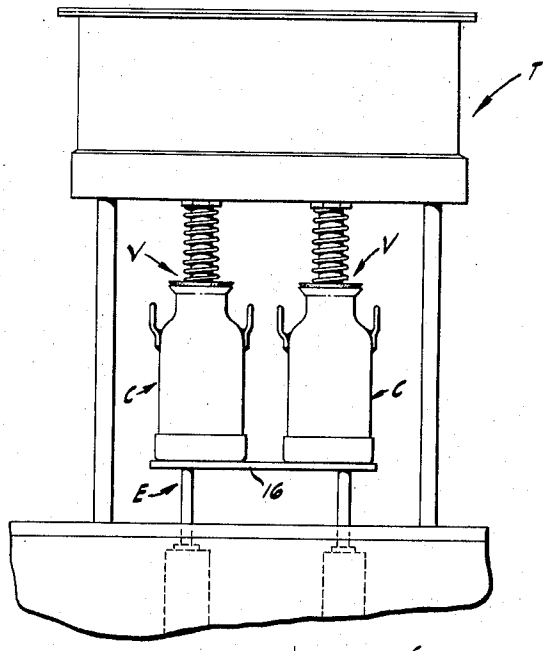
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CAN FILLER

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FIG-1



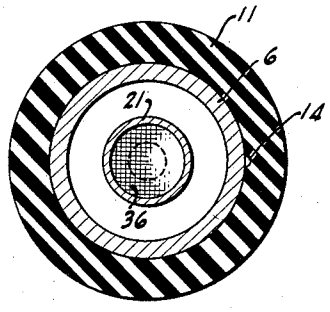


FIG-3

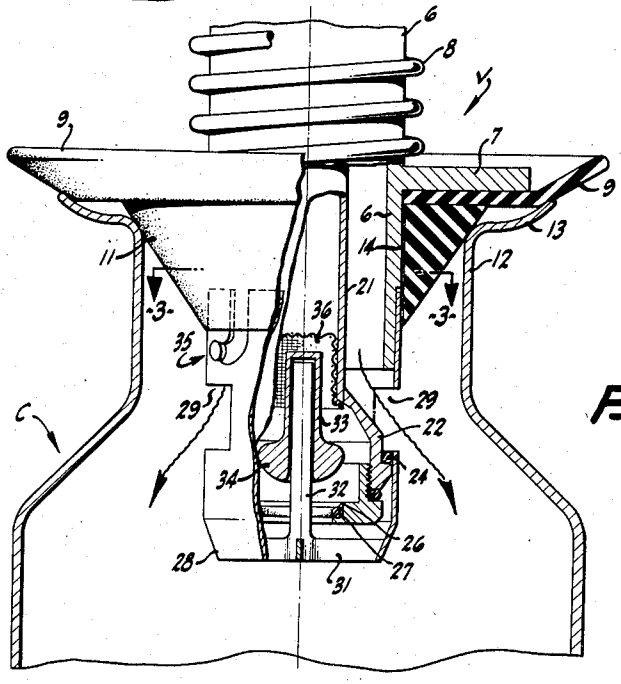


FIG-2

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FIG-4

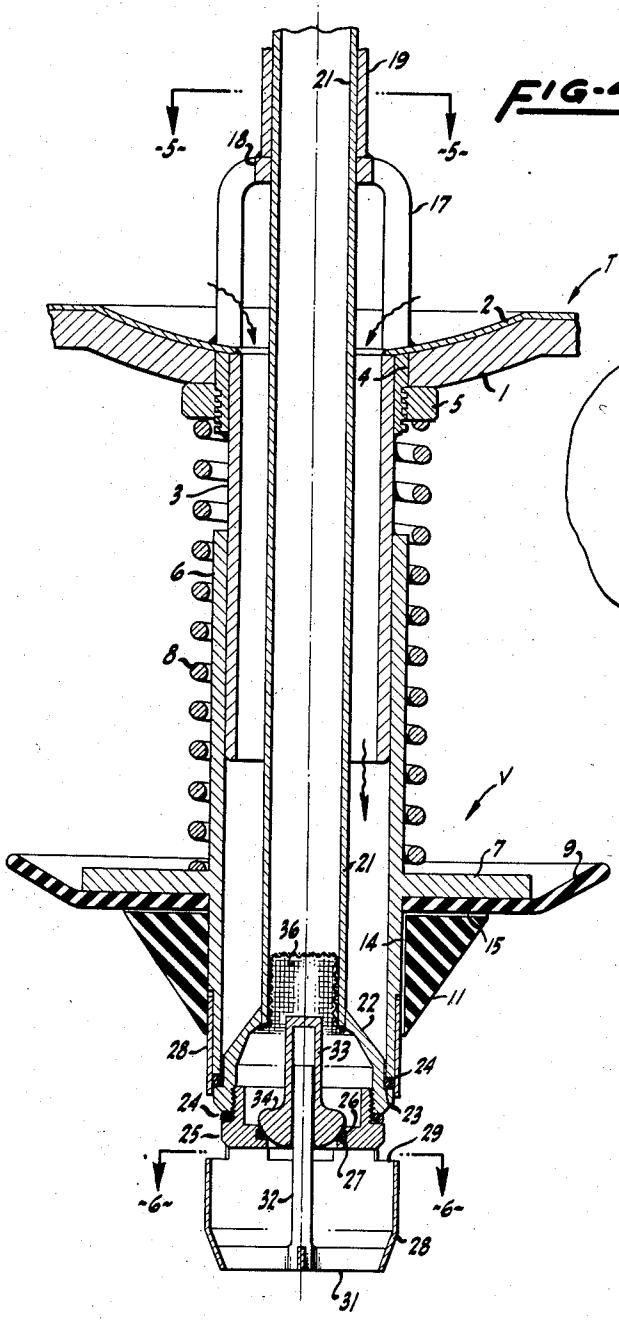


FIG-5

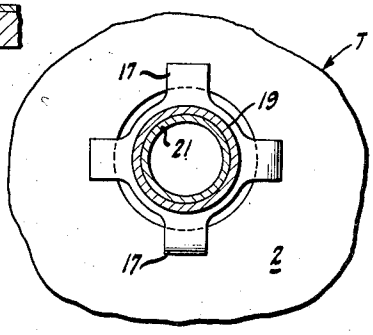
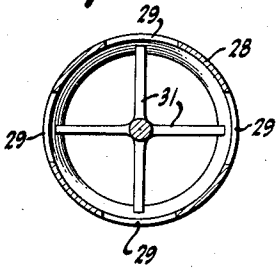


FIG-6



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2,893,445

CAN FILLER

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Application August 19, 1957, Serial No. 678,785

5 Claims. (Cl. 141—294)

This invention relates to and in general has for its object the provision of a can filler provided with a dispensing valve for controlling the flow of milk therefrom during the can filling operation and with an air eduction and drainage control valve for permitting the escape of air from the can during the can filling operation through an air eduction tube and for automatically closing said air eduction tube upon the completion of the can filling cycle thereto to prevent the drainage of milk from said tube.

More specifically, the object of this invention is the provision of a can filler including: an outer contractible and expandable valve operator; an inner rigid air eduction tube forming an annular milk delivery passage with the valve operator and provided at its lower end with an outwardly extending annular flange having a valve seat arranged to receive the lower end of said valve operator; a valve seat provided on the lower end of said annular flange coaxially with said air eduction tube; an annular valve closure member disposed above said latter valve seat and engageable thereon, thereby normally to seal off the lower end of said tube; a sleeve formed integral with and extending upwardly from said latter valve closure member, said sleeve being closed at its upper end; a cylindrical or tubular valve operator extension depending from the lower end of said valve operator and provided intermediate its ends with a milk discharge port or slot; a pin supported by said extension and extending upwardly through said annular valve closure member into said sleeve; means for biasing said valve operator to its normal expanded position; and a resilient conoidal can plug secured to the lower end of said valve operator.

