechanical shaker device as set forth in claim 1 wherein said crank pin carries a roller freely

rotatable relative thereto and operable in said runway with rolling friction, the runway being in the form of a groove in said radius arm in which the roller is retained against axial displacement from said crank pin.

5. A powered mechanical shaker device as set forth in claim 2 wherein said crank pin carries a roller freely rotatable relative thereto and operable in said runway with rolling friction.

6. A powered mechanical shaker device as set forth in claim 5 wherein said flywheel is formed of a light weight material and carries a counterweight thereon in diametrically opposed balancing relationship to said crank pin.

7. A powered mechanical shaker device as set forth in claim 2 wherein said crank pin carries a roller freely rotatable relative thereto and operable in said runway with rolling friction, the runway being in the form of a groove in said radius arm in which the roller is retained against axial displacement from said crank pin.

8. A powered mechanical shaker device as set forth in claim 2 wherein said flywheel is formed of a light weight material and carries a counterweight thereon in diametrically opposed balancing relationship to said crank pin.

9. A powered mechanical shaker device as set forth in claim 1 wherein said cradle is of open top generally rectangular form with a horizontal boss centrally located fixed on one side thereof to which the end of the drive shaft is fixed, so that the axis about which the cradle and container therein are oscillated passes approximately through the center of the load being oscillated, permitting rapid shaking with minimum vibration.

10. A powered mechanical shaker device as set forth in claim 9 wherein the cradle is open at one end where a closure is provided, there being a compressible resilient cushion pad in the other end of said cradle to bear against one end of a container, the closure having a coiled compression spring mounted on the inside thereof arranged to be compressed endwise by contact with the other end of a container, and means for securing the closure in closed position.

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