Oct. 1, 1957 L. F. NORRIS ET AL 2,808,185

PINCHCOCK VALVE MECHANISM WITH WELL-MOUNTING FOR REFRIGERATED LIQUID DISPENSING APPARATUS

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FIG. 1

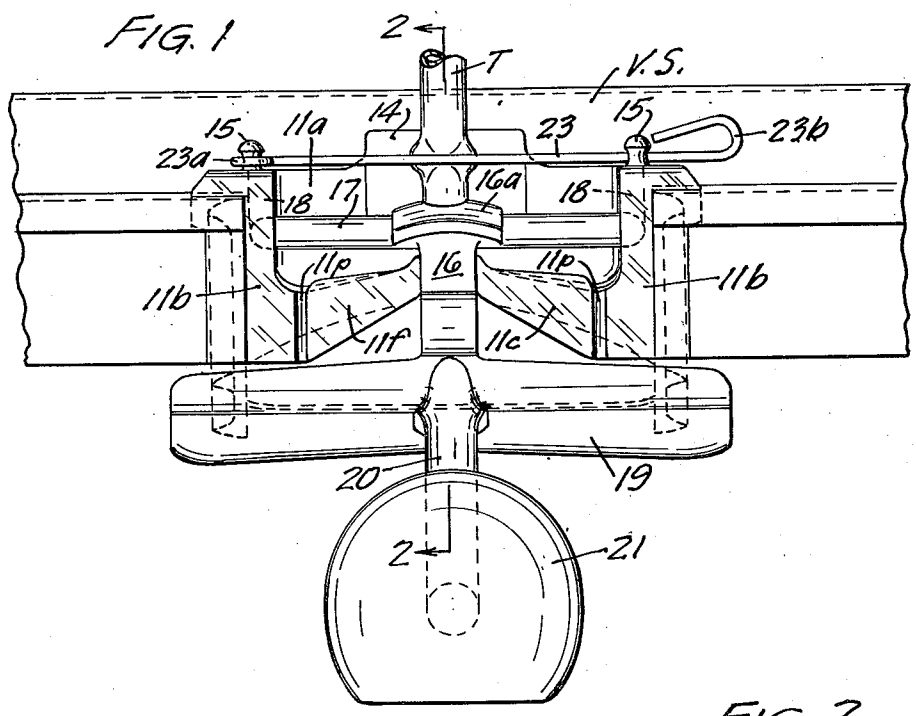


FIG. 10

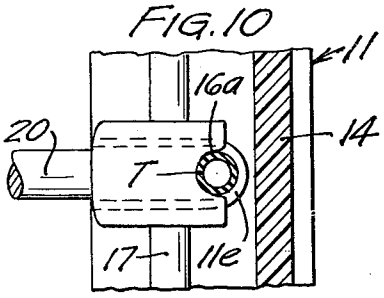


FIG. 2

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FIG. 3

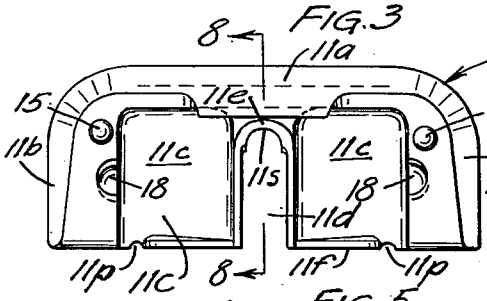


FIG. 4

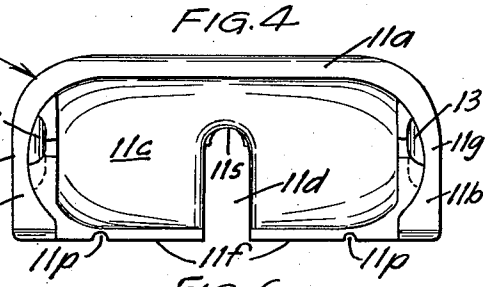


FIG. 5

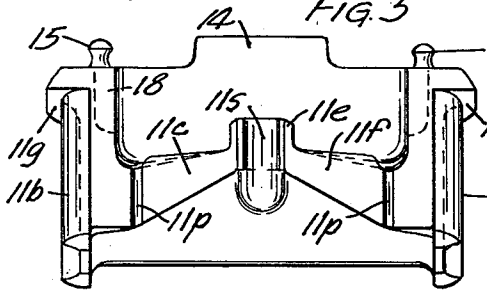


FIG. 6

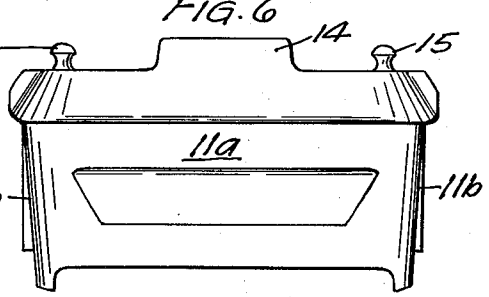


FIG. 7

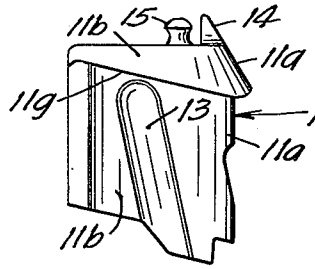


FIG. 8

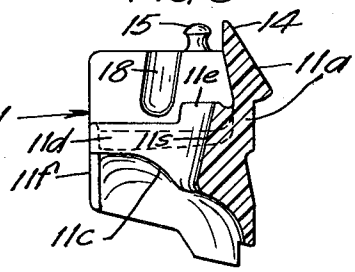
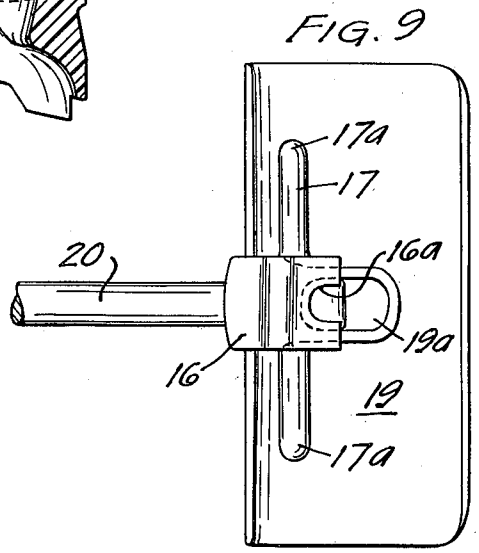


FIG. 9



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2,808,185

PINCHCOCK VALVE MECHANISM WITH WELL-MOUNTING FOR REFRIGERATED LIQUID DISPENSING APPARATUS

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Application March 14, 1956, Serial No. 571,466

7 Claims. (Cl. 222—556)

This invention relates generally to refrigerated, bulk-liquid-dispensing apparatus and more particularly to a substantially improved pinchcock valve mechanism including a valve-carrying and actuating unit and a combination well and mounting for the same having cooperative multifunctions in combination with the flexible dispensing tube associated therewith.

Refrigerated bulk-liquid-dispensing apparatus of the general type of the apparatus of the instant application, is disclosed in our United States Letters Patent Number 2,601,319, employing a refrigerated cabinet within which a bulk-liquid container is mounted, said container having connected with the lower portion thereof, a sterilized, flexible dispensing tube which has its lower end passed through a pinchcock valve device mounted in the lower and forward portion of the cabinet and controllable from the exterior thereof. The dispensing apparatus of our previous patented construction has received wide and favorable acceptance in commercial markets.

However, no positive provision was made in such structures for preventing downward flow of moisture condensation exteriorly of the dispensing tube and to the lower end thereof. Some contamination was thus possible.

Furthermore, when such apparatus was subjected to high ambient temperatures, the medial and lower portion of the dispensing tube confined within the valve structure and extending therebelow, would not be fully refrigerated and when infrequently used, would sometimes warm to such an extent, that the residual milk therein would sour, increasing bacteria and sometimes to some extent, contaminating the tube.

It is a general object of our present invention to provide a highly sanitary and substantially improved pinchcock valve device and a combined mounting and valve well therefor, to the ends that the foregoing objections to our previous apparatus are eliminated; that the entire mechanism may be readily taken apart without use of tools and sterilized and that transmission of condensate from the upper portion to the lower portion of the dispensing tube is eliminated, while the entire dispensing tube is subjected to the maximum refrigeration temperature within the cabinet.

