

June 7, 1932.

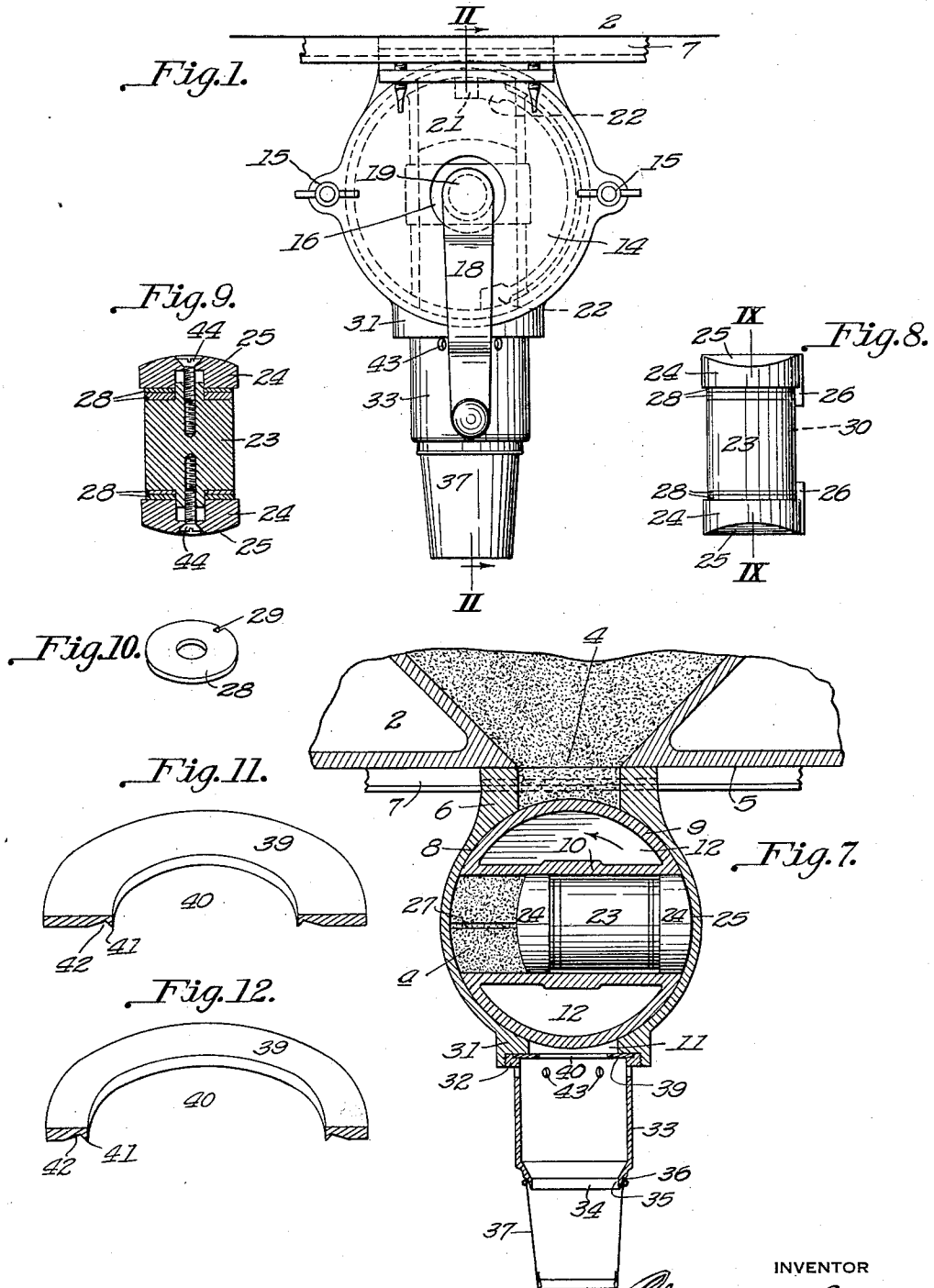
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1,861,734

