May 22, 1956 H. F. SWENSON 2,746,640

BATCH FEEDERS

Filed March 31, 1951 3 Sheets-Sheet 1

FIG. 1

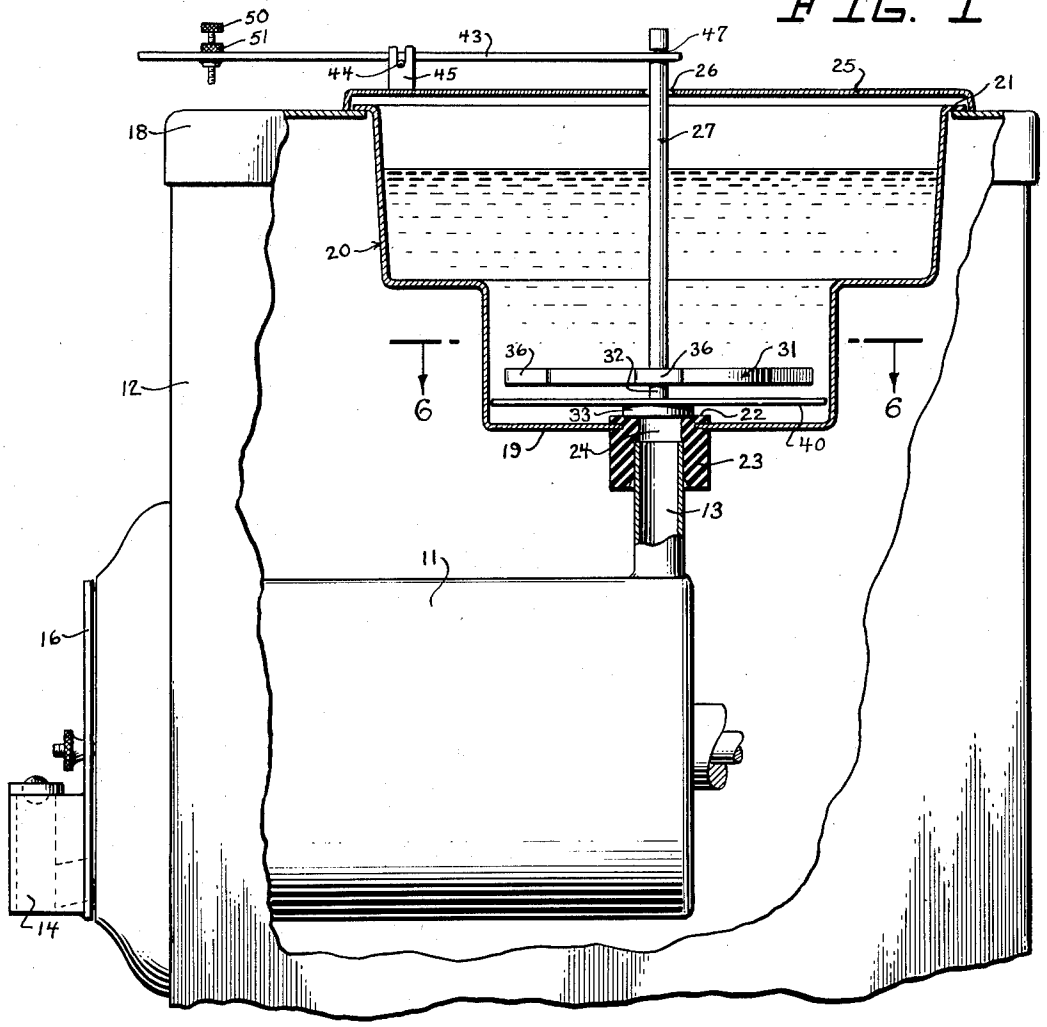
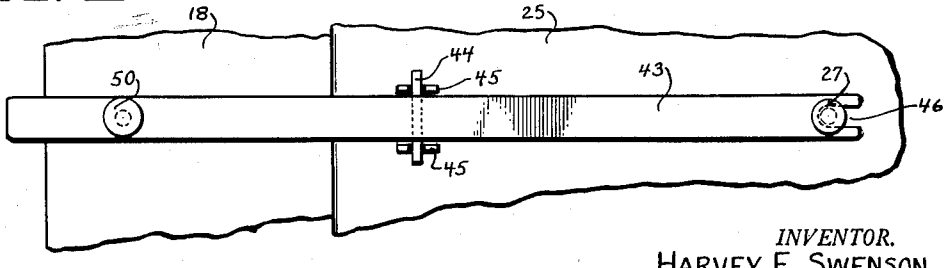


