Oct. 18, 1960 H. MORTARA ET AL 2,956,711

POWDER DISPENSING MECHANISM

Filed Jan. 17, 1957 4 Sheets-Sheet 1

FIG.1

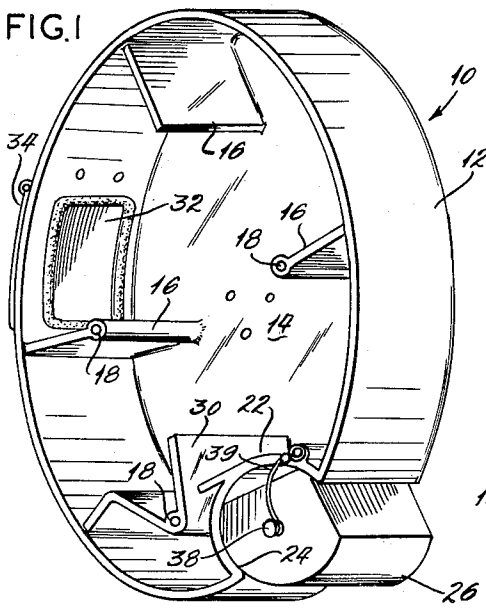


FIG.2

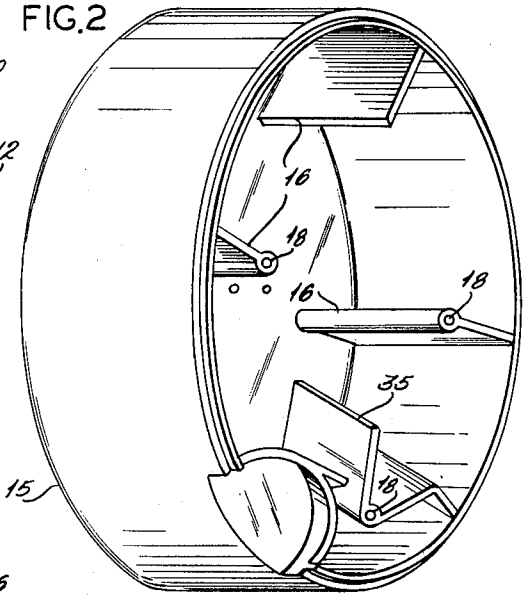


FIG.3

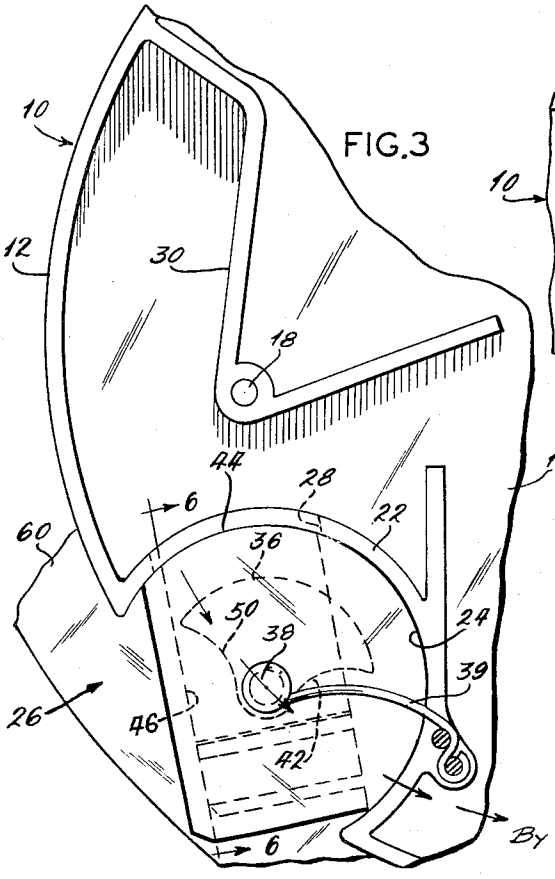
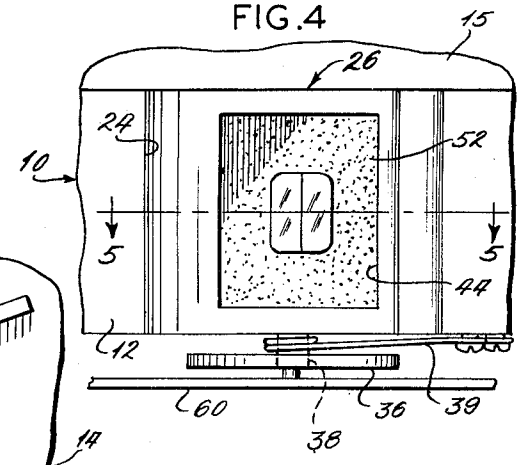