RECEPTACLE FILLING APPARATUS

Filed Oct. 27, 1928

3 Sheets-Sheet 1



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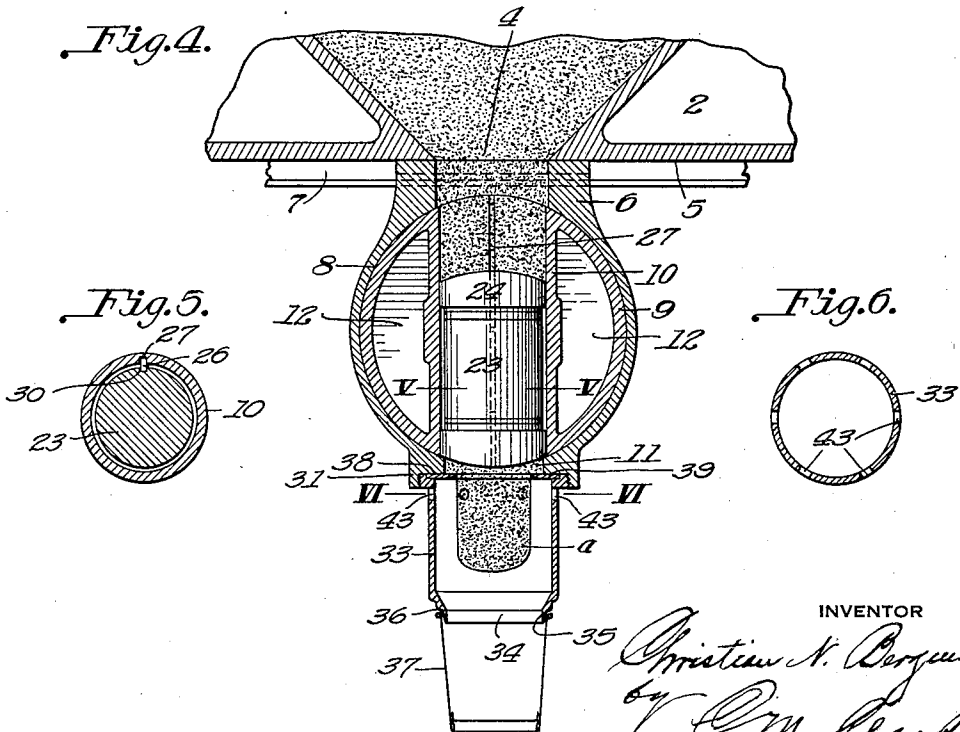
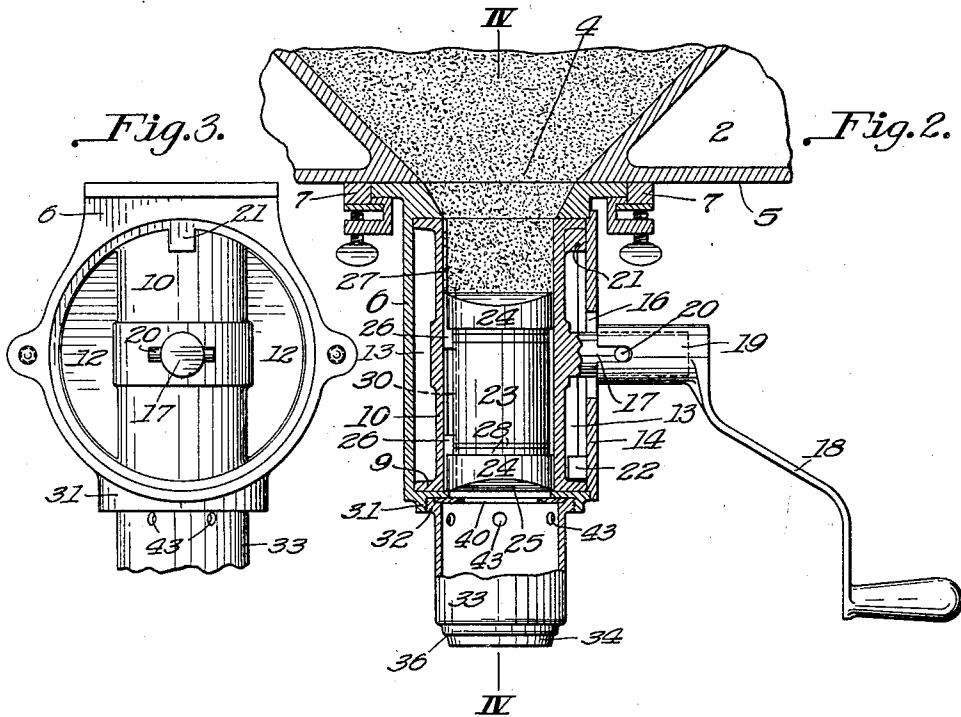
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3 Sheets-Sheet 2