FIG. 2



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May 22, 1956 H. F. SWENSON 2,746,640

BATCH FEEDERS

Filed March 31, 1951 3 Sheets-Sheet 2

FIG. 3

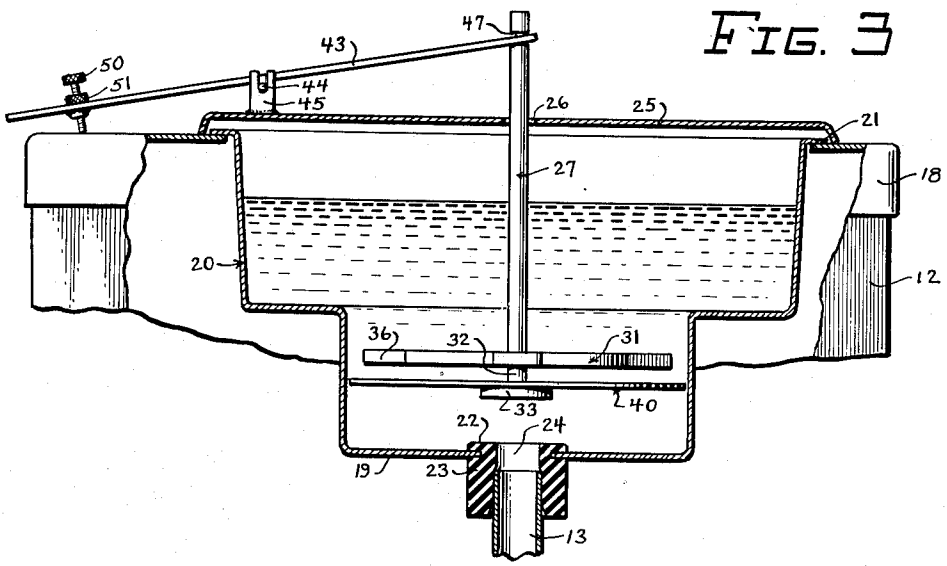
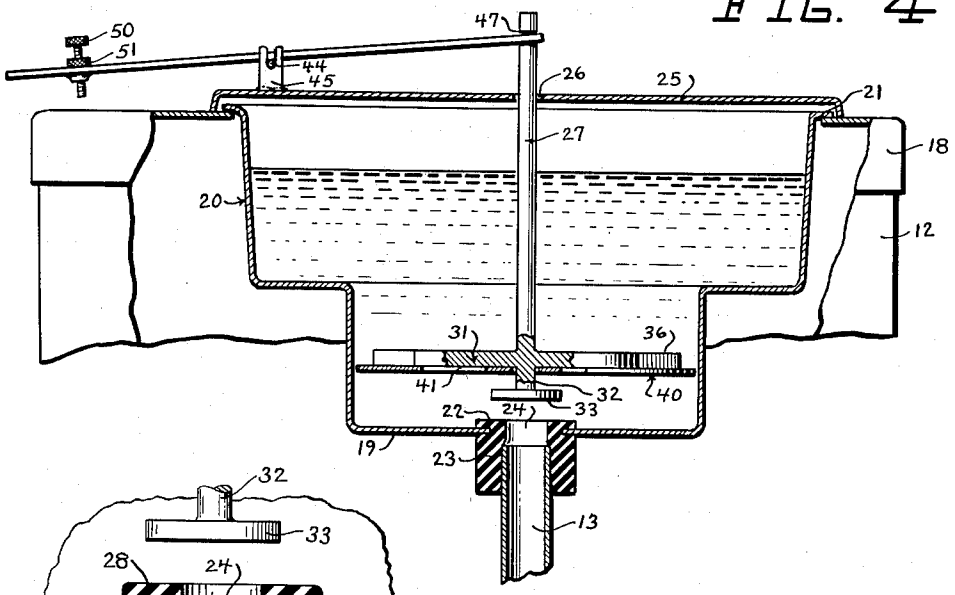


FIG. 4



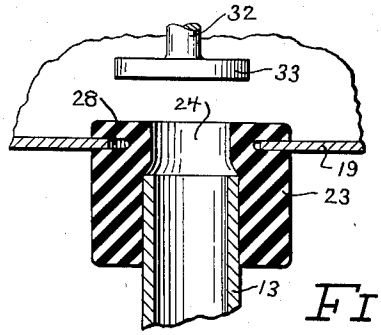


FIG. 7

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May 22, 1956 H. F. SWENSON 2,746,640