More specifically, it is an object to provide a pinchcock valve mechanism of the class described of highly efficient and extremely simple construction, permitting easy replacement of the bulk containers and providing an enlarged valve well and tube-retaining mounting in direct communication with the refrigerated chamber for insuring chilling of the air immediately surrounding the entire tube and furthermore, providing condensation collection and drainage features.

Still a further object is the provision in a device of the class described where in operation the opening of the pinchcock valve may be readily controlled by an attendant from the exterior of the locked cabinet, with the further provision that when desired, a simple, manually

settable tube clamp may be set from within the open cabinet prior to locking the door thereof, thereby preventing theft of the dispensable liquid and also, facilitating cutting of the sealed end of the tube when a fresh container and its tube is installed in the cabinet.

These and other objects and advantages of our invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a front elevational view with the door open of a refrigerated cabinet, having an embodiment of our mechanism applied operatively thereto;

Fig. 2 is a vertical section through the lower portion of a refrigerated cabinet showing our improved pinchcock valve mechanism and mounting operatively applied thereto and in sectional view on a line **2—2** as shown in Fig. 1, the door of the cabinet being closed in sealed position;

Fig. 3 is a top plan view of the combined valve well and mounting member detached;

Fig. 4 is a bottom plan view of the same;

Fig. 5 is a front elevation of said valve well and mounting member detached;

Fig. 6 is a rear elevation of the same;

Fig. 7 is a right hand elevation of the same;

Fig. 8 is a cross section taken substantially on the line **8—8** of Fig. 3;

Fig. 9 is a top plan view of the valve-providing and actuating units detached, with the forward portion of the lever arm and the actuating weight broken away; and

Fig. 10 is a horizontal cross section substantially along the line **10—10** of Fig. 2 illustrating the cooperation of the tube-engaging lip on the valve unit and the lip and socket of the well-forming member to remove and strip condensate from the tube in the downward travel thereof.

Referring now to the form of the invention illustrated in the drawings, our valve mechanism with cooperative well mounting is applied to a type of refrigerated bulk-liquid-dispensing cabinet, only a part of which is illustrated in the drawings (see Figs. 1 and 2), which may be of the general type illustrated in our Patent No. 2,601,319. The said refrigerated cabinet, indicated as an entirety by the letter C is provided with the conventional, heavily insulated swinging door D at the front thereof which has a rectangular compressible, usually rubber, gasket or seal at the inner peripheral edge thereof, adapted to make sealing engagement with suitable facing and edge on the door-receiving portion at the front of the cabinet. The cabinet C is provided with a forwardly extending, valve-mounting step VS at the bottom proper of the cabinet, but spaced some distance above the lower end thereof for convenient attachment of the pinchcock valve mechanism.

A recess is formed in the construction of valve-mounting step VS of oblong shape to accommodate and support the combintion well and valve-mounting member of our improved constructure. Our said well and mounting member illustrated in detail in Figs. 3 to 8 of the drawings, and designated as an entirety by the number **11**, is preferably constructed of material having relatively low heat conductivity, such as plastics of very suitable types including Lucite. Well member **11**, in plan view, is generally of oblong, rectangular shape but has a well formed in the upper portion thereof and defined by a rear, upstanding wall **11***a* and joining end walls **11***b*. The front side of the upper portion of member **11** is open and a bottom, intermediate of the height of said member is provided, indicated as **11***c* and having formed therein, a central, inwardly extending tube-receiving slot **11***d* which is open at its forward end and which at its

inner end is provided with a semi-cylindrical valve seat for accommodating and partially encircling a downwardly extended, flexible dispensing tube. The said seat **11***s* is of a height substantially greater than the thickness of the medial portion of bottom **11***c* of the member and is defined at its upper portion by a boss **11***e* which is clearly shown in Fig. 3 and has an inward, arcuate portion with slightly offset portions emerging from the same into the parallel sides of the tube-accommodating slot **11***s*. The boss **11***e*, see particularly Fig. 5 and Fig. 2, extends for some distance above the adjacent portion of the bottom **11***c* of the well member, for a cooperating condensation-removal feature hereafter to be fully described.

