July 19, 1932. W. E. BENSON 1,867,998

PACKAGE FILLING MACHINE

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Fig. 2

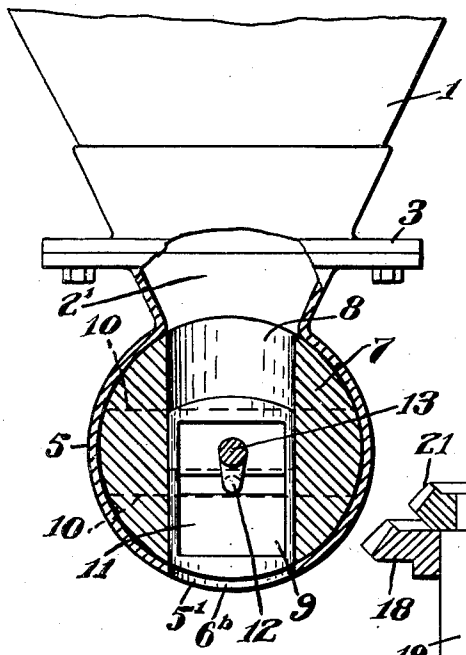


Fig. 1

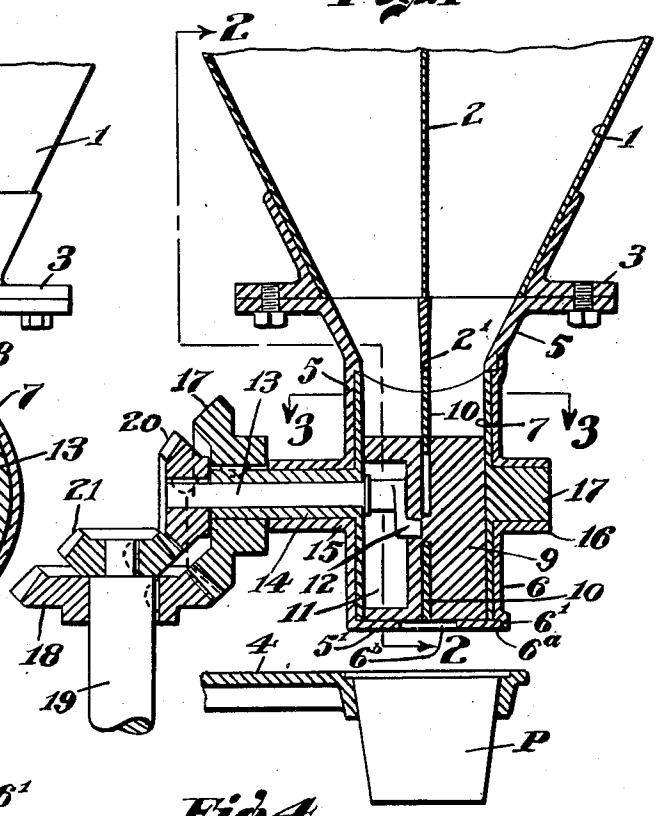


Fig. 3

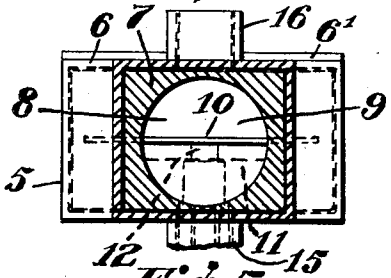


Fig. 4

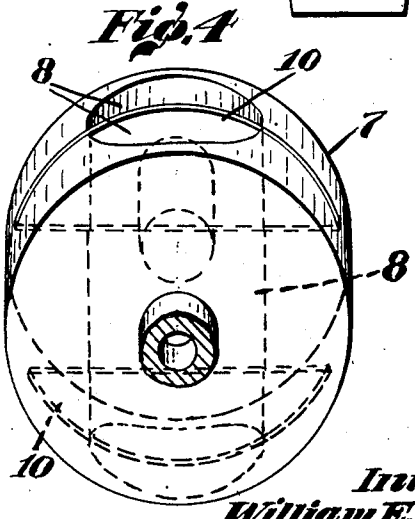
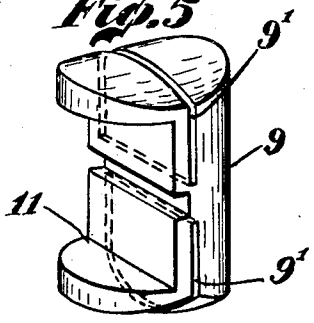