FIG.4



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POWDER DISPENSING MECHANISM

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FIG.5

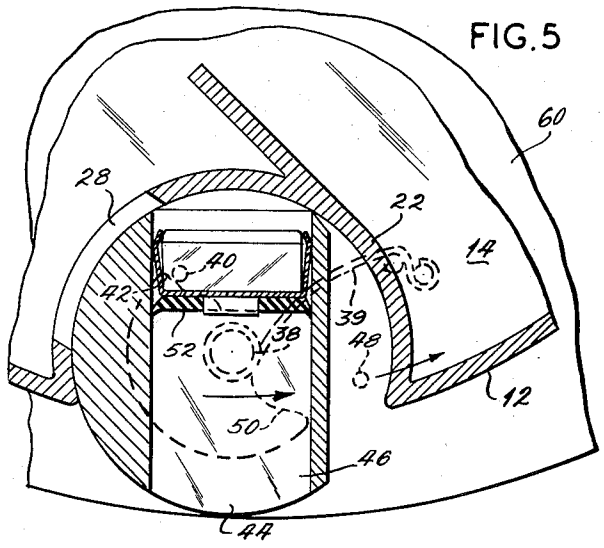


FIG.7

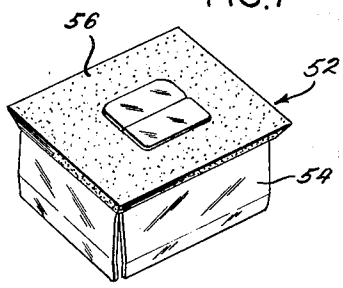


FIG.8

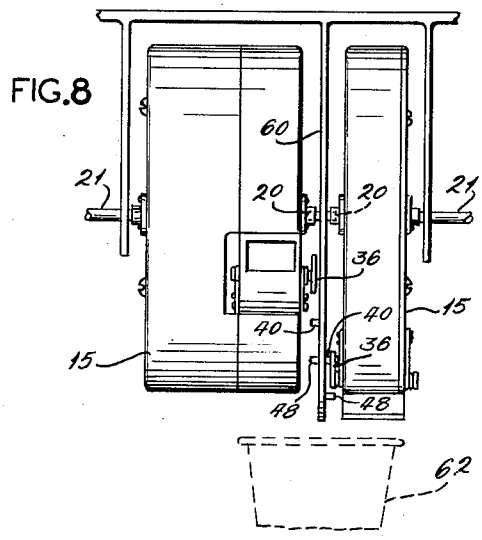
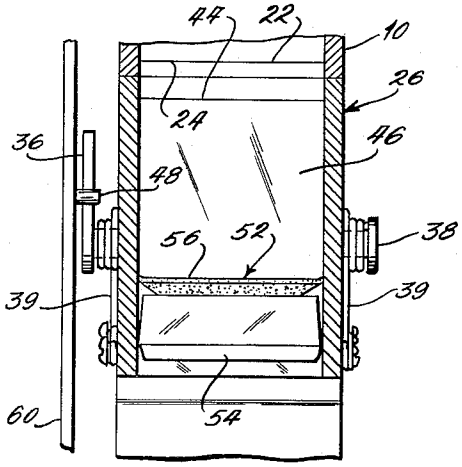


