Dec. 8, 1959 L. A. M. PHELAN ET AL 2,916,044

COVER AND SERVING VALVE FOR FREEZERS

Filed Sept. 18, 1956

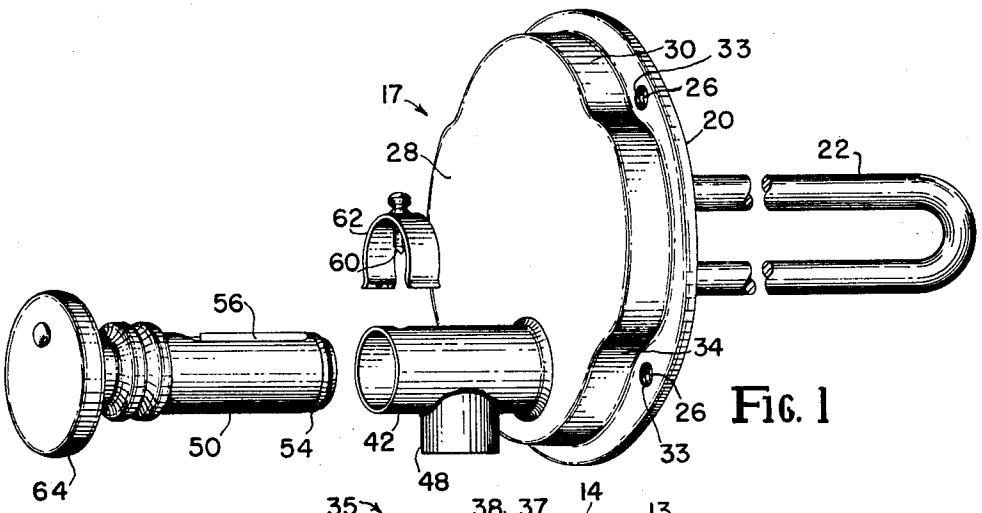


FIG. 1

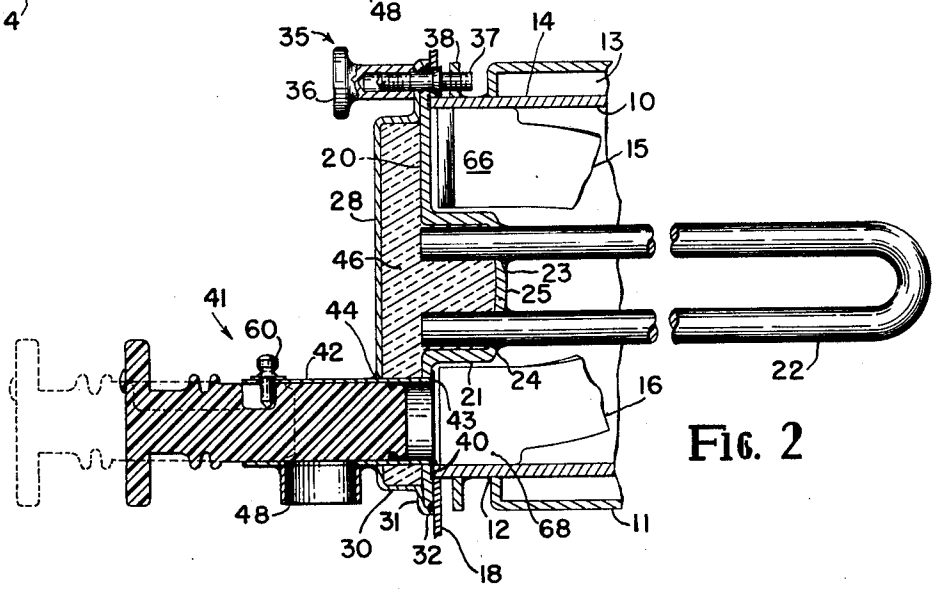


FIG. 2

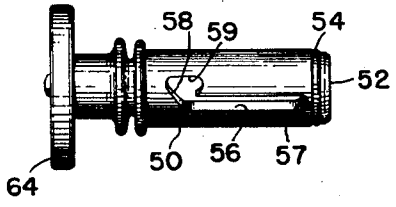


FIG. 3

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United States Patent Office 2,916,044 Patented Dec. 8, 1959

2,916,044

COVER AND SERVING VALVE FOR FREEZERS

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Application September 18, 1956, Serial No. 610,590

4 Claims. (Cl. 137—375)

This is a continuation-in-part application of our co-pending U.S. application Serial Number 393,057, filed November 19, 1953, entitled, "Draw-off Plunger Valve for Receptacles," now abandoned.