Fig. 5



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PACKAGE FILLING MACHINE

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Fig. 6

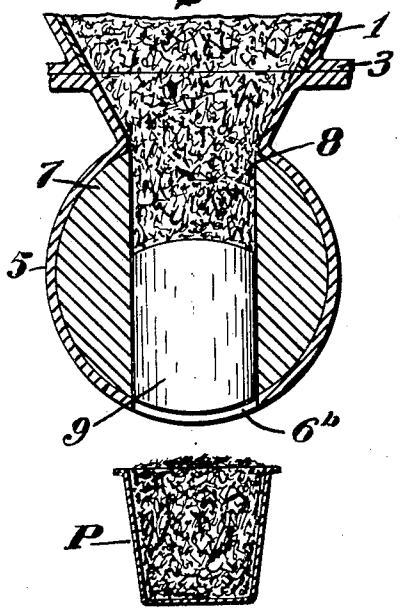


Fig. 7

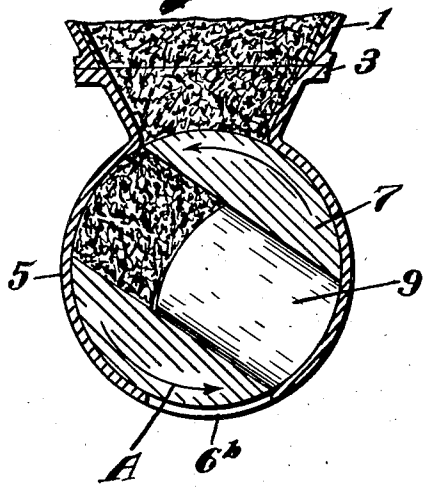


Fig. 8

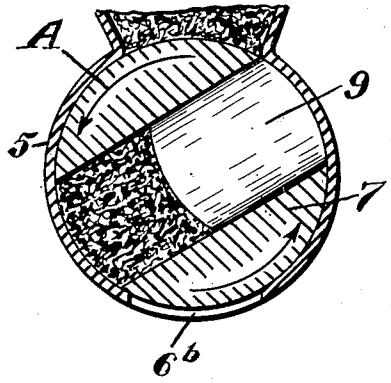
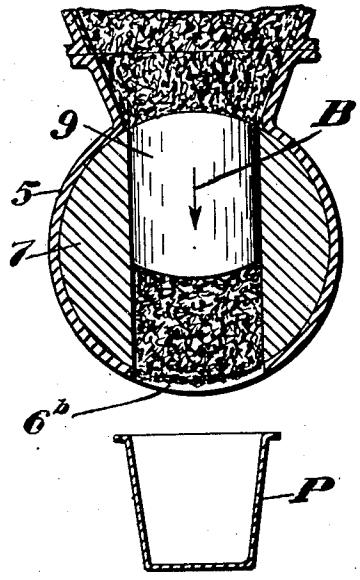


Fig. 9



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Patented July 19, 1932 1,867,998

UNITED STATES PATENT OFFICE

WILLIAM E. BENSON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO KALIX CUP COMPANY, OF WEST CHELMSFORD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

PACKAGE FILLING MACHINE

Application filed June 26, 1930. Serial No. 463,935.

In package filling machines of the type wherein a semi-fluid product such as ice cream, for example, is introduced into a paper cup or other receptacle and the receptacle afterwards capped, the metering of a proper charge of the product into the receptacles. In such machines as usually constructed, the product is stored in a hopper beneath which is an intermittently rotating package carrying table. The packages are successively fed to the table and are carried thereby beneath the discharge opening of the hopper, pausing there for a time sufficient to permit the metering valve of the hopper to deliver a charge of the product into the package, after which a subsequent step in the rotation of the table carries the filled package to the capping station where it is capped.

Where the product being packaged is a semi-fluid product, such as ice cream or cheese, it is difficult to obtain a proper metering of the product at the valve. Such a product requires that the product be drawn from the hopper down into the valve by vacuum as a charge of predetermined quantity, and that it be positively ejected into the cup positioned therebeneath in properly timed relation to the feed of the cup.

Various complicating factors enter into this problem. The valve action must be clean and positive, with the minimum of drippage, both when the charge is drawn into the valve and when it is ejected therefrom, and the bulk or quantity of the charge must be uniform at all times. With a product such as ice cream these considerations impose serious difficulties.