FIG.6



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POWDER DISPENSING MECHANISM

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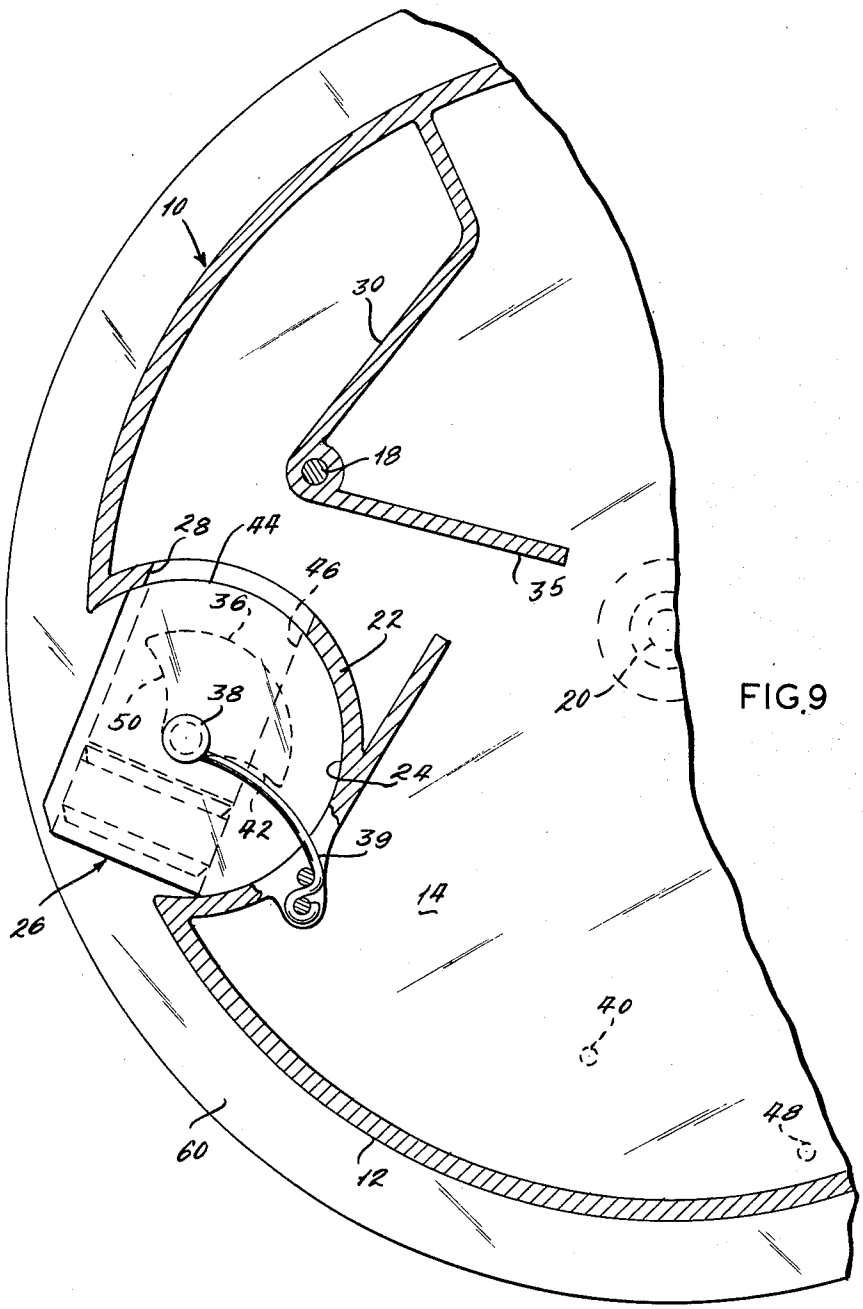

FIG.9

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POWDER DISPENSING MECHANISM

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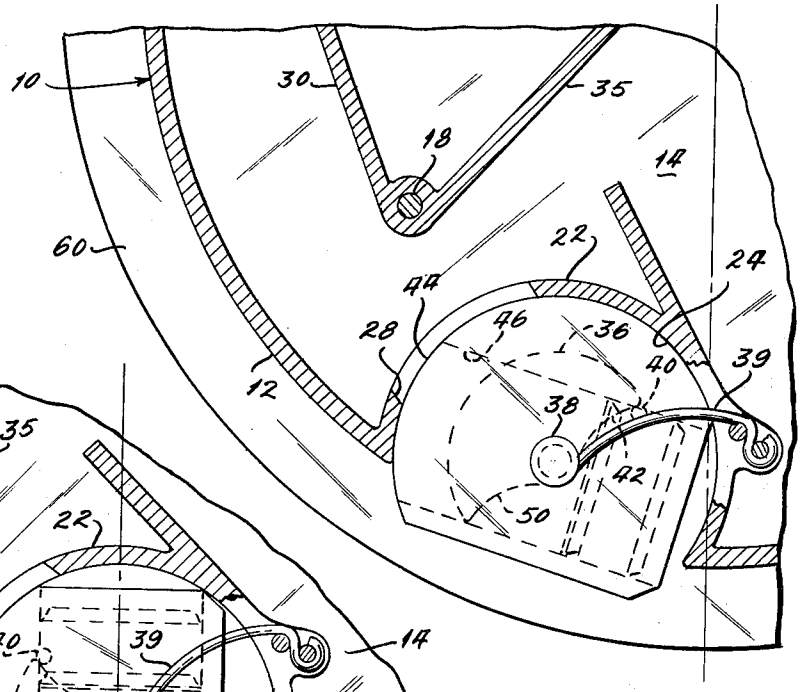

