May 28, 1963 R. MARX ETAL 3,091,371

AUTOMATIC SCOOPING DISPENSING DEVICE

Filed Oct. 28, 1959

Fig_1

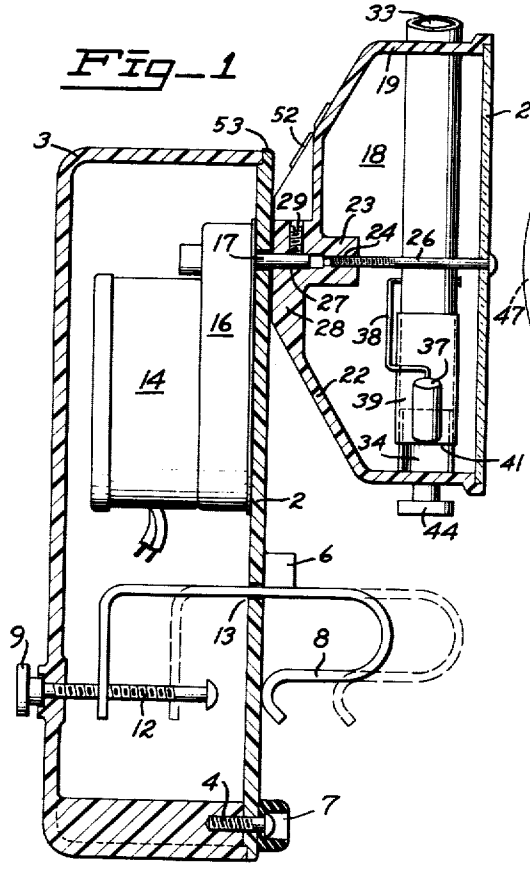
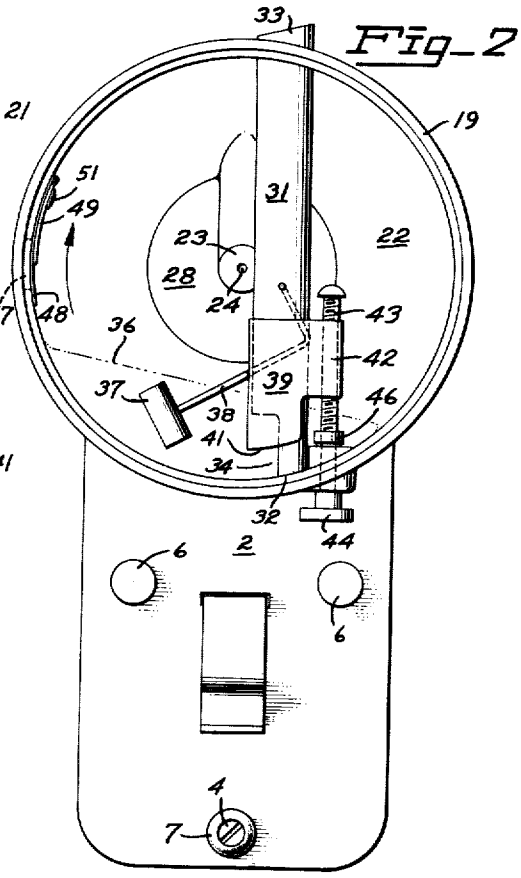


Fig_2



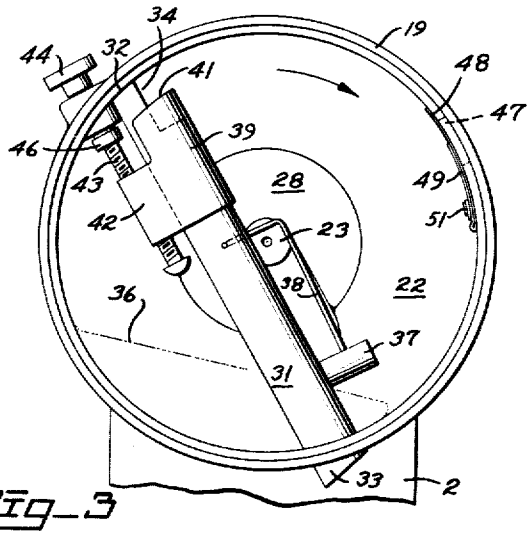


Fig_3

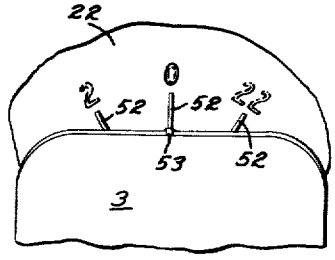


Fig_4

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AUTOMATIC SCOOPING DISPENSING DEVICE

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Our invention relates to dispensing devices; and particularly to a device for dispensing granular materials.

