

Jan. 15, 1957

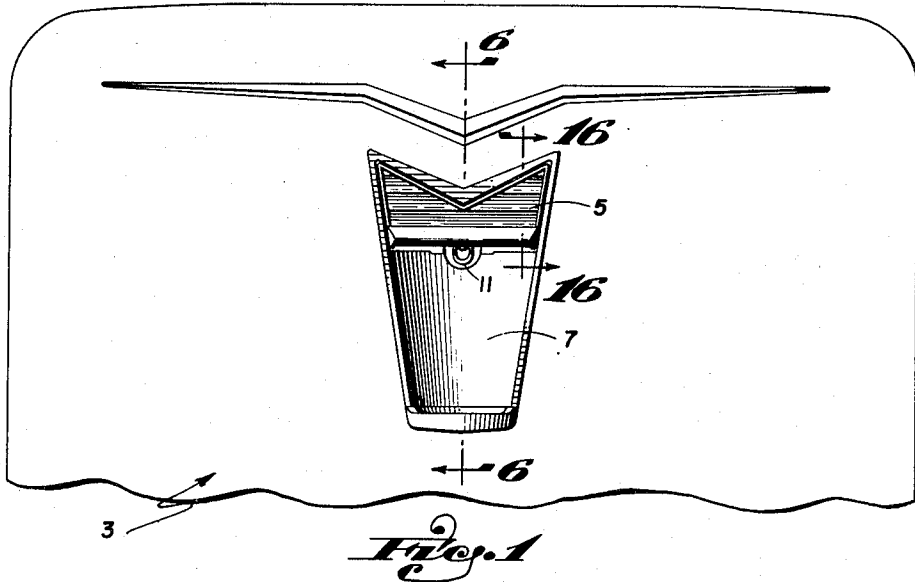
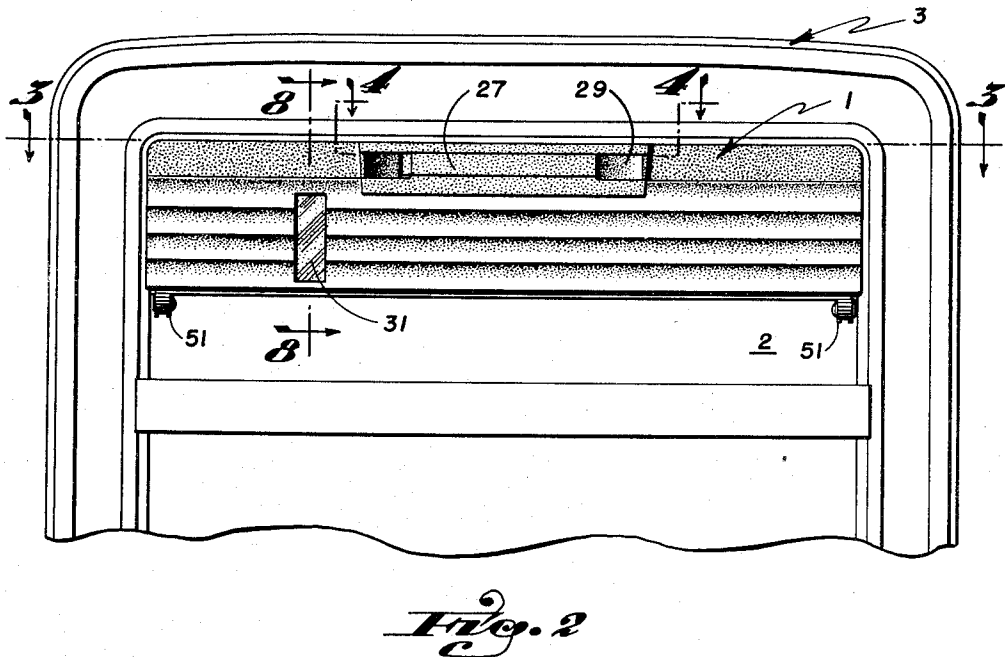
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2,777,304

WATER DISPENSER FOR REFRIGERATOR

Filed Dec. 9, 1953

6 Sheets-Sheet 1



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WATER DISPENSER FOR REFRIGERATOR