FIG.10

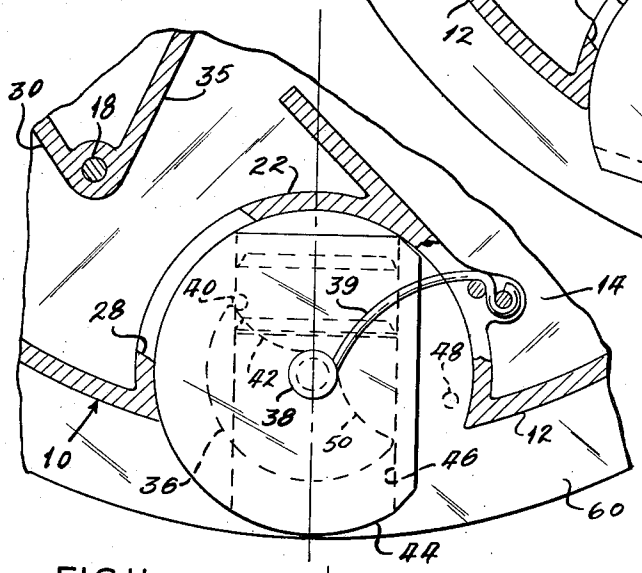

FIG.11

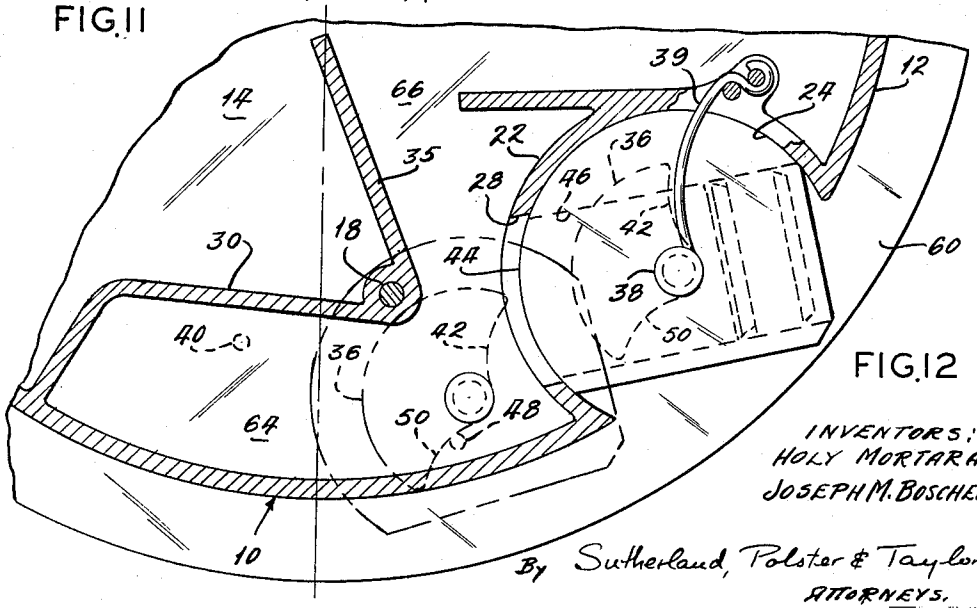

FIG.12

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POWDER DISPENSING MECHANISM

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5 Claims. (Cl. 222—170)