One of the objects of our invention is the provision of a motor driven dispensing device capable of dispensing equal quantities of a granular material at selected intervals.

Another object of the invention is the provision of a dispensing device capable of adjustment to dispense at any selected instant during a twenty-four hour period.

Still another object of the invention is the provision of a dispensing device in which means are provided for varying the quantity of material dispensed.

A still further object is the provision of a dispensing device for wettable granular material in which the granular material is enclosed in a sealed compartment and continuously agitated to maintain the material in a free-flowing condition.

The invention possesses other objects some of which with the foregoing will be brought out in the following description of the invention. We do not limit ourselves to the showing made by the said description and the drawings, since we may adopt variant forms of the invention within the scope of the appended claims.

Referring to the drawings:

FIG. 1 is a vertical half-sectional view partly in elevation showing the interior construction of the device.

FIG. 2 is a front elevation of the device with the receptacle cover plate removed to more clearly disclose the underlying structure. The view illustrates the scooping and dispensing means in material scooping or receiving position.

FIG. 3 is a view similar to FIG. 2, but with the lower portion of the base plate and cover broken away to reduce the size of the figure, and illustrating the scooping and dispensing means in material dispensing or discharging position.

FIG. 4 is a fragmentary perspective view showing the indicia means which correlates the time selected for discharge of the material with the interval of time between the time of adjustment or selection and the time of discharge.

All figures are drawn approximately full size.

Broadly considered, the dispensing device of our invention comprises a base including a cover portion enclosing a synchronous electric motor fixed on the base so that the motor shaft extends through an aperture in the plate. Adjustable clamp means mounted on the base serve to detachably mount the base on a support. Mounted on the motor shaft for rotation therewith is a receptacle or sealed compartment for containing the material to be dispensed. Means are provided through which the receptacle may be filled to the desired level, and a transparent wall in the receptacle provides a convenient means of visually determining the quantity of material in the receptacle. Means are provided for dispensing outside the receptacle, a set quantity of the material inside the receptacle, upon a given rotary movement of the receptacle. In the present embodiment a set quantity of material is dispensed or discharged upon the completion of every revolution, however this timing may be altered in accordance with requirements imposed by related factors. Means are also provided for varying the quantity of material dispensed.

In many manufacturing processes there is a continuing need for a device which is capable of dispensing or discharging at regular intervals a measured quantity of some substance, whether it be a granular material or a liquid, which is to be added to or mixed with other ingredients. Thus, in the manufacture of the well known soda cracker, a process which is largely automatic and electronically controlled, various ingredients are commingled at specific intervals and in specific quantities to achieve a desired result. The device of our invention is particularly adapted for such an environment.

Another application is the feeding of fish in an aquarium, which should be effected at regular intervals and in measured quantities. A few moments reflection will reveal many more environments where our invention may be used to advantage. For purposes of clarity, we have described and illustrated our invention as embodied in a device for automatically dispensing measured quantities of granular material at regular intervals.

More specifically the device of our invention comprises a base including a base plate **2** having a cover **3** secured to the plate by a plurality of screws **4**, only one of which is shown. Spaced pads **6** on the base plate and a rubber bumper **7** secured by screw **4**, cooperate with a resilient and adjustable clamp **8** to detachably mount the device on a vertical support, such as the side of an aquarium. A knob **9** outside the cover and fixed on the end of screw **12**, which threadedly engages the clamp **8**, serves to adjust the position of the clamp, which is prevented from rotating by the rectangular aperture **13** in the base plate through which the clamp extends. Both base plate and cover may be conveniently molded from one of the synthetic resins, in any desired color or combination of colors.