It will be noted that from the upstanding condensation-removal boss **11***e*, the bottom **11***c* of our well member slopes outwardly towards the ends **11***b* of the member and also, slopes forwardly as clearly shown in Fig. 5. Vertical drainage passages **11***p* are cut into or otherwise formed in the forward face **11***f* of body member **11**, communicating with the lowermost and end portions of the sloped bottom of the member previously described. The said forward face **11***f* of member **11** is substantially planar with the exception of said drain passages or grooves **11***p* and is positioned in attachment of the member **11** to the valve mounting step to be engaged by the gasket S on the cabinet door D, making sealed engagement therewith and also, the gasket contacting the entire forward face of the valve step at the sides of the recess formed for attachment of our member **11**.

Any suitable means of attachment of member **11** may be provided, but we prefer to have such attachment in sealed relation to the valve step VS. To this end, at the end and rear wall of the valve member, a downwardly sloping, outwardly extending mounting flange **11***g* is provided, which is adapted to be supported on a suitable shelf flange **12** in the recessed portion of the valve step, as shown, the member **11** being secured to said flange through the intermediary of an efficient bonding material or cement to provide a sealed relation between such parts.

While the same constitutes no vital part of our invention, alignment grooves **13** may be provided in the end of the plastic body **11** for fitting complementary ribs fashioned in the side or end portions of the valve mounting step VS. Likewise, as shown in Fig. 6, the rear and inward wall of the combination well and mounting member **11** may be contoured by an intermediate beveled or inclined surface to most adequately shed condensed moisture in a downward direction.

It will be seen by inspection of Figs. 4 and 5, that the lower surface of the bottom **11***c* of well member **11** is contoured and sloped downwardly from the central portion thereof at the tube-receiving slot **11***b* to facilitate the drainage of any condensation moisture outwardly towards the ends of the member and downwardly.

It will be seen from Fig. 5, that the central portion of the rear wall **11***a* of well member **11**, is extended up to form a substantially vertical lip **14** which has a cooperative function with a manually settable tube-clamping member, later to be described. In this connection, the end walls **11***b* of the well member support upstanding studs **15** for anchoring of said clamping member, as will be later described, the positioning of said studs **15** being in a plane slightly forward of the front surface of the lip **14**.

We provide an economical and highly efficient valve-providing and actuating unit comprising, in the form shown, a central and upwardly disposed head **16** (see Figs. 1, 2 and 9) which has rigidly connected to the upper portion thereof, a relatively large cross pin **17** constituting trunnion connections for the detachable mounting of said valve-providing and actuating member with the combination valve well and mounting member **11**. The outer extremities **17***a* of said cross pin **17** as trunnions, fit into opposed, open ended channels **18** formed in opposing relation upon the inner faces of the end walls **11***b* of well member **11**, said channels being open at their upper ends for ready insertion of the pin extremities **17***a* therein. Head member **16** has at its upper end, just above the trunnions **17**, an inwardly projecting flange **16***a* which is recessed arcuately in a complementary manner to the contour of approximately half of the diameter of the flexible dispensing tube T and positioned oppositely and above the bossed condensation-removing portion **11***e* of the well member **11**, said lip **16***a* being adapted, through light contact engagement with the tube, to cooperate with the upper edge of the element **11***e* in cutting off and diverting any descending water condensate from the tube thereabove.

At some distance below the axis of the trunnion cross pin **17**, a valve element **16***b*, in the form of an inwardly projecting lip of cross-sectional shape, shown in Figs. 2 and 9, is integrally formed or otherwise rigidly connected with head **16** opposed to and adapted to cooperate with the lower portion of the channel or socket **11***e* of the well member and in the downward movement of the valve unit to collapse and close the lower end of the flexible tube, adjacent the extremity thereof, as clearly shown in Fig. 2.

Head member **16**, at its lower end, has rigidly attached thereto a bottom protector plate **19** which is of rectangular shape, as shown in Figs. 2 and 9, and which has a relatively wide, central slot **19***a* therethrough for accommodating the stream of dispensed liquid when the valve is open. The slot **19***a* also may accommodate the extended length of the sterilized tube before the new container has been set up, installed, and the plugged or sealed lower end or extremity of the tube severed before putting the dispensing device into operation.