Another object of this invention is the provision of a can filler of the character above described wherein the valve operator takes the form of a pair of telescoping sleeves normally biased to an extended or expanded position by a coiled wire compression spring.

Still another object of this invention is the provision of a can filler of the character above described wherein its can plug is provided along its inner cylindrical and across its top face with a vacuum release passageway capable of closing when the plug is placed under compression under the influence of a can being filled, but which will immediately open when the can is released from the can filler.

Still another object of this invention is the provision of a can filler of the character above described wherein its said valve operator extension is detachably secured to the valve operator by means such as a bayonet and slot connection so that it and the eduction tube valve assembly can be readily cleaned and sterilized.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where that form of the invention which has been selected for illustration in the drawings accompanying and forming a part of the present specification, is outlined in full. In said drawings, one form of the invention is shown, but it is to be

understood that it is not limited to such form, since the invention as set forth in the claims may be embodied in other forms.

Referring to the drawings:

Fig. 1 is a side elevation of a pair of can fillers embodying the objects of my invention.

Fig. 2 is a fragmentary vertical mid-section of the valve assemblies of one of the can fillers illustrated in Fig. 1 and showing these valve assemblies and the associated can in their operative can filling positions.

Fig. 3 is a horizontal section taken through the section line 3—3 of Fig. 2.

Fig. 4 is a fragmentary mid-vertical section of one of the can fillers illustrated in Fig. 1 but showing the valve assemblies in the closed inoperative positions.

Fig. 5 is a fragmentary horizontal section taken on the section line 5—5 of Fig. 4.

Fig. 6 is a horizontal section taken on the section line 6—6 of Fig. 4.

General assembly

As illustrated in Fig. 1, a can filler embodying the objects of my invention includes in its entirety a milk supply tank T, one or more milk flow control valve assemblies V, and an elevator E for elevating one or more cans C into their operative positions relative to their associated valve assemblies. Per se, the tank T, elevators E, and cans C are of conventional construction and form no part of this invention.

Valve operator assembly

Extending through an opening formed in the bottom 1 of the tank T and its stainless steel liner 2 and welded thereto is a fixed inner cylinder or sleeve 3. Surrounding the upper end of the sleeve 3 and welded thereto is an externally threaded collar 4 and threaded thereto is a lock nut 5. Here it should be noted that the sleeve 3 forms a liquid-tight seal with the tank bottom 1 and its stainless steel liner 2.

Telescoped over the free end of the cylinder or sleeve 3 and having a sliding liquid-tight fit therewith is an outer cylinder 6 provided near its lower free end with an outwardly extending, annular flange 7. Circumscribing the two telescoping sleeves 3 and 6 is coiled wire compression spring 8 abutting the lock nut 5 at its upper end and supported at its lower end by the flange 7. As a result of this structure, the two spring biased cylinders 3 and 6 serve as a longitudinally expandable and contractible milk conduit communicating at its upper end with the milk supply tank 1. Surrounding the lower end of the outer cylinder 6 immediately below its flange 7 is a dished, annular rubber cup 9 and tightly seated on the cylinder 6 in engagement with the lower face of the cup 9 is a resilient inverted conoidal can plug 11 conveniently made of rubber. As shown in Fig. 2, the plug 11 should be of a size such that it will make an effective seal with the neck 12 of an associated can C and the cup 9 should be of a size such that it will overlie the dished lip 13 of the can. Formed along the inner cylindrical face of the plug 11 is a small air vent or vacuum release passageway or channel 14 communicating at its lower end with atmosphere and communicating at its upper end with a similar channel 15 which similarly communicates with atmosphere at its outer end. The composition of the plug 11 should be such that when it is compressed under the influence of a can sealed thereto, the passageways 14 and 15 will close, and that when the can is released therefrom, they will open, thereby to break any partial vacuum which might otherwise develop during the process of releasing the can.