Within the cover and securely fastened to the base plate **2** by appropriate means is a synchronous electric motor **14**, connected directly with a gear reduction **16**, which provides a power shaft **17** extending through an aperture in the base plate. In the embodiment illustrated, the synchronous motor and gear reduction are designed to provide one revolution of the shaft **17** per day. It will of course be obvious that other speeds may be selected to meet different requirements.

Detachably supported by the base and rotatable with the shaft **17** is a cup-shaped receptacle **18** having a cylindrical wall portion **19** closed at one end by a detachable and transparent wall or cover plate **21**, and closed at its opposite end by an integral truncated conical wall portion **22**. An integral boss **23** extending axially into the receptacle provides at its inner end a threaded bore **24** with which screw **26** may be engaged to secure the cover plate **21** in position across the rabbetted end of the cylindrical portion **19**. A bore **27** axially aligned with the bore **24** and opening on the outer surface of flat base **28** of the truncated conical wall portion **22**, serves to receive the free end of the power shaft **17**. A set screw **29** is provided to lock the receptacle to the power shaft for rotation therewith. As with the base plate and cover, the receptacle may be conveniently molded from one of the synthetic resins in colors to match or contrast with the molded base.

Supported on the base is a receiving and dispensing means comprising a tube **31** extending transversely through the wall **19** of the receptacle and across the sealed compartment provided thereby. The inner end **32** of the tube impinges tightly against and is preferably cemented to the inner periphery of the cylindrical wall

portion 19, while the outer end 33 of the tube extends out of the compartment through the wall 19. At its inner end half the diameter of the tube is cut away for a distance from the inner periphery of the receptacle to provide an opening into the tube forming a scoop 34 for receiving thereinto the material to be dispensed. The tube may be of metal or it may be extruded from the same synthetic resin as the base and receptacle.

It will thus be seen that with the receptacle or sealed compartment filled with granular material to the level indicated by the line 36, rotation of the receptacle by the motor in the direction indicated by the arrow, will effect rotation of the scooping and dispensing means. Since gravity retains the granular material in the lower portion of the compartment, rotation of the scoop to move it through the material, as shown best in FIG. 2, causes a flow of granular material into the scoop. Movement of the scooped end of the tube through the granular material serves also to agitate the material and prevent its becoming compacted. When the scoop has progressed through the material and emerges therefrom, it will contain a measured quantity of the material, which is retained in the scoop until a predetermined angle of inclination of the tube is reached, at which point gravity will cause the quantity of material to pass through the tube and thus be conveyed out of the receptacle. To insure that the material does not adhere to the interior of the scoop, means are provided to deliver a jarring impact to the tube coincident to or shortly after it has reached a predetermined inclination.

Such means comprises a gravity responsive metallic hammer head 37, fixed on the free end of an arm 38, the other end of which is pivotally journaled in the tube 31 at about its midpoint. While the scoop 34 is passing through the material as shown in FIG. 2, the hammer head precedes it, thus further insuring that the granular material is maintained in a free-flowing state. As the receptacle continues to rotate and the tube approaches the desired inclination, the center of gravity of the hammer and arm will shift from the left side of its pivot to the right side thereof, and the hammer will be caused by gravity to swing downwardly into the position shown in FIG. 3. Upon impact of the hammer with the tube, any material adhering to the interior of the tube is jarred loose and falls out the open end of the tube.

Means are provided to meter or control the quantity of material scooped into the tube. Associated with the inner end of the tube is a gate 39 formed from sheet metal and having a forward edge 41 contoured to complement the inner periphery of the receptacle. The gate overlies the tube adjacent the scoop 34 and is adjustable along the tube to vary the distance between the forward edge 41 of the gate and the adjacent inner peripheral surface of the receptacle. An integral tab 42 extending from the gate is operatively connected to the screw 43, which is journaled for rotation on the receptacle wall 19, so that rotation of the screw as by knob 44, advances or retracts the gate along the screw and tube. A collar 46 on the screw prevents axial displacement of the screw. It is thus apparent that by adjusting the space between gate and receptacle wall, the effective area of the scoop is varied, and the quantity of material permitted to enter the scoop and tube is thereby controlled.