This invention concerns dispensing canisters and more particularly those of the type generally found in coin operated beverage dispensing machines. Many types of such canisters and closure members therefor have been proposed heretofore, but they have all had the disadvantage either of complicated operation and attendant high cost of manufacture, or lack of proper sanitation because a surface apt to come in contact with the powder was exposed to the air between the dispensing operations. Another difficulty was the caking which occurred as the powder absorbed moisture from the ambient air. A solution to the latter problem was proposed in U.S. Patent No. 2,671,575 to R. W. Hilton, in the form of a powder canister which was adapted to rotate during the dispensing operation and thus tumble the powder therein. The tumbling by mere rotation, however, was not always completely satisfactory under severe humidity conditions, and the Hilton construction still allowed introduction of moisture into the canister by way of the exposed surfaces of the measuring mechanism. Furthermore, the difference in weight of the powder pressing on the measuring opening, depending on whether the canister was full or nearly empty, resulted in a variable amount of "packing" and hence inaccurate measurement.

The present invention obviates all these difficulties by providing a canister equipped with a system of distributing vanes and an adjustable measuring chamber enclosed in a rotatable cylindrical member which is normally protected on the inside of the canister and is rotated out of the canister only for a very short period of time during the dispensing operation.

It is therefore an object of this invention to provide a dispensing mechanism for a powder dispensing canister in which the powder canister is sealed and the powder and measuring chamber are protected from contamination at all times except during the fraction of a second needed for actual discharge.

It is a further object of this invention to provide a canister closure member which automatically rotates during a predetermined portion of the rotation of the canister and comprises a minimum of parts.

It is a still further object of this invention to provide a closure member for a dispensing canister in which the amount of powder dispensed can be easily adjusted.

It is a still further object of this invention to provide a closure member for a dispensing canister which has only a single measuring chamber.

It is another object of this invention to provide a powder container adapted to efficiently tumble its contents when rotated, and to maintain a constant packing pressure in the measuring chamber.

We will now describe our invention in greater detail, reference being had to the drawings in which:

Figure 1 is a perspective view of the canister of our invention with the lid removed;

Figure 2 is a perspective view of the lid used in one embodiment of our invention;

Figure 3 is a side elevation of the closure member in a closed position;

Figure 4 is a bottom view of the closure member in an open position;

Figure 5 is a sectional view of the closure member along the lines 5—5 in Figure 4;

Figure 6 is a sectional view of the closure member along lines 6—6 of Figure 3;

Figure 7 is a perspective view of our adjusting plug; and

Figure 8 is an end view showing two embodiments of our canisters in operational position.

Figures 9–12 are views similar to Figure 3 but showing the measuring chamber in various positions during a dispensing operation.

Referring now to Figures 1 and 2, the improved canister of our invention consists of a body **10** formed by a drum **12** closed by a rear wall **14** and a removable lid **15**. A series of vanes **16** are formed integrally with the wall **12** of the canister body **10** and with the rear wall **14**. The purpose of these vanes is twofold: first, they tumble the powder contained in the canister when the canister is rotated, and second, they cause a measured amount of powder to be directed toward the opening **28** regardless of the amount of powder in the canister, thus assuring a constant degree of "packing" of the powder in the measuring chamber **46**. Some of the vanes **16** are further provided with screwthreaded bores **18** which are adapted to receive screws attaching the lid **15** to the canister. A shaft **20** (Fig. 8) is formed integrally with the rear wall **14** and a matching shaft **21** is formed integrally with the lid **15**. At one point on the periphery of the canister body **10**, the outer wall **12** is curved inwardly at **22** to form a recess **24** which receives a cylindrical closure member **26**. An opening **28** (Figure 3) is provided in the curved portion **22** of wall **12** facing the **S** shaped vane **30** so as to allow a predetermined amount of powder caught by the vane **30** to drop into the measuring chamber **46** of closure member **26** upon rotation of canister. A second aperture is provided in the outer wall **12** at **32** for the purpose of introducing powder into the canister, and a cover **34** is provided to close this aperture when the canister is placed in operation.

Two embodiments of this invention are particularly contemplated herein. In the first embodiment, the lid **15** consists simply of a flat plate, covering the portion of the canister defined by wall **12** and curved portion **22**, equipped with a shaft **21** and adapted to be directly screwed onto the canister body **10**. In the second embodiment the lid **15** is formed as shown in Figure 2. It will be noted that in this latter embodiment, the closure member is still only as thick as the body **10** of the canister, but the lid **15** has considerable depth, and that consequently, when lid **15** of this embodiment is screwed onto the body **10** of the canister, the total capacity of the canister is considerably greater than the capacity of a canister of the first embodiment.