This invention relates to freezers for ice cream, custard and the like of the type in which the frozen product is usually drawn off into an edible cup for immediate consumption. Continuous freezers of this general type usually comprise a horizontally disposed refrigerated cylinder and the fresh mix is introduced adjacent one end thereof in a substantially liquid state and drawn off through the other end of the cylinder as a frozen edible product. The invention relates more particularly to a cover for the "serving" or front end of such a refrigerated cylinder and also to the serving valve connected therewith.

The outer surface of many conventional doors or covers "sweat" with condensation, particularly on warm humid day when the product is sold at peak volume and the freezers run almost continuously. As a result they are unsightly and messy and the condensation and frost must be continually wiped off. These conventional covers are inefficient in that they permit considerable heat exchange which not only requires more refrigeration, but causes the product within the freezer adjacent the door to become too "wet." It is necessary that the product at the door is always at proper temperature in order that it "stands up" and can be formed into inviting and appealing "tops."

The beater within the freezer creates a discharge pressure for the product, i.e., it forcibly ejects the product through the serving valve. Thus a certain amount of pressure is exerted on the valve tending to force it to the open position. It is highly desirable to have a serving valve that can be shut by a simple pushing movement and still be securely held against this discharge pressure. Such a valve of course should also prevent melted mix from leaking or dripping at the draw-off.

It is therefor an object of the present invention to provide a particularly efficient, removable cover and serving valve arrangement for a freezer cylinder which overcomes the above mentioned difficulties.

It is a more specific object of the invention to provide a serving valve for a freezer which can be positively shut and locked by a simple pushing movement and yet unlocked and opened by a simple twisting motion.

It is another object of the invention to provide an insulated cover and serving valve for a freezer, said valve being of the piston type and which forces the unused product back into the insulated portion of the freezer. Such an arrangement insures proper temperature of the product at the cover and prevents melted mix within the valve.

It is another object of the invention to provide a serving valve for a freezer, said valve being of the true piston type which forms an efficient seal regardless of slight axial displacement.

It is a general object of the invention to provide an improved insulated and removable cover and serving valve

arrangement which is highly efficient in performing its intended functions, easy and foolproof to operate, and easily and thoroughly disassembled and cleaned.

Other objects and advantages will become more apparent from the following detailed description, taken in conjunction with the attached sheet of drawings in which, by way of preferred example only, is illustrated the invention.

In the drawings:

Figure 1 is a perspective exploded view of a cover and serving valve made in accordance with this invention.

Figure 2 is an elevational, cross sectional view of the cover and serving valve shown in Figure 1 but assembled and secured to a freezer cylinder.

Figure 3 is a plan view of the piston type draw-off plunger shown in Figures 1 and 2.

Referring more particularly to Figure 2 of the drawings, a horizontally disposed freezer cylinder **10** has a jacket **11** welded thereto at **12** to form an annular chamber **13** through which refrigerant is passed in the well known manner. An ice cream or the like mix is introduced adjacent the rear end (not shown) of the cylinder and fed forwardly towards the front end **14** while being thoroughly beaten and aerated by the rotatable helical screws **15, 16** of the driven rotor. For a more complete description of the rotor and its function, if deemed necessary, reference may be had to the co-pending U.S. application of Louis A. M. Phelan, Serial Number 604,481, filed August 16, 1956, entitled "Freezer Mechanism", now Patent No. 2,810,557, issued October 22, 1957.