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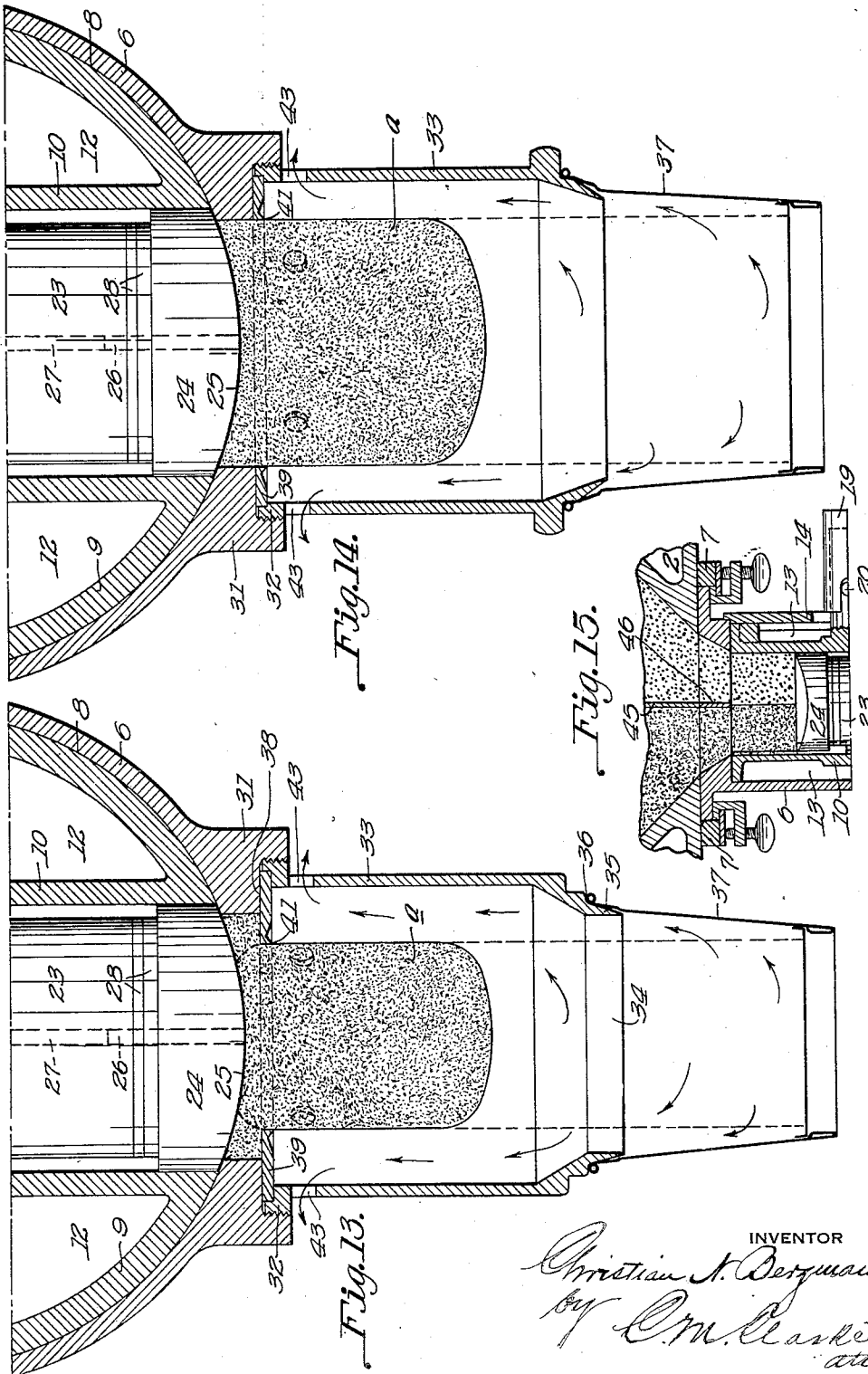
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RECEPTACLE FILLING APPARATUS