As a can C seated on the table 16 of the elevator E is elevated into sealing engagement with the plug 11,

the cylinders 3 and 6 will, of course, be contracted against the biasing action of the spring 8 or, more specifically, the outer cylinder 6 will slide upwardly over the inner cylinder 3. As a result of this action and for other reasons which will presently appear, the assembly so far described can be considered as an expandable and contractible valve operator as well as a milk passageway.

Valve assembly

Welded to and within tank T in vertical alignment with the cylinders or sleeves 3 and 6 is an upstanding spider 17 formed at its upper end with a hub 18. Welded to the hub 18 is a sleeve 19 and rigidly mounted therein is a valve supporting an air eduction tube 21 extending downwardly through the cylinders 3 and 6 coaxially therewith to a point somewhat short of the lower end of the cylinder 6.

Secured to the lower end of the tube 21 is a downwardly diverging or conoidal wall or flange 22 provided on its periphery with a circular valve seat 23. Mounted on the valve seat 23 is an O ring 24 arranged normally to receive and seal with the lower end of the cylinder or sleeve 6. The tube 21, cylinder 6, and flange 22 therefore constitute a closed end annular chamber serving as a milk passageway when the cylinder 6 is raised relative to the tube 21, the lower end of the cylinder 6 and the flange 22 serving as a valve for the purpose of effecting the latter function.

Threaded to the lower end of the conoidal flange 22 against an intermediate O seal ring 24 is an annular cap 25 formed with a central valve seat 26 and accommodated within the valve seat 26 is an O seal ring 27.

Slidable over the reduced lower end of the cylinder 6 is a cylinder extension 28, the upper end of this extension being snugly circumscribed by the lower end of the container plug 11. Formed in the extension intermediate its ends are a plurality of valve ports 29 normally located immediately beneath the valve seat 23 but which straddle the valve seat 23 when the valve operator assembly moves upwardly in response to a rising can. As a result of this, communication between the interior of the cylinder 3 and the interior of the can is established through the valve ports 29, as best shown in Fig. 2.

Attached to and extending across the lower end of the extension 28 is a spider 31 and, secured centrally thereto, is an upstanding pin 32. Mounted on the pin 32 with positive clearance is a closed ended sleeve 33 merging at its lower end with an annular, inverted mushroom-shaped valve closure member 34 arranged normally to seat on the O ring 27, thereby to close off the lower end of the air eduction tube 21. Here it should be noted that, as shown in Fig. 1, the sleeve 33 extends a substantial distance above the upper end of the pin 32, thereby to provide a lost motion connection between these two members.

Conveniently, the extension 28 can be detachably secured to the cylinder 6 by a conventional bayonet and slot connection generally designated by the reference numeral 35 in Fig. 2.

Finally and optionally, a wire mesh thimble type of filter 36 may be detachably inserted into the lower end of the air eduction tube 21 and retained therein by a mere friction fit.

Operation

In the operation of this device, a can C is placed on the table 16 of the elevator E in axial registration with the can plug 11, all as illustrated in Fig. 1 and in accordance with conventional practice. The elevator E is then activated, whereupon the can is raised first into sealing engagement with the can plug 11 and then both the can and the valve operator assembly are elevated relative to the fixed valve assembly against the biasing action of the spring 8. During this latter increment of elevation, the ports 29 of the extension 28 rise above the valve seat 23 of the flange 22 and, as a result, communication is established between the annular passageway formed by the tube 21 and the cylinders 3 and 6, and the open ports 29. Milk will therefore flow from the tank T into the can C until the can and the valve operator assembly are lowered by the elevator.

Also, during this last increment of elevation, the upper end of the pin 32 will come into contact with the upper closed end of the sleeve 33 and serve to unseat the valve closure member 34, thereby to establish communication between the lower open end of the extension 28 and the air eduction tube 21.

During the can filling operation, the incoming milk will displace an equal volume of air and milk foam contained in the can and force it upwardly through the lower end of the extension 28, and through open port in the cap 25 together with some milk into the air eduction tube 21.