BATCH FEEDERS

Filed March 31, 1951 3 Sheets-Sheet 3

FIG. 5

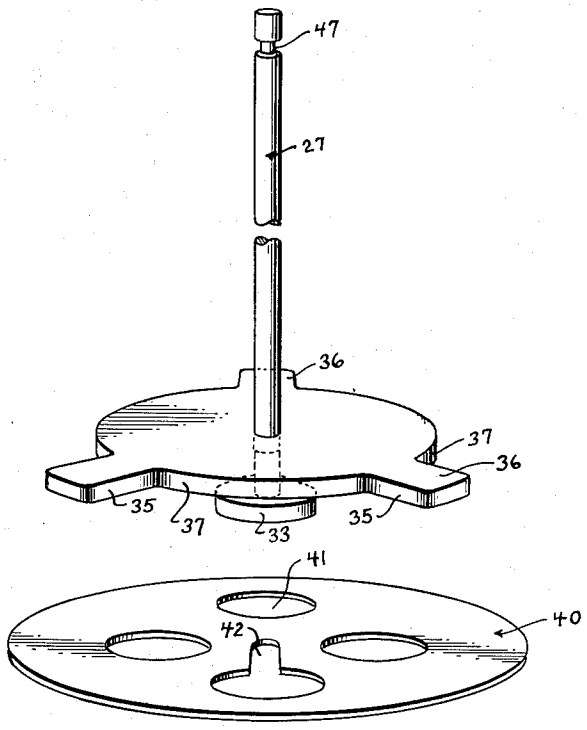
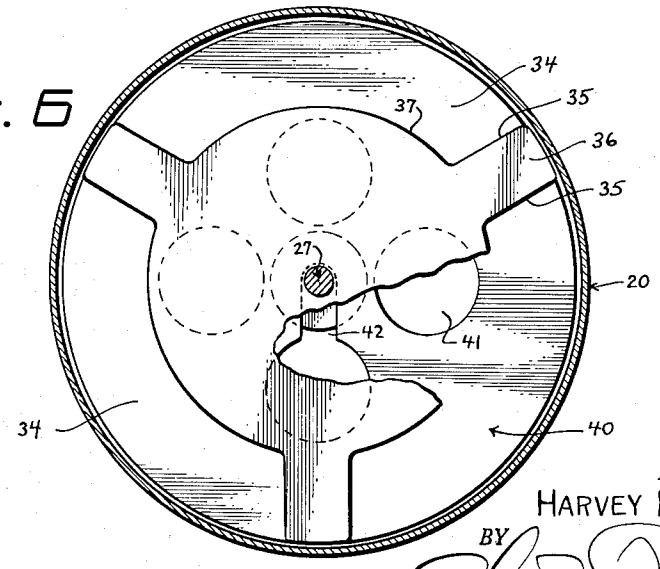


FIG. 6



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United States Patent Office 2,746,640
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BATCH FEEDERS

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Application March 31, 1951, Serial No. 218,673

9 Claims. (Cl. 222—440)

This invention relates to a batch feeding device, and more particularly to a device for periodically introducing a predetermined quantity of mix into the freezing cylinder of a commercial ice-cream freezer.

When refilling a freezer with mix, a common practice has been to measure out an individual fresh charge of mix and manually pour the same into the freezing cylinder. It can readily be appreciated that such a manual measuring and filling operation, repeatedly performed during a day's operations, necessarily consumes a considerable amount of time. Accordingly, a principal object of the present invention is to provide a batch feeding device whereby a predetermined batch of mix will be automatically fed from a storage tank into the freezing cylinder upon the manual actuation of a control arm or the like.

A further object is to provide a device of this nature in which means are provided for selectively regulating the same for predetermining the volume of each batch delivered.

It is a further important aim of the present invention to provide a batch feeding device which admits of having all parts thereof which come into contact with the mix each thoroughly cleaned, and in which this cleaning operation can be carried out with unusual ease and expedition.

Another object is to provide a batch feeding device of simple and economical construction.

These and other objects will appear and be understood in the course of the following description and claims, the invention consisting in the novel construction and in the adaptation and combination of parts hereinafter described and claimed.

In the accompanying drawings:

Figure 1 is a view partly in side elevation and partly in longitudinal vertical section showing the invention applied to an ice-cream freezer.

Fig. 2 is a fragmentary top plan view of the invention drawn to an enlarged scale.