To the end therefore of providing a valve which will satisfactorily answer the several requirements met with in this type of machine, I have devised my present invention. According to it I use an intermittently revolving valve and a plunger which reciprocates in timed relation to the rotation of the valve. The ice cream in the hopper follows the plunger down into the valve by gravity as the plunger descends, which plunger therefore meters out a predetermined charge, and also functions as an ejector for positively ejecting the charge at a subsequent phase in the rotation of the valve. In other words, in my valve, the construction is such that the ice cream is received in the valve when the valve is at one phase of its rotation and discharged at an opposite phase of rotation. This means that while the valve is being filled with a charge at one side the charge previously received is being ejected at the opposite side.

For the purposes of this application I have shown my invention in its adaptation to an ice cream package filling machine of the type wherein the packages are intermittently revolved beneath the ice cream hopper. Such disclosure, however, is purely illustrative and in no way limiting since the principles of my invention apply to a variety of machines.

In the accompanying drawings:

Fig. 1 is a fragmentary elevation through the material delivery hopper of a package filling machine equipped with a metering valve in accordance with my invention.

Figs. 2 and 3 are sections on the lines 2—2 and 3—3 respectively of Fig. 1.

Fig. 4 is a detailed view of the valve shown in said figures removed.

Fig. 5 is a detail view of the piston member of said valve removed, and

Figs. 6 to 9 inclusive are diagrammatic indications showing successive positions of the valve.

I have indicated at 1 a portion of the material hopper of a package filling machine of the character contemplated herein. Such hopper may, if desired, be vertically subdivided as indicated at 2 providing chambers for two different kinds of material to be packaged, or for material of different flavors, as in the case of ice cream, and this partition is extended downwardly into the valve casing, as indicated at 2′.

The hopper is supported upon any suitable support 3 with its restricted discharge end disposed above the intermittently rotating package carrier 4 for alignment with the cups or other packages P carried by said table as said packages are successively rotated therebeneath and pause to receive a charge of the material from the hopper.

Such charge is a metered charge and is metered by the valve forming the subject mat-

ter of the present invention which valve is interposed between the delivery end of the hopper and the filling station position of the package P on the carrier 4, being operated in timed relation to the operation of the package carrier 4 so as to discharge into the package only when the package is paused beneath the discharge port of the valve casing and registered therewith.

The valve may be mounted in such relation by any suitable mounting means. As here shown I fasten a depending valve casing 5 to the hopper support 3. This casing is open at its upper end and coincides with the restricted discharge opening of the hopper. At its lower end, the casing is formed as a discharge port 6^b with which the packages P are adapted successively to aline. One side of the casing is open and covered by a valve cover 6.

The lower end of the casing 5 is inturned as at 5′ and the lower edge of the cover is recessed as at 6′ to receive a half round segment 6^a which with the inturned edge of the casing defines a discharge orifice 6^b for the delivery of the material metered by the valve.

Intermittently rotatable with the valve casing is my novel material valve. Such valve consists of a generally cylindrical rotor or valve body 7 loosely fitting within the casing and diametrically bored as indicated at 8 to receive a reciprocating plunger or piston 9. The valve body or rotor fits within the valve casing and where the material hopper is equipped with the partition 2 the valve body carrier at its upper and lower edges partitions 10 which successively aline with the partition extensions 2′.

The valve piston 9 is cut away as indicated at 11 to receive the crank 12 of a crank shaft 13 which is assembled within a hollow bearing 14 intergral with the valve body at one side thereof and itself journaled in a bearing 15 integral with the valve casing 5. Opposite the crank 12 the valve cover 6 is formed with a bearing 16 in which is received a stud or journal 17 projecting from the opposite side of the valve body. The piston 9 is also slotted at its opposite ends as indicated at 9′ to receive the partitions 10 of the valve body.

Fast on the bearing 14 is an intermittent gear 17 which meshes with an intermittent gear 18 on a driving shaft 19. Fast on the outer end of the crank shaft 13 is a bevel gear 20 which meshes with a bevel gear 21 on the drive shaft 19.

The drive is as follows:

The gears 18 and 17 which intermittently rotate the valve body 7 are intermittent gears so that although gear 18 rotates at constant speed, it causes gear 17 to make only one half of a revolution and then to pause during the equivalent of another one half revolution. The gears 21 and 20 which drive the piston 9 are regular mitre gears but their operation is so timed to the operation of the valve as to produce the action detailed in Figs. 6 to 9 inclusive.