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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RECEPTACLE FILLING APPARATUS

Application filed October 27, 1928. Serial No. 315,511.

My invention relates to improvements in the class of cup or receptacle filling apparatus, for the filling of paper cups or the like with ice cream or other similar commodity.

It has for its object to provide means whereby a measured amount may be charged into the receptacle, utilizing a rotatable measuring holder, adapted to extract a definite amount from a superimposed main supply, and to deliver it downwardly through an outlet coping or shell into a receiving receptacle, as a cup, in register therewith.

The invention is generally similar to the measuring device illustrated and described in prior patents to myself and others Nos. 1,632,165, 1,659,802 and 1,676,377.

The improvements herein relate particularly to the adjustable plunger therein; the terminal outlet shell or coping; an intervening centering ring, and certain other features of improvement, as shall be more fully hereinafter described.

Referring to the drawings showing one preferred embodiment of the invention:

Fig. 1 is a view in front elevation of the mechanism, depending below the base of a main reservoir or hopper;

Fig. 2 is a vertical sectional view on the line II—II of Fig. 1, showing the plunger lowered in ejecting position;

Fig. 3 is a face view showing the interior of the drum, with the cover removed;

Fig. 4 is a similar sectional view on the line IV—IV of Fig. 2;

Fig. 5 is a cross sectional detail view on the line V—V of Fig. 4;

Fig. 6 is a similar view on the line VI—VI of Fig. 4;

Fig. 7 is a sectional view similar to Fig. 4, with the plunger cylinder, during rotation, at its half way position;

Fig. 8 is a detail view in elevation of the plunger;

Fig. 9 is a vertical sectional view through the plunger, on the line IX—IX of Fig. 8;

Fig. 10 is a detail view in perspective of one of the length adjusting washers of the plunger;

Fig. 11 is a full size sectional view of the outlet drip washer or ring used between the

unit measuring cylinder and the delivery shell;

Fig. 12 is a similar view showing the ring with an enlarged opening for use with a proportionately enlarged receptacle;

Fig. 13 is a full size sectional view illustrating the operation of ejecting a unit into a cup and release of air therefrom;

Fig. 14 is a similar view showing the use of an enlarged delivery shell and drip ring opening for a corresponding enlarged receptacle;

Fig. 15 is a partial sectional view like Fig. 2, showing a double flavor machine.

In the drawings, 2 represents the base of a hopper or reservoir adapted to contain ice cream or other substance in a sufficiently soft condition to freely flow downwardly through a central delivery opening 4.

The bottom of the hopper is preferably planed off smooth underneath, providing a flat attaching surface 5, upwardly against which may be secured the closely fitting flat upper surface of the unit measuring drum shell 6. The latter may be fixedly mounted in registering position with the opening 4 by any suitable securing means, as bolts or screws.

In the drawings, the hopper bottom is illustrated as being provided with the slide bars 7, adapting the present improvement to attachment to and use with a hopper like that shown in my prior Patent No. 1,635,160, for use with a slidable receptacle holder and filler, operable in such slide-ways.