Figs. 3 and 4 are views similar to Fig. 1 and show, respectively, the barrier assembly at its upper limit of travel and during its downward travel, such assembly having been portrayed in its closed lower-limit position in Fig. 1.

Fig. 5 is a perspective view of the barrier assembly and related parts in a disassembled state.

Fig. 6 is a horizontal sectional view taken along line 6—6 of Fig. 1; and

Fig. 7 is an enlarged-scale sectional view of the grommet which couples the tank to the discharge pipe leading therefrom, and bringing out details of construction not apparent from an inspection of the preceding views.

Referring to the drawings, and more particularly to Fig. 1 thereof, the batch feeding mechanism of the present invention is shown operatively associated with the freezing cylinder 11 of a commercial ice-cream freezer housed in a suitable cabinet 12. The freezing cylinder may be of that type in which the ice-cream mix is supplied thereto through a feed pipe 13 located at the rear end of the cylinder and after being frozen is forced by the action of a rotary dasher toward the forward end of the cylinder, there to be discharged in individual servings by the use of a dispensing valve 14. This valve is carried by a front cover plate 16 made removable to facilitate cleaning of the cylinder and dasher. The top cover 18 of the freezer cabinet presents a circular opening aligned with the feed pipe 13, and receiving in this opening is a tank 20 suspended from the cover 18 by a flange 21 seated on the marginal edges of the circular opening. The tank is desirably given a stepped configuration to produce upper and lower compartments with the latter having much the lesser volumetric capacity. The floor wall 19 of the tank presents a discharge opening overlying the feed pipe 13 and to effect a fluid-tight and removable connection between the base and the feed pipe, a grommet 23 of rubber, neoprene or other suitable flexible material is removably fitted in the discharge opening while the feed pipe is snugly received in the bore 24 of the grommet. As will appear later, the top face 22 of the grommet surrounding the upper end of the bore serves as a valve seat.

The grommet, see Fig. 7, is peculiarized in that the annular groove 28 which extends circumferentially thereof has a diameter somewhat less than the diameter of the discharge opening into which it fits, and the purpose thereof is to enable the grommet to be shifted transversely in a minor degree so as to compensate for any misalignment as between the center of the discharge opening and the axial center of the tube 13. In the production of a structure such as I have here shown it can be expected that there will be some manufacturing variations, and while these variations should be quite minor it will nevertheless be appreciated that the act of fitting the tank-carried grommet upon even a slightly misaligned tube would cause the grommet to become cocked. Even though cocked in only a slight degree it will be self-evident that a valve of the gravity-closing type hereinafter described would fail to establish a proper seat positively sealing the outlet opening. Moreover, if such cocking be of any appreciable magnitude it could feasibly so distort the circumferential groove into which the mating lip of the tank is received as to permit leakage past the lip. A further characteristic of my grommet is that the groove 28 has its circumferential inner wall radiused, thus promoting sanitation by eliminating any sharp corners which would be resistant to cleaning. The upper part of the grommet, and namely that part which lies between the groove 28 and the seat 22, is comparatively thin so as to flex readily and permit easy lifting in order to expose the groove for cleaning.

The tank is closed by a removable cover 25 having a central opening 26 therein to receive a rod 27. Such rod has a crenelated plate 31 fixedly carried thereby to occupy a position somewhat above the extreme lower end thereof, leaving therebelow a short section of the rod which serves as a valve stem 32. This stem carries a flat valve 33 arranged to seat against the top face 22 of the grommet for closing the bore. The marginal cutouts which give to the plate 31 its crenelated appearance are denoted by 34 and are each defined at the ends by the lateral edges 35 of radially extending wings 36 and at the inside by an arcuate edge 37 placed concentric to the axis of the rod 27. The wings serve to guide the plate for endwise vertical movement within the lower compartment of the tank and hence have a radial extent approximating the radius of such compartment. A disc 40 is slidably mounted on the valve stem for limited movement between the plate and valve and such disc also has a diameter determined by that of the lower compartment of the tank. Several openings 41 are punched

in the disc, and these openings lie within a radius less than that of the arcuate edges 37. As can be best seen from an inspection of Fig. 6 the disc is provided with a slot 42 extending from the center of the disc and connecting with one of the openings, the width of the slot being slightly greater than the diameter of the valve stem so as to accommodate the latter. The said opening which connects with the slot is of sufficient diameter to permit the valve to be inserted therethrough so that the disc is removable for cleaning purposes, it being merely necessary to slide the valve stem laterally along the slot and then draw the valve through the opening.