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6 Sheets-Sheet 2

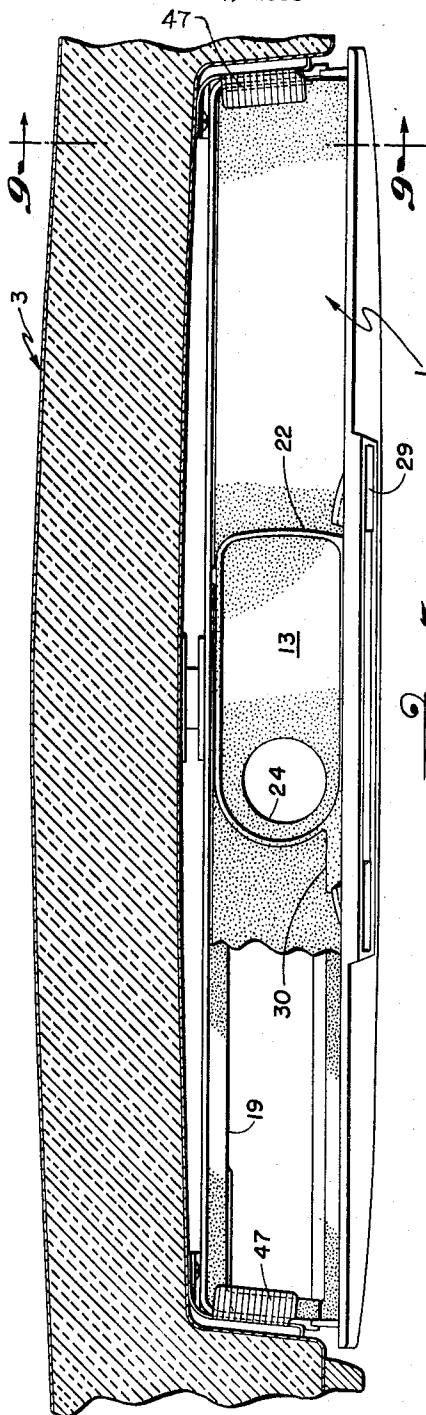


Fig. 1

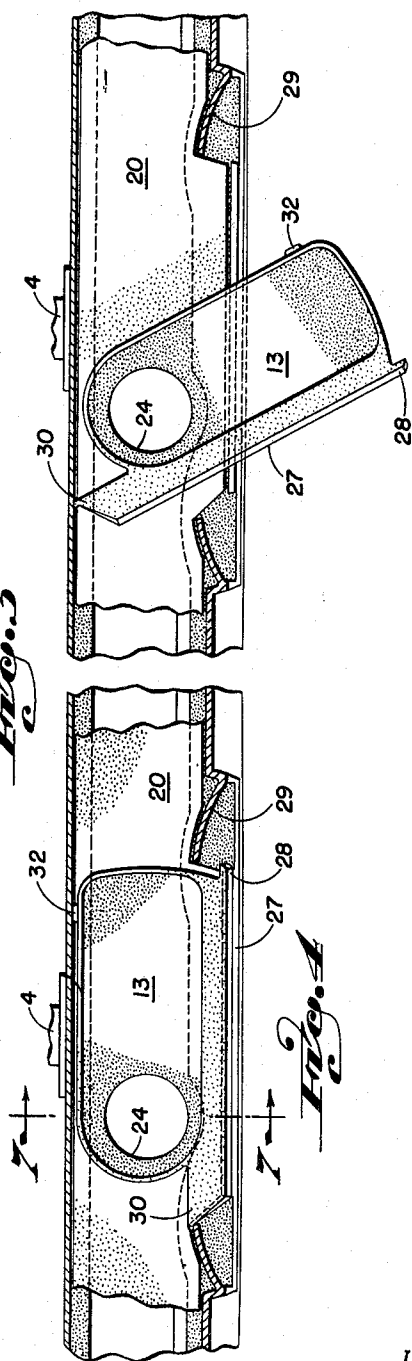


Fig. 2



Fig. 3

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6 Sheets-Sheet 4