Incidentally, the present improvement constitutes an alternative attachment to such machine whereby the same hopper may be utilized for filling either rectangular or cylindrical receptacles. It will be understood, however, that the machine of this application may be used thus interchangeably, or may constitute a permanently connected fixture with the hopper or reservoir, for cup filling only, as desired.

The shell 6 is generally cylindrical in form, and is bored out to provide an inner cylindrical face 8, within which is rotatably mounted the drum 9. Drum 9, as shown, is provided with a middle transverse cylindrical

cal plunger shell or casing 10 opening mid-way continuously through the drum, and adapted to register at one end and the other with the supply opening from the hopper and with a discharge opening 11 of casing 6 respectively, in either of two operative positions, effected by a half rotation of the drum.

Shell 10, which is preferably integral with drum 9, may be spaced inwardly from its outer cylindrical portion by intervening clearance spaces 12 at both sides, and similar spaces 13 are preferably provided at each end of the drum, for lightness and air or liquid circulation if desired, for temperature regulation.

One side of the casing 6 is closed by a cover plate 14 held in position by thumb screws 15 for easy removal, and an enlarged opening 16 is provided at the center of the plate 14, for air circulation around the outwardly extending operating stem 17 of the drum. The drum is rotated, first in one direction and then reversely, by means of a crank 18 having a hollow hub 19 in pin and slot, or other suitable engagement with stem 17, as indicated at 20.

Drum 9 is provided at one outer end of the middle cylinder 10 with an abutment stop 21, adapted to engage co-operating limiting stops 22—22 at opposite inner portions of the cover plate 14, to positively arrest rotative movement of the drum 9, insuring its registering position with the opposite inlet and outlet openings, at the limit of each half rotation, in one direction or the other.

Slidably mounted within the transverse cylindrical cavity of shell 9 is the gravity plunger valve 23, which is the active gravitating element of the unit measuring mechanism. Plunger valve 23 is preferably of solid metal for maximum weight and is provided with terminal heads 24—24, rounded as at 25, to the same radius as that of the inner annular face 8 of the shell.

As the plunger valve is lowered by gravity, as in Fig. 4, its either part-cylindrical end will therefore neatly fit against the interior cylindrical face of casing 6 during rotation, without interference or undue friction, and will seal the outlet opening when in discharge position.

The middle portion of the plunger valve being slightly less in diameter than its heads provides an annular space which will become filled with ice cream, tending to form an airtight packing ring and resulting suction action. A further advantage is in providing continuous lubrication for the plunger valve during operation of the machine.

The internal diameter of plunger casing 10 is slightly larger than that of outlet opening 11, providing an annular shoulder for limiting downward movement of the plunger valve against the exposed portion of the inner

cylindrical face 8, closing the opening against possible leakage from above.

Heads 24 are provided with fixedly mounted longitudinal keys 26 slidably engaging key-way 27 of the shell 9, and maintaining the plunger valve in proper position, as to its part cylindrical terminals 25 at all times, within the casing 10 of rotating drum 9 and with relation to the inner surface of the inclosing casing 6.

Between the heads 24 and the middle body portion 23 of the plunger are interposed a plurality of adjusting washers 28 which may be of uniform or varying thickness, the purpose of which is to allow for lengthening or shortening of the plunger valve with relation to the fixed length of the plunger valve cavity, the heads 24 being held by central screws 44.

The purpose of such adjustment is to vary the cubical contents of the withdrawn and ejected unit, adapting the machine to the extraction and ejection of different size units for filling different size receptacles.

Keys 26 extend inwardly sufficiently far to engage holding key-ways 29 of washers 28, and preferably extend somewhat therebeyond inwardly toward the middle, through a key-way 30 of the middle portion 23 of the plunger. By such engagement all of the parts are maintained in proper relative position, and the plunger valve is continuously operative at each half rotation of its casing.