When the can is filled and the elevator moves downwardly, the valve operating assembly will follow the can until the lower end of the cylinder 6 again seats on its valve seat 23 under the influence of the biasing spring 8. Simultaneously, the valve closure member 34 will drop to its closed position, thereby to close off the lower end of the air eduction tube 21 and trap therein all of its foam and milk content. This is a very important feature of my invention for unless such foam and milk are trapped, the foam will collapse into a considerable volume of milk and all such milk will then drip from the can filler after the can has been removed therefrom. This expedient therefore not only obviates a messy situation, but results in a considerable saving of milk.

After the two valves above mentioned have been brought to their closed positions, the continued downward movement of the elevator results in depressing the can below the level of the can plug 11. However during the initial downward movement of the valve operating assembly which, in effect, can be considered as an upward movement of the valve operating assembly relative to the can, the volumetric capacity is being slightly increased and this results in the production of a partial vacuum within the can prior to the parting of the can from the can plug 11. Unless precautions were taken to break this partial vacuum, considerable force would be required to break the seal between the can plug and the neck of the can. To this end, I have provided the air passageways 14 and 15 in the plug 11, all as above described. So long as the plug 11 is under compression, these passageways remain closed but as soon as this pressure is relieved as by the downward movement of the elevator during its final stages of movement, the passageways 14 and 15 automatically open so as to permit the egress of air into the can. With the vacuum so broken, there is then no tendency for the can to adhere to the can plug.

I claim:

1. A can filler comprising: a tank; an open ended, hollow, longitudinally contractible and expandable valve operating member secured to and communicating at its upper end with said tank; a substantially rigid tubular member extending through said valve operating member coaxially therewith and fixed to said tank in communication therewith, said tubular member and said valve operating member together defining an annular chamber; an outwardly extending annular flange secured to the lower end of said tubular member for normally closing the lower end of said annular chamber, said flange being provided at its periphery with a first valve seat for normally receiving the lower end of said valve operating member; a second valve seat provided on said annular flange in axial alignment with said tubular member; a tubular extension mounted on the lower end of said valve operating

member and provided with at least one valve port normally located immediately below said first valve seat; an upwardly extending pin supported from said tubular extension coaxially with said second valve seat; a sleeve surrounding the upper end of said pin, the upper end of said sleeve being closed and its lower end being provided with a valve closure member arranged normally to seat on said second valve seat thereby to close off the lower end of said tubular member; a resilient can closure plug fixed to and surrounding said valve operating member immediately above its lower end; and means for biasing said valve operating member towards an expanded position.

2. A can filler comprising: a tank; an open ended, hollow, longitudinally contractible and expandable valve operating member secured to and communicating at its upper end with said tank; a substantially rigid tubular member extending through said valve operating member coaxially therewith and fixed to said tank in communication therewith, said tubular member and said valve operating member together defining an annular chamber; an outwardly extending annular flange secured to the lower end of said tubular member for normally closing the lower end of said annular chamber, said flange being provided at its periphery with a first valve seat for normally receiving the lower end of said valve operating member; a second valve seat provided on said annular flange in axial alignment with said tubular member; a tubular extension mounted on the lower end of said valve operating member and provided with at least one valve port normally located immediately below said first valve seat; an upwardly extending pin supported from said tubular extension coaxially with said second valve seat; a valve closure member normally seated on said second valve seat and arranged to be unseated in response to upward movement of said valve operating member; a resilient can closure plug fixed to and suurrounding said valve operating member immediately above its lower end; and means for biasing said valve operating member towards an expanded position.

3. A can filler such as defined in claim 2 wherein said valve operating member is provided at a point immediately above said can closure plug with an outwardly extending flange serving to support the upper end of said plug.

4. A can filler such as defined in claim 3 wherein an annular resilient liner is disposed between the said outwardly extending flange of said valve operating member and said can closure plug and wherein said plug is provided with an air vent passageway extending from its inner face to atmosphere.

5. A can filler as defined in claim 2, wherein said longitudinally contractible and expandable valve operating member includes a pair of telescoping cylinders.

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