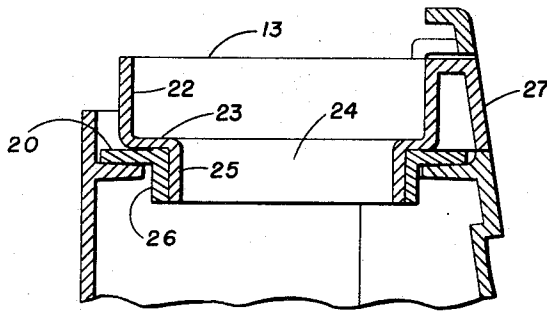


Fig. 7

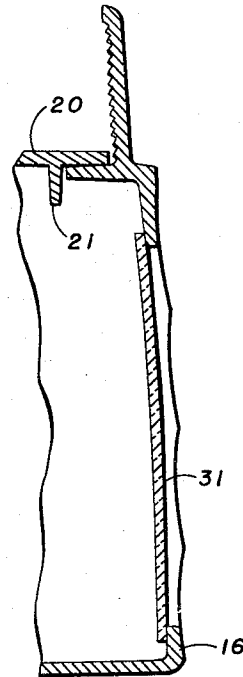


Fig. 8

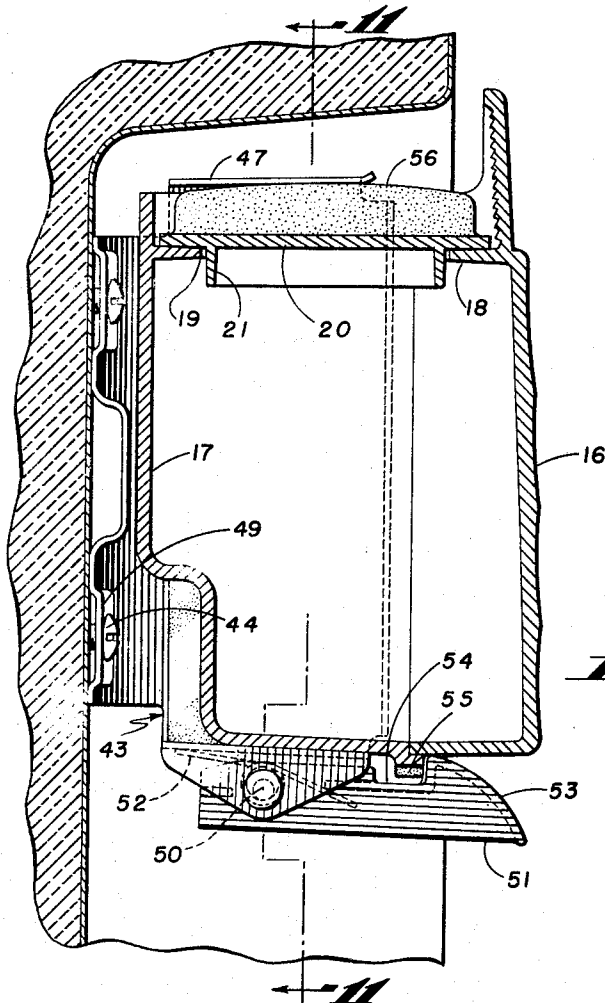


Fig. 9

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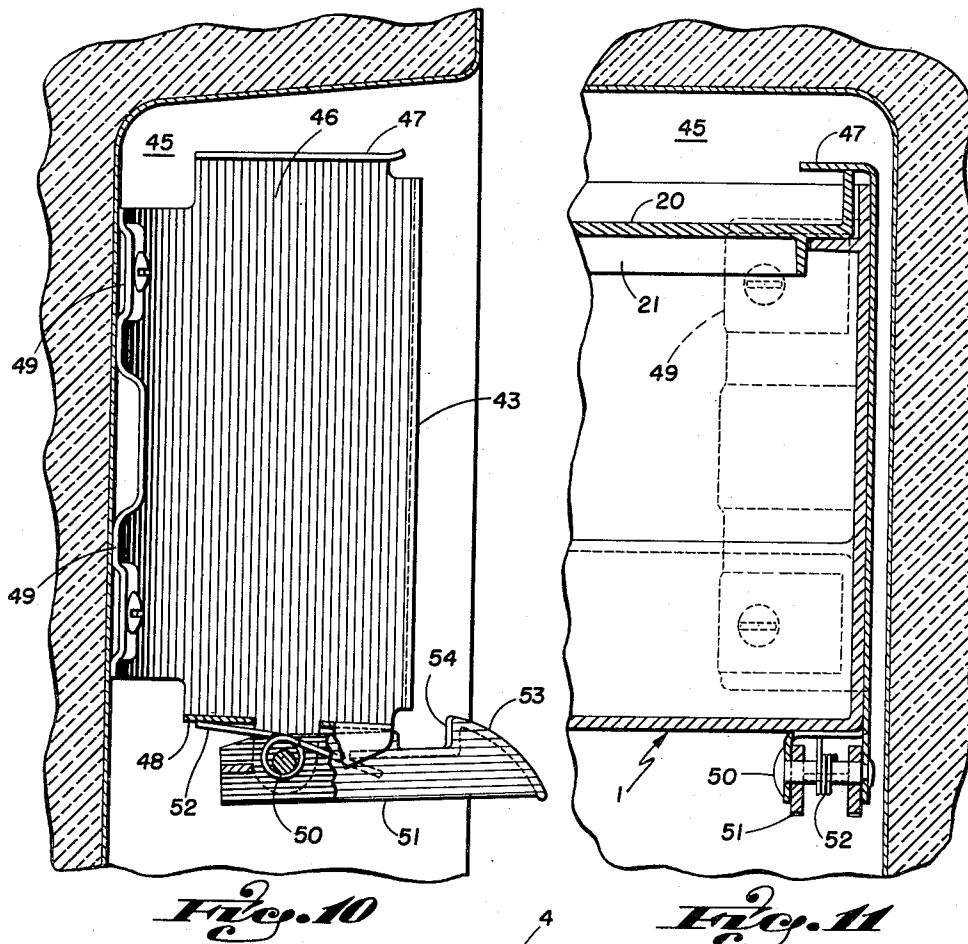
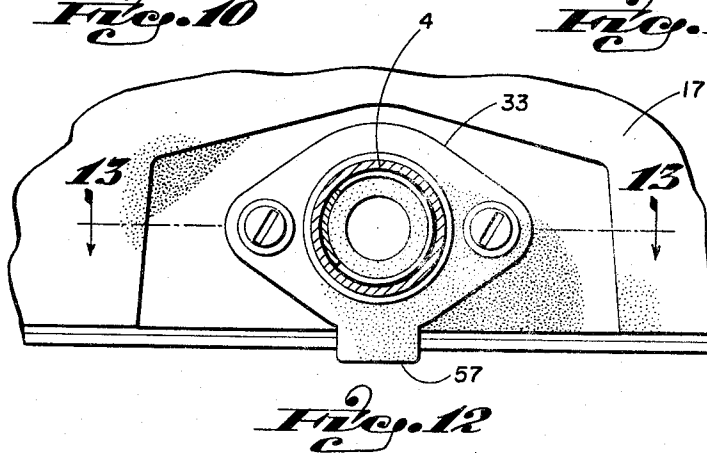
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WATER DISPENSER FOR REFRIGERATOR

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6 Sheets-Sheet 5



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WATER DISPENSER FOR REFRIGERATOR