The lower portion of casing 6 is provided at its bottom with a cylindrical extension 31 into which is screwed by its threaded terminal 32 the upper end of the delivery shell or casing 33. Such casing forms a cup centering discharge nozzle and extends downwardly sufficiently far, and is of ample diameter, to receive the discharged plug or unit of ice cream etc. with surrounding air circulation clearance, as it is delivered through the bottom opening of the inner plunger shell 9, when the latter descends by gravity for ejection of the unit through the contracted opening of the intervening drip washer.

Casing 33 is sufficiently large to allow for vertical dropping of the unit *a* with surrounding air circulation space, as shown in Figs. 13 and 14.

The lower terminal 34 of shell 33 is converged inwardly as shown, providing a bottom tapering rim 35, shouldered as at 36, for snug adjustment thereagainst of the upper rim of a receiving receptacle, as a cup 37, Fig. 4.

The bottom face of casing 6, upwardly within the threaded rim portion 31, is flat as at 38, adapted to make abutting contact with the upper face portion of the interposed drip washer in the top of shell 33. Such portion of the shell is annularly shouldered, providing a depressed seating face for an intervening hollow center outlet washer or disk ring or drip washer 39, having a central opening

40, for downward delivery therethrough of the ejected unit. The diameter of opening 40, which is concentric with the outlet opening 11 and of the plunger valve cavity within shell 10, is somewhat reduced in diameter, thereby somewhat contracting the diameter of the ejected unit, in its passage through shell 33 to the receptacle 37.

Likewise, the diameter of opening 40 of the drip washer is preferably smaller than the final outlet opening through the contracted rim terminal 34 of shell 33, allowing for free upward escape of air around the descending unit, from the interior of the cup.

The inner portion of drip washer 39, surrounding opening 40, is tapered downwardly to a knife edge 41 inwardly of a surrounding annular groove 42, as in Figs. 11 and 12. The purpose of such construction is to provide a drip edge so as to ensure downward delivery of all of the contents at each operation, and avoiding underrunning of ice cream or other substance, should it become unduly fluid.

For the purpose of providing ample air circulation, for free exhaust of contained air, upon dropping of the unit through the shell and into the cup which is held tightly against its bottom, the shell 33 is provided around its upper rim portion with a series of air circulating ports 43, of any suitable size and number.

The diameter and length of outlet casing 33 and the clearance opening 40 of drip washer 39 are suitably proportioned to adapt them to the size of receptacle 37 being used. For the purpose of protecting the upper inner rim portion of the cup from splashing and leaving a clean dry seat for the cover, the lower edge of rim 35 should extend slightly below the cover seating groove of the cup when it is held upwardly in closed air-tight receiving position, as in Figs. 13 and 14.

Likewise, by making the opening 40 of the drip ring of slightly smaller diameter than that of the bottom of the cup the unit *a* will fall centrally, leaving a continuous annular clearance passage for upward escape of contained air as the unit descends. The downward movement of the unit is comparatively rapid, it being jarred loose from the bottom of the plunger valve upon the plunger valve coming to a sudden stop upon making contact with the inwardly extending edge of casing 6 surrounding its outlet opening.

The surrounding and contained air passes upwardly from the cup through the shell 33 and outwardly through ports 43, under slight compression, tending to maintain the vertical fall of the unit into the cup. When so deposited, the unit, being plastic will quickly fill the cup to the desired level, just below the placement position of the cover. The cover is then applied and the contents are then usually hardened by further refrigeration.

The variations in proportions of the discharge casing 33 and its drip ring 39, for application to a standard drum 6 for varying size and capacity of receptacle 37, are clearly illustrated in Figs. 13 and 14. In each it is desirable that the lower end of unit *a*, just before severance, shall be somewhat above the lower discharging nozzle of the casing, with maintenance of its concentric position, as shown.

I show in Fig. 15 the application of the invention to use with a hopper adapted to the supply of double flavor units. In such case the hopper cavity is divided by a vertical partition 45 and the base of drum 6 is provided with a similar thin partition 46 registering therewith. The hopper cavities at each side of partition 45 deliver ice cream downwardly at each side of partition 46 into the unit-forming cavity, the half units being joined to each other on a coincident vertical line.