The vanes **16** are extended in the lid member **15** of the second embodiment so as to form continuous vanes throughout the whole thickness of the canister. In the lid member **15**, however, vane **30** is positioned at an angle with the front lid surface as shown in Figure 2 and cooperates with a special vane **35** found only in the lid section of the second embodiment and which is so positioned, as shown in Figure 2, that it will deflect powder caught by vane **30** into the body portion **10** of the canister upon rotation thereof, and thus direct all the powder caught by vane **30** toward the opening **28**.

Referring now to Figure 3, it will be seen that a cam **36** is mounted on the side of the closure member **26**. This cam is press fitted onto the shaft **38** which is integrally formed with the closure member **26** and is rotatably sup-

ported by spring members 39 attached to the lid 15 and rear wall 14. The function of the springs 39 is to press the closure member 26 tightly against the wall 22 of recess 24. When canister 10 is rotated in the direction of the arrows (Figures 3 and 5) around the shaft 20—21, pin 40 which is mounted on the frame 60 of the machine (Figure 8) and is fixed with relation thereto engages the portion 42 of cam 36 and rotates closure member 26 in a counterclockwise direction until the opening 44 of the measuring chamber 46 of the closure member 26 has reached the outside of the canister and has discharged its contents by operation of gravity. This is the position shown in Figures 5 and 11. The cam 36 is thereupon engaged by pin 48 as the canister continues its movement in the direction of the arrows, and pin 48 engages portion 50 of cam 36 in such a manner is to rotate the closure member 26 in a clockwise direction until the opening 44 of measuring chamber 46 once again faces opening 28 in the wall 22 of canister body 10, as shown in Figure 3.

More particularly, the motion of canister 10 and closure member 26 during a dispensing cycle takes place as follows: During the first few seconds of the rotation of canister 10, the closure member 26 remains stationary with respect to canister 10 while canister 10 rotates from a position like that shown in Fig. 9 to that shown in Fig. 3. During this interval, an appropriate mechanism (not shown) causes a cup 62 to slide into the receiving position beneath canister 10 (Fig. 8). When canister 10 reaches the position shown in Fig. 3, the stationary pin 40 mounted on support member 60 engages the portion 42 of cam 36, and, as canister 10 with closure member 26 continues its counterclockwise rotation, the action of pin 40 on cam 36 causes closure member 26 to rotate counterclockwise with respect to canister 10 (Fig. 10). When the closure member 26 has reached its full open position (Fig. 11) and the powder contained therein has had time to drop into the cup 62, the portion 50 of cam 36 strikes pin 48, and as canister 10 continues to rotate, the action of pin 48 on cam 36 causes closure member 26 to rotate clockwise (dash-double dot outline in Fig. 12) back to its rest position as shown in Fig. 12. In the meanwhile, canister 10 has rotated sufficiently so that a new charge of powder drops into compartment 64 through passage 66 (Fig. 12). As the canister 10 continues to rotate, compartment 64 successively lies below, beside, and above closure member 26. At the end of the cycle of canister 10, when compartment 64 lies above closure member 26, as shown in Fig. 13, some of the powder contained in compartment 64 drops through opening 28 into the measuring chamber 46 of closure member 26. At that time, it will be noted that vanes 30, 35 support the weight of the powder lying above them and thus limit the amount of powder pressing against measuring chamber 46. Thus, the amount of powder packed into measuring chamber 46 in each cycle is constant, regardless of whether canister 10 is full or nearly empty. When canister 10 has reached the position shown in Fig. 9, it stops and awaits the next dispensing operation.

In Figures 4 and 5, the opening 44 of the measuring chamber 46 is shown in the open or discharging position. The size of measuring chamber 46 can be adjusted by means of the plug 52 which comprises a metal plate 54 and a rubber plate 56 (Figure 7) attached thereto which acts as a washer to prevent particles of powder from slipping around the edges of plates 54, and also to hold the plate 54 in place.