Starting from the position shown in Fig. 1 with the piston at the bottom of its throw all gears revolve and the valve makes a half revolution while the piston is stationary relative to the valve. This brings the valve into discharge position (Fig. 9) over the cup. After this half revolution is completed the piston is at the top of its throw and the valve now remains stationary for a half revolution of the gears 17 and 18 while the piston continues to move during a half revolution of the crank and returns again to its original position, thereby ejecting the charge of material into the cup.

Referring now to Figs. 6 to 9 inclusive, Fig. 6 shows the position of the parts at what may be considered as either the beginning or the end of the cycle. In this figure, the package P is represented as having been filled with a metered charge of material and the valve and piston are in position to draw in a new charge of material from the hopper. The valve rotates in the direction of the arrows A in Figs. 7 and 8, which represent successive intermediate positions thereof, and ultimately reaches the position of Fig. 9 wherein the piston is shown as blocking the admission of material from the hopper and in readiness to expel the charge of material drawn in when the valve and piston were in the position of Fig. 6. In the position of Fig. 9 the valve is paused with the charge of material in registry with the discharge port 6^b beneath which an unfilled package P is shown as registering and the piston is about to descend in the direction of the arrow B in Fig. 9 to expel such charge

This action is wholly positive and reliable and results in the ice cream or other product being metered and ejected with no spillage whatever. The construction is such that the speed of the machine as regards filling may be considerably increased over that of machines heretofore constructed.

It will thus be noted that in my machine the weight or pressure of the ice cream in the hopper forces a charge of cream into the valve on top of the piston when the parts are in the position of Fig. 9 and that as the piston descends this charge of cream is received in the valve for ejection therefrom by the piston in a subsequent position of the valve. This action is not dependent upon any suction created by the sliding piston but is wholly a gravity action.

Various modifications in the construction and operation of my device may obviously be resorted to if within the spirit and scope of my invention without departing from the limits of the appended claims.

What I therefore claim and desire to secure by Letters Patent is:

1. Means for dispensing material from a container comprising a rotatable member having a transverse bore, means for rotating said member to bring an end of said bore to a material receiving position and subsequently to a material discharging position, a piston reciprocable within said bore, and means operating in timed relationship to the means for rotating said member to retract the piston when the bore reaches the material receiving position to permit material to enter the bore and to project the piston to force material from the bore when the bore reaches the material discharging position, said piston operating means comprising a shaft coaxial with the axis of rotation of the member, and a crank on said shaft operatively connected with said piston.

2. Means for dispensing material from a container comprising a rotatable member having a transverse bore, means for rotating said member to bring an end of said bore to a material receiving position and subsequently to a material discharging position, a piston reciprocable within said bore, said piston having a side recess and a transverse channel opening into said recess, a shaft coaxial with the axis of rotation of said member, a crank on said shaft accommodated within the side recess of said piston, a crank pin on said crank engaged in the traverse channel of the piston whereby rotation of said shaft relative to said member is effective to produce reciprocation of the piston, and means for rotating said shaft in timed relationship to the rotation of the member to cause the piston to be retracted to permit material to enter the bore when the latter reaches the material receiving position and to project the piston to force material from the bore when the same reaches the material discharging position.

3. Means for dispensing material from a container comprising a rotatable member having a transverse bore, a hollow shaft rigid with and extending from said member for rotating the same to bring an end of said bore to a material receiving position and subsequently to a material discharging position, a piston reciprocable within said bore, a shaft extending through said hollow shaft, a crank on said second mentioned shaft operatively connected with said piston, and means for rotating said second mentioned shaft in timed relationship to the rotation of said member to retract the piston when the bore reaches the material receiving position to permit material to enter the bore and to project the piston to force material from the bore when the latter reaches the material discharging position.

4. Means for dispensing material from a container comprising a rotatable member having a transverse bore, a hollow shaft rigid with and extending from said member for rotating the same to bring an end of said bore to a material receiving position and subsequently to a material discharging position, a piston reciprocable within said bore, said piston having a side recess and a transverse channel opening into said recess, a shaft extending through said hollow shaft, a crank on said second mentioned shaft accommodated within the side recess of said piston, a crank pin on said crank engaged in the transverse channel of the piston, and means for rotating said second mentioned shaft in timed relationship to the rotation of said member to retract the piston when the bore reaches the material receiving position to permit material to enter the bore and to project the piston to force material from the bore when the latter reaches the material discharging position.

In testimony whereof I affix my signature.

WILLIAM E. BENSON.