Thereafter the operation is as above described with discharge of the composite severed unit into the cup in inverted position, just as in the case of a continuous single flavor unit.

The vertical drop of the compound unit through the shell 33, assisted by the surrounding equalizing action of the escaping air, ensures proper vertical deposit in the cup without tipping or distortion.

Upon removing the cover from the cup the refrigerated contents will therefore present the contrasting flavors of the entire unit in an approximate evenly divided distribution at opposite sides.

As thus constructed the operation of the machine is as follows:

With the drum 9 in the position shown in Fig. 4 and the plunger lowered by gravity, with the outer rim portion of lower head 24 bearing against the surrounding edges of the reduced opening 11, the upper cavity above the plunger valve becomes filled with a measured amount of the contents of the hopper, by gravity, assisted by the suction action of the lowering plunger.

At the same time a previously formed unit will have been ejected downwardly through the shell into the cup 37 which is held upwardly by one hand of the operator against the lower tapering rim edge of the shell.

Upon removal of such filled cup and an empty cup being replaced in the same manner, the drum is rotated by crank 18 one-half revolution, carrying around with it the unit *a*, which is severed from the superimposed mass by the surrounding edge portion of the drum, as in Fig. 7. The plunger valve being carried around will gradually increase its gravitating force, due to its solidity and weight. Upon the unit *a* coming into register with the lower opening, the plunger valve will descend, ejecting the unit and at the

same time drawing downwardly an equivalent gravitating portion from the hopper delivery opening, ready for rotation, severance, and ejection in the same manner.

5 The drum, as stated, is rotated alternately in one direction and the other, the speed of operation being only limited by the skill and speed of the operator.

10 The construction and operation of the invention will be readily understood and appreciated from the foregoing description.

It is comparatively simple, composed of few parts, not liable to get out of order, and is readily taken apart for cleaning or repair. 15 If desired, hot air or other heating vapor may be introduced through opening 16 to the interior cavity 13, for the purpose of maintaining the parts at any desired temperature, or preventing undue chilling when used with 20 ice cream or the like.

The dimensions, capacity, detail construction or other features of the invention may be changed or varied by the skilled mechanic, but all such changes are to be understood as 25 within the scope of the following claims.

What I claim is:

1. In a cup filler, the combination with a unit measuring device having a terminal drip preventing disk, of a surrounding enlarged delivery shell therefor having a lower 30 terminal provided with an annular inwardly tapered lip for engagement within the rim of a receiving receptacle.

2. In a cup filler, the combination with a 35 unit measuring device having a terminal drip preventing disk, of a surrounding enlarged cylindrical delivery shell therefor having a lower annular inwardly tapered and shouldered terminal for interfitting telescoping 40 engagement within the rim of a cylindrical receiving receptacle.

3. In a cup filler, the combination with a unit measuring device having a terminal drip preventing disk, of a surrounding enlarged delivery shell therefor having a lower 45 terminal for engagement with a receiving receptacle and provided with upper air circulation openings.

4. In combination with a cylindrical 50 casing having an upper inlet opening and a lower outlet opening provided with a drip preventing disk, and a rotatable unit measuring drum in the casing; a delivery shell secured around and depending below the 55 casing enlarged beyond the outlet opening and having an inwardly converging outlet terminal.

5. In combination with a cylindrical casing having an upper inlet opening and a lower 60 outlet opening provided with a drip preventing disk, and a rotatable unit measuring drum in the casing; a delivery shell secured around and depending below the casing enlarged beyond the outlet opening and having 65 air circulation openings at its upper end.

6. In combination with a cylindrical casing having an upper inlet opening and a lower outlet opening, and a rotatable unit measuring drum in the casing; a delivery 70 shell secured around and depending below the outlet opening of the casing, and an intervening open center drip preventing disk.

7. In combination with a cylindrical casing having an upper inlet opening and a lower outlet opening, and a rotatable unit 75 measuring drum in the casing; a delivery shell secured around and depending below the outlet opening of the casing, and an intervening drip preventing disk provided with an opening of less diameter than that 80 of the outlet opening of the casing.