Filed Dec. 9, 1953

6 Sheets-Sheet 6

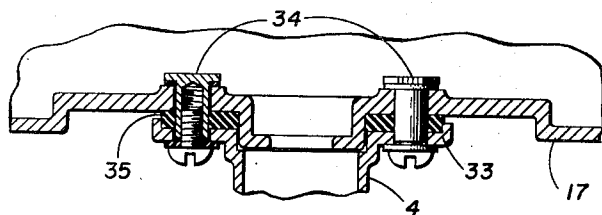


Fig. 13

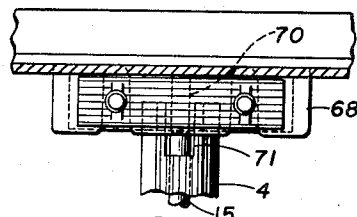


Fig. 14

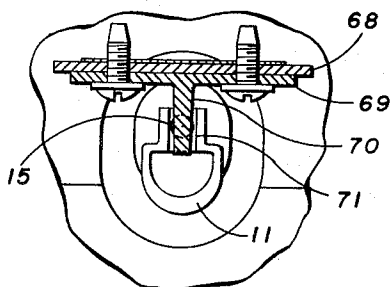


Fig. 15

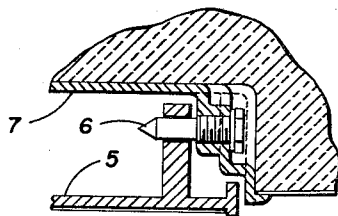


Fig. 17

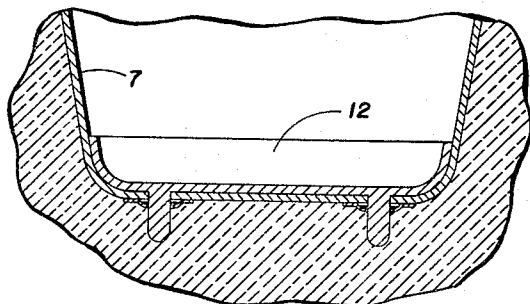


Fig. 18

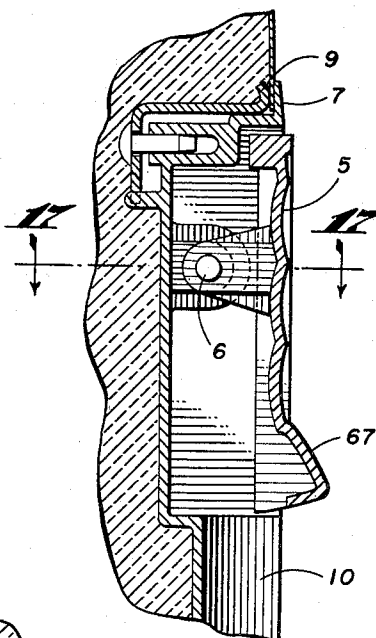


Fig. 16

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WATER DISPENSER FOR REFRIGERATOR

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Application December 9, 1953, Serial No. 397,192

5 Claims. (Cl. 62—141)

The present invention relates to a water dispenser and, more particularly, to a water dispenser designed for installation in a refrigerator door whereby drinking water cooled within the refrigerator can be readily dispensed by means located on the exterior of the refrigerator.

Broadly considered, water dispensers for refrigerators are not new but such dispensers have not been used widely because of inherent shortcomings which have prevented ready acceptance by the consuming public. Nevertheless, there is considerable evidence that the public desires water dispensers built into refrigerators to make it possible to obtain cool water conveniently with a minimum of effort. The present invention has been devised to meet this demand and provides a storage and dispensing mechanism which is simple, convenient, and attractive as well as economical to produce.

Briefly stated, the present invention comprises a water tank releasably attached to the inner liner of a refrigerator door and having a discharge spout extending through the door into cooperative engagement with a spring-loaded pushbar which, when actuated, permits flow of water through the spout into a drinking glass or other receptacle placed adjacent the spout at the exterior of the refrigerator door. The pushbar is pivotally attached to an escutcheon plate, secured to the shell of the refrigerator door, which defines a shallow well for receiving the drinking glass. In the course of its movement, the pushbar engages a spring-loaded valve which controls the flow of water from the water tank.

The invention comprehends the provision of improved means for sealing the spout where it extends through the insulation within the refrigerator door.

The preferred embodiment of the present invention also includes an inlet conduit pivotally connected to the water tank whereby the conduit may be swung away from the refrigerator door and the tank may be filled with water while it is in its assembled position on the door.

In view of the foregoing, it is obviously a broad object of the present invention to provide an improved drinking water dispenser for a refrigerator or similar appliance.

Another object of the invention is the provision of an improved water tank which may be filled while assembled on a refrigerator door and which may be readily removed and disassembled for cleaning purposes.

A further object of the invention is the provision of improved sealing means for the discharge spout of a water dispenser.

Another object of the invention is the provision of a spring-loaded pushbar mechanism located on the exterior of a refrigerator door which may be actuated to release drinking water from a tank stored within the refrigerator

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for so that it may flow through a discharge nozzle to the exterior of the refrigerator.

A broad object of the invention is the provision of an improved water tank assembly which may be releasably attached to the inner liner of a refrigerator door so as to be housed substantially within a recess formed in the door liner. An advantage of the invention is that the tank enhances the appearance of the door without detracting significantly from the useful volume of the refrigerator.

An important object of the present invention is the provision of means for dispensing cooled drinking water at the exterior of a refrigerator door without necessitating opening of the door.