The rod is lifted by the tilting of a control lever 43 which is fulcrumed adjacent its longitudinal center on a pin 44 made integral therewith and lodged between the fork-arms of furcate brackets 45 secured to the cover of the tank. These brackets also restrain the control lever against lateral displacement. The inner end of the control lever is forked to provide an axially extending reentrant throat 46 mating with a circumferential groove 47 formed in the upper end of the rod. An adjusting screw 50 is threadably received by the outer end of the lever and is held in adjusted position by a lock nut 51. From this description it will be readily apparent that downward pressure upon the head of the screw, or upon the related free end of the lever, will cause a corresponding lift of the forked end of the lever, resulting in a lifting of the rod 27. The degree of tilting of the lever arm is perforce controlled by the adjusting screw 50 which engages the cover 18 of the cabinet and hence functions as a stop.

Tracing now the operation of the present invention, the rod 27 is normally in the lowered position shown in Fig. 1 with the valve 33 seated against the grommet 23 to block the flow of the mix from the tank to the freezing cylinder and with the disc 40 resting against the valve. When it is desired to apply another batch of mix to the freezing cylinder the screw-carrying end of the control lever 43 is pushed downwardly until the screw 50 engages the cabinet lid as shown in Fig. 3, resulting in the raising of the rod and hence resulting in the lifting of the disc and plate 31 and an unseating of the valve. During this lifting operation the disc 40 bears against the valve 33 and this permits the mix above the plate 31 to work past the plate and flow through the openings in the disc so that when the rod has been lifted to the upper limit of its travel the portion of the tank below the disc will be filled with mix. When the control lever is thereupon released the rod with its attached plate 31 and valve 33 move by gravity toward the grommet 23. The disc 40, in consequence of its relatively large surface area and comparatively light weight, remains more or less stationary at the outset of such descending movement, or which is to say until the lowering plate engages the same, as shown in Fig. 4, and the entire assembly then lowers as a unit. When the disc 40 is thus brought into engagement with the plate 31, the disc covers the marginal cut-outs 34 therein and the plate in turn covers the openings 41 in the disc so that the plate and disc, acting together, serve to isolate a batch of mix therebelow. As this batch escapes through the feed pipe 13 to the freezing cylinder, the plate and disc lower in concert and hence act as a barrier to prevent the mix thereabove from augmenting the batch. The disc again separates from the plate when the valve reseats itself upon the grommet. From this explanation it can be seen that the more the screw protrudes below the control arm the less will be the lift of the plate and hence the smaller will be the batch.

While I have illustrated and described the now preferred embodiment of the invention it will be apparent that changes may be resorted to without departing from the spirit of the invention. I accordingly intend that no limitations be implied and that the hereto annexed claims be given a scope fully commensurate with the broadest interpretation to which the employed language admits.

I claim:

1. In a batch feeder, a container having a discharge opening at the lower end thereof, a barrier slidably mounted in said container for vertical travel to and from the lower end of the container, said barrier presenting ports for the passage of fluid automatically opened when the barrier is raised, and means below the barrier arranged to be urged by the pressure of the fluid below the barrier into a covering position over the lower end of the said ports when the barrier travels downwardly toward the discharge opening to prevent fluid above the barrier from passing the barrier during such downward movement thereof, said means being arranged to be removed from said covering position by the downward pressure of fluid in said barrier ports when the barrier travels upwardly.

2. A batch feeder comprising a container having a discharge opening at the bottom thereof, a rod, a valve at the lower end of the rod for closing the said discharge opening, and a barrier assembly carried by the rod above and adjacent the said valve and slidably mounted in said container for vertical travel to and from a position whereat the valve closes said discharge opening, said barrier assembly comprising a plate member secured to the rod and a disc member slidably mounted on the rod between the plate member and the valve, said plate and disc members each providing respective openings each arranged to be closed by the other member while the two members are together and serving as a barrier isolating a batch of fluid therebelow when the valve is lowered toward the discharge opening, and arranged to provide a through passage for fluid while the plate and disc are spaced apart with the latter resting against the valve during a lifting thereof way from the discharge opening.

3. The batch feeder of claim 2 wherein the combined weight of the rod, plate member, and the valve is sufficiently more than the weight of the disc member to cause the plate member when released from a raised position to lower by force of gravity substantially faster than the disc member lowers so as to bring the plate and disc members together during the lowering operation.