In accordance with this invention, a hermetically sealed and insulated cover **17** is provided for the front end of cylinder **10**. When the entire unit is assembled within the cabinet **18**, only the cover is exposed to view. The cover includes a disc shaped mounting plate **20** having a large hub portion **21** pressed therein. The hub extends from the center of the plate **20** and into the cylinder between the helical screws **15, 16**. A retarder **22** extends through apertures **23, 24** in the end **25** of the hub and is securely welded thereto in sealing relationship. For a more complete description of this retarder and its function, reference may be had if desired to the above mentioned co-pending application. It is believed sufficient to say that this retarder acts to create the desired turbulence within the cylinder. A plurality of circumferentially spaced apertures **26** extend through the plate **20** adjacent its outer edge. The cover also includes a cap or outer wall **28** which is of dish-shaped configuration and is spaced a distance from plate **20**. The outer wall has a generally axially extending peripheral flange **30**, which extends axially toward plate **20**, a radial flange **31**, and a lip portion **32** extending over the edge of plate **20**. The lip **32** is welded to plate **20** all around its circumference to form an air-tight seal. Radial flange **31** also has a plurality of circumferentially spaced apertures **33** which register with apertures **26**. The edges of the mating apertures **26, 33** are welded together to form an air-tight seal. The outer wall is pressed into shape from a sheet of steel, preferably stainless steel, and has a series of recesses **34** in alignment with its apertures to admit the fastening means **35**. The fastening means are provided to facilitate easy and quick removal of the cover assembly from the freezer cylinder for cleaning and inspection purposes. Large nut members **36** are threadably engaged in the bolts **37** which extend through the apertures in the cover and are in turn threadably engaged in the ring **38** welded to the cylinder. The cover assembly can be readily removed from the cabinet and cylinder when the four large nuts **36** are unscrewed. A

non-metallic ring **40** is set into the inner wall of plate **20** and acts as a seat for the front edge of the cylinder to form a leakproof seal therebetween.

A serving valve **41** is provided for the cover and extends outwardly from the lower side thereof. The valve includes a generally horizontally positioned discharge tube **42** which passes through the plate **20** and the outer wall **28**, and is welded thereto at **43** and **44** respectively. It will be noted that the space between the plate and outer wall is thus completely sealed. An insulating material **46** is inserted within this space through the apertures in the hub **21** before the retarder **22** is inserted and welded therein. The hermetically sealed cover prevents any moisture from reaching the insulation and thereby rendering it waterlogged.

The discharge tube has an outlet **48** extending downwardly from its lower side and is of sufficient diameter to permit free flow of the product when the valve is open. An elongated piston **50** is provided which has a diameter only slightly less than the bore of tube **42** so as to form a snug sliding fit therewith. As shown by the full lines of Figure 2, the inner end **52** of the piston is located within the cover **17** when the valve is in the closed position. A sealing means in the form of a flexible O-ring **54** is seated in the piston adjacent its inner end. Thus the O-ring forms a sliding seal with the uniform bore of the tube regardless of axial displacement of the piston, for example, when the piston is in the full line position shown in Figure 2 (locked position) or when it is pushed still farther into the tube when the operator has just closed the valve. When the piston is withdrawn outwardly to the position shown in dotted lines in Figure 2, the product is free to flow through the outlet **48**.

As shown best in Figure 3, the piston **50** has a generally axially positioned slot **56** in its periphery and adjacent the upper side of the piston. The slot terminates at its inner end in a stop portion **57**. At its outer end the slot has an intermediate inclined portion **58** and an enlarged offset locking portion **59**. A pin **60** extends through the tube **42** and into the slot. The pin is held on the tube by the spring clip **62** and is easily removed therefrom to permit the piston to be completely withdrawn from the tube for cleaning purposes.

When the piston is in the position shown by the dotted lines of Figure 2 the product is forced out of the cylinder by the revolving paddles **66**, **68** of the screws. In this connection the large hub **21** serves an important function in that it reduces the cross-sectional area of the front end of the cylinder and makes the paddles more effective in forcing the product out of the serving valve with the required pressure. In other words, it defines a path of movement for the product being moved by the paddles and prevents the product from simply being "pushed aside" by the paddles.

The piston is prevented from being completely withdrawn by the pin **60** which bears against the stop portion **57** of the slot.