Since most granular materials will absorb moisture and become compacted after an interval, it is important to seal the receptacle against the entry of moisture while still providing a means for easy filling of the receptacle. For this purpose we provide an aperture 47 in the wall 19 of the receptacle positioned so that when the tube 31 is horizontal, the aperture will be at the top of the receptacle. In this position, the stem of a small funnel (not shown) may be inserted through the aperture and granular material poured into the compartment to the desired level, which in the embodiment shown will be

reached when the material reaches the bottom of the tube. To permit insertion of the funnel and automatic resealing of the aperture, a flat strip of resilient material is folded double to provide a resiliently displaceable leaf 48 lying against the inner periphery of the receptacle and overlying the aperture. The other leaf 49 of the strip is relatively shorter, terminating at about the center of the aperture and closely overlies and impinges against the leaf 48. A rivet 51 passing through both leaves adjacent the fold secures the strip to the receptacle wall.

In order to permit adjustment of the device to discharge at any given time in a twenty-four hour period, indicia means are provided to correlate the selected time of discharge with the interval of time between the time of adjustment and the time of discharge. Molded into the back surface of the receptacle, as shown best in FIG. 4, are twelve radially extending indicia lines 52. A single index line or point 53 is molded on the upper edge of the base plate so that by rotation of the receptacle by hand, any one of the indicia lines 52 may be brought into registry with the index line 53. A friction clutch built into the gear train permits hand rotation of the shaft 17 and receptacle in either direction.

With the receptacle positioned at the proper inclination for discharge of the granular material, as in FIG. 3, it will be found that one of the indicia lines 52 is in registry with the index line 53, as shown in FIG. 4. In this position of the receptacle, this particular indicia line is designated by the numeral "0", indicating that the inclination of the tube is such as to discharge material at once or in "zero" time. Each successive indicia line 52 is designated by a successively larger even number, thus, "2", "4", "6" . . . "22" until each indicia line is designated by a number. In the embodiment of our invention illustrated in the drawings, the receptacle has been arranged to rotate clockwise one revolution every twenty-four hours. Thus, starting at a "0" setting of the receptacle, twenty-four hours must elapse before the "0" again comes into registry with the index line 53.

As an example, if the device is mounted to dispense granular fish food into an aquarium, and it is desired that such feeding occur every twenty-four hours at 6:00 a.m., the user of the device may either arise at 6:00 a.m. and set the "0" line opposite the index line 53, or if he arises at 10:00 a.m. and still wants the device to discharge fish food the following morning at 6:00 a.m., he may set the indicia line designated by the numeral "20" opposite the index line. This indicates that twenty hours after 10:00 a.m., or at 6:00 a.m. the following morning, the device will cause fish food to be dispensed into the aquarium. If undisturbed, the device will continue to discharge fish food at this same hour at twenty-four hour intervals, so long as fish food remains in the receptacle.

From the foregoing description the versatility of our dispensing device will be apparent. Thus, while we have illustrated and described a device particularly suited to dispensing measured quantities of a granular material, substantially the same mechanism could be used to dispense measured quantities of powdered or liquid substances at regular intervals.

We claim:

1. An automatic material scooping and dispensing device comprising a base, a receptacle mounted on the base to contain the material to be dispensed, material receiving and dispensing means supported by the base comprising a tube communicating between the interior and exterior of the receptacle and including a scoop movable through the material in said receptacle between material receiving and dispensing positions, metering means adjustably associated with said scoop and comprising a gate being in all positions of the scoop within the receptacle and movable relative to the scooped end of the tube from outside the receptacle to selectively vary the effective area of the scoop.

2. A device for automatically scooping and dispensing at predetermined intervals a selected quantity of materail to be dispensed comprising a base, a receptacle rotatably supported on the base to contain the material to be dispensed, scooping and dispensing means within the receptacle communicating between the interior and exterior thereof and movable therewith through scooping and dispensing means supported byt he base comprisinterval, means pivotally mounted on said scooping and dispensing means and movable therewith through the material to be dispensed to deliver an impact to said scooping and dispensing means when the scooping and dispensing means has reached a dispensing position.

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