8. In combination with a cylindrical casing having an upper inlet opening and a lower outlet opening, and a rotatable unit 85 measuring drum in the casing; a delivery shell secured around and depending below the outlet opening of the casing, and an intervening disk provided with an opening of less diameter than that of the outlet opening 90 of the casing and having a lower annular tapering drip edge.

9. In combination with a cylindrical casing having an outlet opening and a rotatable drum in the casing having an ejecting plunger, a disk at the outlet opening 95 having a central circular opening and a lower undercut groove providing an annular downwardly tapering dripping edge.

10. In a unit measuring machine, a cylindrical casing having an upper inlet opening 100 and a lower outlet opening provided with a drip preventing disk, a rotatable unit measuring drum in the casing having a transverse cylindrical opening registrable with said openings and provided with a longitudinal 105 keyway, and a gravitating plunger valve slidably mounted in the drum opening having a lengthening and shortening end and a guiding key.

11. In a unit measuring machine, a cylindrical casing having an upper inlet opening 110 and a lower outlet opening provided with a drip preventing disk, a rotatable unit measuring drum in the casing having a transverse cylindrical opening registrable with said 115 openings and provided with a longitudinal keyway, a gravitating plunger valve slidably mounted in the drum opening having opposite ends rounded to conform to the cylindrical curvature of the casing, a guiding key 120 engaging said keyway, and means for adjustably connecting the ends and plunger.

12. In a unit measuring machine, a cylindrical casing having an upper inlet opening 125 and a lower outlet opening provided with a drip preventing disk, a rotatable unit measuring drum in the casing having a transverse cylindrical opening registrable with said 130 openings and provided with a longitudinal keyway, a gravitating plunger valve slidably

mounted in the drum opening having opposite ends rounded to conform to the cylindrical curvature of the casing, a guiding key engaging said keyway, length adjusting washers between the ends and the plunger, and a screw connecting each end with the plunger.

13. In a unit measuring machine, a cylindrical casing having an upper inlet opening and a lower outlet opening, a rotatable unit measuring drum in the casing having a transverse cylindrical opening registrable with said openings and provided with a longitudinal keyway, a gravitating plunger valve slidably mounted in the drum opening having a guiding key, a delivery shell depending below the casing having an inwardly converging terminal portion, and an open center drip preventing ring between the delivery shell and the casing surrounding the outlet opening thereof.

14. In a unit measuring machine, a cylindrical casing having an upper inlet opening and a lower outlet opening, a rotatable unit measuring drum in the casing having a transverse cylindrical opening registrable with said openings and provided with a longitudinal keyway, a gravitating plunger valve slidably mounted in the drum opening having a guiding key, a delivery shell depending below the casing having an inwardly converging terminal portion and upper air circulation ports, and an open center drip preventing ring between the delivery shell and the casing surrounding the outlet opening thereof.

15. In a cup filler, the combination with a delivery casing having an outlet opening and provided with a concentrically open restricting ring, of a cylindrical shell of greater interior diameter than the opening in said ring having screw engagement with the casing and against the ring, said shell depending vertically below and annularly spaced around such opening and having at its upper portion an air circulation opening.

16. In a cup filler, the combination with a delivery casing having an outlet opening and provided with a concentrically open restricting ring of less diameter, of a cylindrical shell of greater interior diameter than the opening in said ring depending vertically below and annularly spaced around such opening and having at its upper portion an air circulation opening and provided with a converging outlet terminal and an annularly projecting shoulder for limiting engagement against a receptacle rim.

17. In a cup filler, the combination with a delivery casing having an outlet opening and a covering ring therefor having a concentric opening of less diameter, a cylindrical shell of larger diameter than such opening secured to the casing against said ring provided with

an air circulation port and a converging outlet terminal.

In testimony whereof I hereunto affix my signature.

CHRISTIAN N. BERGMANN.

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