The novel features that are considered characteristic of the invention are set forth in the appended claims; the invention itself, however, both as to its organization and method of operation together with additional objects and advantages thereof, will best be understood from the following description of the preferred embodiment when read in conjunction with the accompanying drawings, in which:

Figure 1 is a front elevational view of the upper portion of the exterior of a refrigerator door showing the present invention in assembled relationship with the door;

Figure 2 is an elevational view of the interior of the door showing the water tank releasably attached thereto;

Figure 3 is a cross sectional view taken on plane 3—3 of Figure 2 showing the water tank in plan view, a portion of the cover of the water tank being broken away to illustrate the interior construction of the tank;

Figure 4 is a fragmentary cross sectional view taken on plane 4—4 of Figure 2 showing the inlet conduit in closed position above the tank;

Figure 5 is a fragmentary view corresponding generally to Figure 4 but showing the inlet conduit in the position assumed when the tank is being filled;

Figure 6 is a vertical sectional view of the water dispenser taken on plane 6—6 of Figure 1;

Figure 7 is a cross sectional view of the inlet conduit in assembled relationship with the tank taken on plane 7—7 of Figure 4;

Figure 8 is a cross sectional view of a portion of the tank taken on plane 8—8 of Figure 2 and illustrating in cross section a transparent window through which the water level within the tank may be observed;

Figure 9 is a cross sectional view taken through the end of the tank adjacent one of the tank supports, the view being taken on plane 9—9 of Figure 3;

Figure 10 is a fragmentary, vertical sectional view through the upper portion of the refrigerator door showing in elevation one of the brackets for supporting the water tank;

Figure 11 is a longitudinal sectional view through the end of the water tank and one of its support brackets, the view being taken on plane 11—11 of Figure 9;

Figure 12 is a cross sectional view taken through the discharge spout attached to the water tank as viewed on plane 12—12 of Figure 6;

Figure 13 is a cross sectional view through the discharge spout taken on plane 13—13 of Figure 12;

Figure 14 is a horizontal cross sectional view through a portion of the pushbar taken on plane 14—14 of Figure 6;

Figure 15 is a vertical sectional view through a portion of the pushbar taken on plane 15—15 of Figure 6,

the view showing the end of the discharge spout in elevation;

Figure 16 is a vertical sectional view through the pivotal support of the pushbar taken on plane 16—16 of Figure 1;

Figure 17 is a horizontal sectional view of the pushbar pivot taken on plane 17—17 of Figure 16; and

Figure 18 is a vertical sectional view taken through the lower portion of the escutcheon plate, the view being taken on plane 18—18 of Figure 6.

General arrangement

With reference to Figures 1, 2, and 6, there is shown a water dispenser including a water tank, generally designated 1, which is releasably secured to liner 2 of a refrigerator door, generally designated 3. The water tank includes a discharge spout 4 which extends through the door into engagement with a pushbar 5, the pushbar being pivotally attached at 6 to an escutcheon plate 7 which is clamped to outer shell 8 of the refrigerator door by means of a plurality of brackets 9 which are bolted to the rear of the escutcheon plate. Viewed from the exterior of the refrigerator door, the escutcheon plate 7 is concaved, as indicated at 10, to define a shallow well in the face of the refrigerator door for receiving a drinking glass (not shown), or similar receptacle, which may be disposed beneath lip 11 of discharge spout 4 to receive water released from water tank 1 by actuation of the pushbar 5. A small catch basin 12 may be permanently or releasably attached to the lower portion of the escutcheon plate to receive any water that may drip from lip 11.

The water tank may be filled through an inlet conduit 13 which is pivotally attached to the water tank, as will be described more fully hereinafter. Release of water from the water tank is controlled by operation of a control valve, generally designated 14, which is housed within the discharge spout 4. The valve includes a valve stem 15 which is forced into the discharge spout by the pushbar to effect release of water from the water tank.

Details of the water tank

The water tank 1 may be molded from plastic or any other suitable material. As indicated in Figure 6, the tank may be conveniently molded in halves as indicated at 16 and 17. These halves are cemented together to form a tank having an open top wall 18 defining a rectangular opening 19.

Within opening 19 there is positioned a removable plastic cover 20 having a continuous depending flange 21 for strengthening the cover and engaging rectangular opening 19 in top wall 18 of the tank.

Attention is now directed to Figures 3 through 7 which show the structural details of the inlet conduit 13. The inlet conduit has a shallow box-like formation including side walls 22 and a bottom wall 23 through which a filling opening 24 is formed. The filling opening is defined by a downwardly extending cylindrical wall 25 which is closely fitted within a correspondingly dimensioned cylindrical wall 26 formed integrally with cover 20, cylindrical walls 25 and 26 providing a pivotal connection for the inlet conduit to the water tank.