Plate **19**, it will be noted, in the normal closed position of the valve declines from front to rear and is concaved somewhat on the upper surface thereof and is, furthermore, sloped from the medial slotted portion thereof to the ends for facilitating drainage of any condensing moisture or other fluids thereon.

A forwardly extending lever arm **20** extends first downwardly and then outwardly from the head member **16**, carrying at its outer end an actuating weight **21** which is shown of substantially spherical shape. The effect of this weight and lever arm upon the balance of the valve unit is to swing the entire unit downwardly and rearwardly on the axis of the trunnions **17**, thereby pinching the lower end of the flexible tube T and completely restricting and closing the same while, at the same time, causing the lip **16***b* with its arcuate fashioned wiping edge, to engage and slightly compress the forward side of the tube a short distance above the end thereof. In such position, however, it will be noted (see Fig. 2) that the tube is guided and held away from the upper portion of the rear wall with air completely surrounding the same and with the well at the top of member **11**, giving free communication to the full refrigeration within the cabinet. In Fig. 2, a simple, manually-settable tube clamp is illustrated in operative position, comprising a straight rod **23** having an eye or loop **23***a* at one end thereof which surrounds the left hand stud **15** of the valve well member and having its opposite end looped to form a convenient handle **23***b*. The rod **23** is substantially rigid and when it is pressed rearwardly as shown in Fig. 2, with the handle portion interlocked behind the right hand stud **15**, it cooperates with the upstanding lip **14** at the rear wall of the plastic well member to completely collapse and clamp the tube T in closed position, as shown in Fig. 2. The clamp is readily releasable by dislodging the handle portion from behind the right hand stud **15**.

In Fig. 10, the cooperation of the condensation removal lip **16***a* on the head member of the valve unit with the boss or lip **11***e* forming a part of the tube socket, is

well illustrated, the valve unit being normally disposed in its closed position. In such position, the tube is slightly compressed or deformed into an oval position or shape through the contact of the semi-circular lip **16***a* at the forward portion of the tube and the engagement of the interior of the boss **11***e* at the rear and slightly below 180 degrees of the circumference of the tube. Any condensate tending to drip downwardly from the upper portion of tube T is engaged and deflected either by the lip **16***a* or by the boss edge **11***e*, such condensate because of the elevation of said lip and boss being deflected and dripping downwardly and outwardly away from the tube and the tube socket.

In the successive operation of the valve, a further condensate removal function is obtained, since in each slight lifting of the actuating arm **20**, the tube is struck slightly and further deformed, thereby tending to remove any small droplets of condensate is such action from time to time. All of the surfaces of the valve well member as well as the head and lip **16***a* as a valve unit, are sloped and positioned to drain condensate outwardly and downwardly from the points where it is stripped off from the tube T.

It will be readily seen that the entire valve unit may be bodily removed from the combined valve well and mounting **11**, by merely lifting of the head and the cross pin **17** which furnishes the trunnion, from the well. Thereafter, the entire valve head unit as well as the well may be readily sterilized.

With our combination of valve well and valve unit as described and illustrated, the lowest portion and consequently, the coldest portion of the entire refrigeration chamber immediately surrounds the lower portion of the flexible tube T whereby substantially the entire tube is subjected to the intense refrigeration within the cabinet. The lower extremity of the tube in operation is partially in contact with the metal head **16** of the valve unit which is maintained at a temperature substantially that of the cold air in the refrigeration chamber. With our said construction, there is no chance even in very high outside temperatures, of residual milk or other liquid within tube T, becoming heated or bacteria-infested.

Furthermore, from the foregoing description, it will be seen that we have provided simple but highly efficient pinch valve mechanism and valve well and mounting member therefor, which will prevent downward travel of condensation from the intermediate or upper portions of the tube to the lower and discharge end thereof.

It will of course be understood that various changes may be made in the proportions, details and arrangement of parts without departing from the scope of applicants' invention.