In operation, a number of canisters 10, half of them of the first embodiment described herein and the other half of the second embodiment, are mounted between vertical support or frame members 60 (Figure 8) of the beverage dispensing machine, which may be so arranged as to allow a desired canister 10 to be placed directly above a cup 62 for the dispensing operation. The canisters 10 are so supported between these support members that they can be individually rotated around their shafts 20—21, as for example by electric motor means (not shown) in order to accomplish a dispensing operation. The actual discharge of powder occurs in the early part of the canister's rotary cycle, and the canister then continues to rotate until the powder therein has been tumbled by the action of vanes 16 and a new supply of powder has been caught in compartment 64 by the vane 30. Toward the end of the rotary cycle of the canister, the powder caught in compartment 64 is discharged into the opening 28 and thus into the measuring chamber 46. When the measuring chamber 46 is full and the closure member 26 is thus ready for the next dispensing operation, rotation of the canister ceases until its next dispensing operation.

This dispensing operation takes place as follows: A motor (not shown) provided for this purpose in the vending machine engages the shaft 21 of the selected canister and turns it in a counterclockwise direction in Figs. 3, 5, and 9–12. Closure member 26 soon reaches a position at the bottom of the canister and directly over the cup 62 (Figure 8) into which it is desired to dispense the powder. At this point, pin 40 engages cam 36 and rotates closure member 26 so as to discharge the powder caught in the measuring chamber 46. Immediately after the powder has been discharged, pin 48 engages cam 36 and returns closure member 26 to its original position with respect to the canister 10, where it is ready to receive the next charge of powder toward the end of the rotary cycle of the canister. Pins 40 and 48 are integrally formed with the support member 60 and remain stationary during the rotary cycle of the canister.

It will be seen that the apparatus of this invention constitutes an extremely simple and sanitary method of dispensing an easily adjustable measured amount of powder from a powder containing canister. Many different embodiments of this invention could, of course, be conceived to fit the requirements of any particular machine without departing from the spirit of this invention. For example, the closure member 26 need not be supported by springs 39, but may be journalled in conventional bearings or otherwise supported by any convenient means. Furthermore, the closure member need not be of cylindrical shape, nor need its motion be rotational, as the same result may be achieved, for example, by a sliding motion.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. A powder dispensing mechanism comprising a movable canister having an opening, a rotatable closure member positioned in contact with said canister, said closure member comprising a measuring chamber having an opening normally aligned with said canister opening so as to allow communication between said measuring chamber and the interior of said canister, and means operated by the movement of said canister for rotating said closure member so that said measuring chamber opening becomes directed away from said canister and then rotating the closure member back to its original position in the course of a single dispensing operation.

2. A dispensing mechanism as set forth in claim 1, wherein said canister is rotatable about an axis and is divided into a plurality of intercommunicating compartments by vanes mounted therein, the vanes being positioned to direct a controlled quantity of contained powder toward the measuring chamber as the canister is rotated, the closure member being substantially smaller than the canister in the axial direction, and one of the vanes being arranged to displace a portion of the contained powder caught by another vane in an axial direction toward the closure member.

3. A dispensing mechanism comprising a movable canister having a discharge opening, a closure member mounted on said canister in contact therewith so as to close said opening, said closure member being rotatable with respect to said canister, said closure member containing a measuring chamber normally in communication with said opening, means for moving said canister through

a predetermined path, and means actuated by the movement of said canister for rotating said closure member so as to cause the contents of said measuring chamber to be discharged away from said canister and then to return said measuring chamber to its normal position, whereby contamination of said measuring chamber is avoided.

4. A mechanism according to claim 3, in which said canister is movable with respect to a fixed frame, and said means for rotating said closure member include actuating elements fixedly mounted with respect to said frame.

5. A container for storing powdered commodities to be dispensed, comprising a rotatable canister having a discharge opening, a vane positioned interiorly of said canister adjacent said discharge opening, said vane being spaced from said discharge opening so that a predetermined quantity of powder can drop into the space between said vane and said opening when said canister is in a position where said vane is beside said opening, and said vane extending sufficiently far toward the center of said canister to support the powder which has not dropped into said space in spaced relation from said opening when said canister is in a position where said vane is above said opening, whereby the pressure of the powder during discharge through said opening is independent of the amount of powder in the canister.

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