When the draw is completed the operator simply pushes the piston directly inwardly. This movement usually is rapid and forceful and the piston thus forces the product in the tube back into the cylinder and well within the insulated cover. The last portion of this piston travel causes the inclined portion **58** of the slot to bear against the pin **60** which causes the piston to rotate slightly about its longitudinal axis. This rotational movement brings the offset locking portion into axial alignment with the pin. The pressure of the product within the cylinder acting on the end **52** of the piston forces the inner end of the locking portion against the pin which prevents further outward movement of the piston.

To open the valve for another draw the operator simply twists the knob **64** to the left (when facing the freezer), the slot **56** is thus aligned with the pin, and the knob **64** is then pulled forwardly to cause the stop portion **57** to bear against the pin.

By positioning the slot **56** on the top of the piston and making the piston fit snugly in the tube, leakage and consequent dripping at the draw-off is prevented. The product cannot accumulate in the slot.

Because the piston has kept all of the product within the cold insulated area, it is never too "wet" but remains frozen and at the proper temperature so as to "stand up" for good forming of the cone, particularly the top. The product located close to the inner wall of the cover is kept at the required degree of coldness and continuous high efficiency and minimum running time of the refrigerating apparatus is assured.

It should be understood that it is not intended to limit the invention to the above described forms and details, and that the invention includes such other forms and modifications as are embraced by the scope of the appended claims.

We claim:

1. A cover and serving valve arrangement for a freezer cylinder including, a plate, an outer wall spaced from said plate and mounted thereto, the space between said plate and said outer wall being an insulated space, a uniform bore discharge tube passing through said plate and wall and extending outwardly therefrom, an outlet extending from said tube intermediate the length of the latter and at a location spaced outwardly from said outer wall, a piston having a closed inner end and sealing means adjacent thereto and slidable in said tube between a discharge position and a closed position, means for positively holding said piston in said closed position in which said sealing means is located within said insulated space, said sealing means extending radially outwardly of the periphery of said piston so as to be in slidable sealing engagement with said tube.

2. A serving valve and insulated cover arrangement for a freezer comprising, a uniform bore tube passing through said cover and extending therefrom, an outlet in said tube, a piston slidable in said tube between closed and discharge positions, said piston having an inner end located within said cover when in the closed position, sealing means carried by said piston adjacent said end and extending radially outwardly of the periphery of said piston to form a sliding seal between said piston and tube, said piston having a generally axially positioned slot in its periphery, said slot having an intermediate inclined portion and an offset locking portion, a pin carried by said tube and extending into said slot whereby when said piston is pushed towards the closed position said pin will bear against said inclined portion to turn said locking portion for engagement with said pin.

3. A serving valve and a cover for a freezer comprising, a generally horizontal and uniform bore tube, said tube extending through said cover, an outlet extending downwardly from said tube, a piston slidable in said tube between closed and discharge positions and having an inner end, said inner end adapted to be positioned within the cover when in the closed position, an O-ring seal around the periphery of said piston and adjacent said end and forming a sliding seal between said piston and tube, said piston having a generally axially positioned slot in its periphery, said slot having an intermediate inclined portion and an enlarged offset locking portion, a pin carried by said tube and engageable in said slot whereby when said piston is pushed towards the closed position said pin will bear against said inclined portion to turn said enlarged locking portion for positive locking engagement with said pin.

4. A cover and serving valve arrangement for a freezer cylinder including a plate, an outer wall spaced from said plate and mounted thereto, the space between said plate

and said outer wall being an insulated space, a uniform bore discharge tube passing through said plate and wall and extending outwardly therefrom, an outlet in said tube, a piston slidable in said tube between closed and discharge positions and having an inner end which is located in said space when in the closed position, sealing means carried by said piston adjacent said inner end and extending radially outwardly of the periphery of said piston so as to be in slidable sealing engagement with said tube regardless of the axial position of said piston therein, said piston also having a generally axially positioned slot in its periphery, said slot having an inclined portion and an enlarged offset locking portion, and a pin carried by said tube and extending into said slot whereby when said piston is pushed towards the closed position said pin will bear against said inclined portion to turn said locking portion for engagement with said pin.

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