What is claimed is:

1. A pinchcock valve mechanism for use with a refrigerated liquid dispenser of the type employing a flexible dispensing tube and a dispenser cabinet, said mechanism comprising a valve well and mounting member for attachment to the lower front portion of the dispenser cabinet and defining an open-topped well having a substantially horizontal bottom portion, said portion having a tube-accommodating recess therein, an upstanding channel at the inner end of said recess shaped to partially surround said flexible tube and constituting a valve seat, a shiftable pinch valve unit mounted in the upper portion of said well and having an inwardly protruding, lip-type valve element opposed to said seat and having at a point some distance above said lip valve an inwardly projecting flange having an upstanding concave, arcuate edge for engaging the forward portion of said tube, said well having a semi-boss disposed in opposed relation to said arcuate edge for encircling and engaging the rear portion of said tube to cooperate with said arcuate edge in intercepting and removing any downwardly moving condensation from above said areas of contact.

2. The structure set forth in claim 1, and said tube-accommodating recess being defined at its inner end by an upstanding channel portion formed in said well, said channel portion constituting said upstanding valve seat and terminating at its upper end in said semi-boss for cooperating and intercepting condensation.

3. A pinchcock valve mechanism for use with a refrigerated liquid dispenser of the type employing a flexible dispensing tube and a dispenser cabinet, said mechanism comprising a valve well and mounting member for attachment to the lower front portion of the dispenser cabinet and defining an open-topped wall in open communication with the refrigerated air within said cabinet, said well having an open front, rear and end walls and a bottom portion, said bottom portion having a tube-accommodating recess therein defined at its inner end by an upstanding channel, said channel being shaped to partially surround said tube adjacent its lower extremity while also constituting an upstanding valve seat, a shiftable pinch valve unit mounted in the upper portion of said well and having an inwardly protruding, lip-type valve element opposed to said seat and also having at a point above said lip valve an inwardly projecting flange having an upstanding concave arcuate edge for engaging the forward portion of said tube, said well having an arcuate upstanding edge projecting from the rear wall thereof in opposed relation to the arcuate edge of said flange for encircling and engaging the rear portion of said tube to cooperate with said first edge in intercepting and removing any downwardly moving condensation from above said areas of contact, said tube with the exception of said contacted areas being subjected to the refrigerated air within said dispenser cabinet and within said well.

4. A pinchcock valve mechanism for use with a refrigerated liquid dispenser of the type employing a flexible dispensing tube and a dispenser cabinet, said mechanism comprising a valve well and mounting member for attachment to the lower front portion of the dispenser cabinet and defining an open-topped well in open communication with the refrigerated air within the bottom of said cabinet, said well having a substantially horizontal bottom portion provided with an inwardly extending tube-accommodating recess and also having an upstanding valve seat for engagement with the inner side of the tube, a weight-actuated pinch valve unit mounted in the upper portion of said well and having an inwardly protruding valve element opposed to the valve seat, said well and its tube-accommodating recess positioning said tube in spaced relation to the walls of said well and substantially completely exposed to the refrigerated air within the bottom portion of said cabinet.

5. The structure set forth in preceding claim 4, further characterized by said valve unit having an inwardly extending protector plate of general configuration similar to the plan configuration of said well and disposed below said well and having a transverse slot for permitting passage of liquid discharged from said tube.

6. A pinchcock valve mechanism for use with a refrigerated liquid dispenser of the type employing a flexible dispensing tube and a dispenser cabinet, said mechanism comprising a valve well and mounting member for attachment to the lower front portion of the dispenser cabinet and defining an open-topped well in open communication with the refrigerated air within the bottom of said cabinet, said well having a lower closure portion with accommodations for the lower end of a dispensing tube and also having a concave valve seat adjacent the same, a pinch valve unit mounted in the upper portion of said well and having an inwardly protruding valve element opposed to said seat, said well exposing said tube with the exception of the lower extremity thereof to the refrigerated air within the bottom portion of said cabinet.

7. The structure set forth in claim 6, further characterized by said well having in the end portions thereof opposed upwardly extending trunnion-receiving slots and

said valve unit having a cross pin in the upper portion thereof of a length to span said slots, the ends of said cross pin constituting trunnions for said valve unit to facilitate ready detachment of said unit from said well and said unit having a forwardly extending lever arm with an actuating weight mounted at the forward end thereof.

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