4. In a batch feeder, a container having a discharge opening at the bottom thereof, a barrier assembly including a plate member journaled for sliding movement in the container and a disc member below the plate member and arranged for both limited relative movement with respect to and concerted movement with the plate member, and a valve depending from the plate member and operative to close the discharge opening when in a lowered position, said plate and disc members providing respective openings each arranged to be closed by the other member while the members are together serving as a barrier isolating a batch of fluid therebelow when the valve is lowered toward the discharge opening and arranged to provide a through passage for fluid while the plate and disc members are spaced apart with the latter resting against the valve during a lifting thereof away from the discharge opening.

5. In a batch feeder, a cylindrical container arranged to receive a fluid moderately resistant to flow and having a discharge opening at the bottom thereof, a circular plate somewhat smaller in diameter than the container and presenting radially extending wings for guiding the plate in endwise movement in the container, a valve stem depending from the said plate, a valve at the lower end of the valve stem for closing the discharge opening, and a circular disc corresponding in diameter to that of the container and guided on the valve stem for movement between the plate and the valve, said disc being provided with an opening contained within a circle less in diameter than that of the plate, and the plate, valve stem, and valve being less buoyant than the disc to cause the plate when released from a raised position to lower by the

force of gravity substantially faster than the disc lowers so as to bring the plate and disc together to isolate a batch of fluid therebelow during the lowering operation.

6. In a batch feeder, a cylindrical container arranged to receive a fluid moderately resistant to flow and having a discharge opening at the bottom thereof, a circular plate somewhat smaller in diameter than the container and presenting radially extending wings for guiding the plate in endwise movement in the container, a valve stem depending from the said plate, a valve at the lower end of the valve stem for closing the discharge opening, and a removable circular disc corresponding in diameter to that of the container and guided on the valve stem for movement between the plate and the valve, said disc being provided with a key-hole slot contained within a circle less in diameter than that of the circular plate, the major opening of said slot being large enough to receive the valve therethrough and the narrowed laterally extending throat portion thereof normally receiving the valve stem therein, the plate, valve stem, and valve being less buoyant than the disc as to cause the plate, when released from a raised position, to lower by the force of gravity substantially faster than the disc lowers so as to bring the plate and disc together to isolate a batch of fluid therebelow during the lowering operation.

7. A batch feeder comprising a cylindrical container arranged to receive a fluid moderately resistant to flow and having a discharge opening at the bottom thereof, a rod, a circular plate member secured to the lower end of the rod, a valve stem depending from the plate member, a valve at the lower end of the valve stem for closing the discharge opening, and a circular disc member guided on the valve stem for movement between the plate member and valve, said plate and disc members having a diameter slightly less than that of the container and each providing respective openings arranged to be closed by the other member while the two members are together serving to isolate a batch of fluid therebelow when the valve is lowered toward the discharge opening and arranged to provide a through passage for fluid while the plate and disc members are spaced apart with the latter resting against the valve during a lifting thereof away from the discharge opening, and the plate, valve stem, and valve being less buoyant than the disc member to cause the plate member when released from a raised position to lower by the force of gravity substantially faster than the disc member lowers so as to bring the plate and disc members together during the lowering operation.

8. A batch feeder comprising a cylindrical container arranged to receive a fluid moderately resistant to flow and having a discharge opening at the bottom thereof, a rod, a circular plate member secured to the lower end of the rod, a valve stem depending from the plate member, a valve at the lower end of the valve stem for closing the discharge opening, and a circular disc member guided on the valve stem for movement between the plate member and valve, said plate and disc members each having a diameter slightly less than that of the container and providing respective openings arranged to be closed by the other member while the two members are together serving to isolate a batch of fluid therebelow when the valve is lowered toward the discharge opening and arranged to provide a through passage for fluid while the plate and disc members are spaced apart with the latter resting against the valve during a lifting thereof away from the discharge opening, the plate, valve stem, and valve being less buoyant than the disc member to cause the plate member when released from a raised position to lower by force of gravity substantially faster than the disc member lowers so as to bring the plate and disc members together during the lowering operation, and adjustable means for selectively limiting the upward travel of the plate member to predetermine the volume of each batch fed.

9. The batch feeder of claim 8 wherein said adjustable means includes a control lever fulcrumed adjacent its longitudinal center, operatively interconnected at one end to the upper end of the rod, and presenting a screw at the other end functionally related to a stop for selectively adjusting the downward limit of travel of the screw-carrying end of said control lever for responsively limiting upward travel of the rod.

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