The conduit 13 also has molded integrally with it a face portion 27 which, as indicated in Figure 2, is commensurate with the decorative treatment of the water tank. The face portion is extended at one end, as indicated at 28, for engagement by the user's finger which may be inserted into a clearance space defined by curved wall 29 in the front of the tank. By engaging extension 28, the inlet conduit may be pivoted from the position shown in Figure 4 to that shown in Figure 5, pivotal movement of the conduit being limited by a stop member 30 which is molded integrally with the conduit.

When the conduit is positioned, as indicated in Figure 5, water may be poured into the conduit which conducts

the water through filling opening 24 and into the water tank 1.

The water level within the tank may be visually determined by means of a transparent window 31 which is sealed to the wall of the water tank (see Figure 2).

After the water tank has been filled, the inlet conduit may be returned to the position shown in Figure 4, another stop member 32 being provided on the conduit for engagement with the rear wall of the water tank.

As indicated in Figure 6, water flows from the water tank through the discharge spout 4. The discharge spout includes an integral flange 33 which is bolted, as at 34 (see Figure 13), to portion 17 of the water tank. A sealing gasket 35 may be clamped between flange 33 and the wall of the tank to form a watertight seal.

Formed integrally with spout 4 is a transverse wall 36 which defines a discharge aperture 37. Valve stem 15 extends through this aperture and bears a bib washer 38 which is movable into sealing relationship with aperture 37. The valve stem 15 is slidably guided by an integral portion 39 formed in the discharge spout.

Bib washer 38 is held in sealing engagement against aperture 37 by means of a conical spring 40 which engages the wall of the tank at 41 and exerts pressure on end 42 of valve stem 15. As will be understood by those skilled in the art, pressure applied to the end of valve stem 15 will compress spring 40 thereby forcing bib washer 38 away from aperture 37 and permitting a flow of water from the tank through the spout and past lip 11 from which the water flows to a drinking glass.

Tank mounting means

The tank is releasably attached to door liner 2 by means of two brackets, generally designated 43, which are bolted, as at 44, near the sides of recess 45 formed in the door liner. The brackets are illustrated in Figures 3, 9, 10, and 11. With particular reference to Figures 10 and 11, it will be noted that each bracket includes a planar end wall 46 having an upper intumed flange 47 and lower intumed flange 48. Each bracket also includes rear flanges 49 which are bolted to the door liner at 44, as has been explained.

As illustrated in Figure 3, a bracket 43 engages each end of the tank, the tank being supported on flange 48 on each of the brackets.

To each bracket 43 there is pivotally attached, as at 50, a latch 51 which is urged counterclockwise, as viewed in Figure 10, by a torsion spring 52. Each latch includes a rounded front end 53 and a notch 54. The water tank attached to the door is forced past front end 53 until projections 55 (see Figure 9) come into locked engagement with notch 54. When projections 55 are engaged with the spring-loaded latches, the tank is releasably but firmly attached to the door liner. The door may be slammed without dislodging the tank from its mounting.

When the tank is mounted on brackets 43, cover 20 is held securely against top wall 18 of the tank by means of flanges 47 on the brackets. These flanges engage elongated projections 56 which are formed integrally with and project above cover 20 of the water tank (see Figure 9).

The water tank may be removed from the door by applying a downward pressure to the spring-loaded latches 51 which, when disengaged from projections 55, will permit the water tank to be removed from the door for cleaning purposes.

Attention is now directed to Figure 12 which shows a projection 57 formed at the lower edge of flange 33 of the discharge spout 4. During the time that the tank is removed from the door it may be stood upon any flat surface, the tank resting on projections 55 and 57 which act as supporting feet.

Sealing means for discharge spout

As will be appreciated by those skilled in the art, it is

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important that ambient air be prevented from entering the refrigerator during the time that the door is closed. Any air leakage into the refrigerator results in loss of refrigeration and carries moisture into the refrigerator which deposits as frost on the evaporator. A unique construction has been provided to permit passage of discharge spout 4 through the door without disturbing the insulation and without leakage of ambient air into the refrigerator. Attention is now directed to Figure 6 which shows an inner and an outer rubber sealing washer 58 and 59, respectively. Both of these sealing washers engage grooves formed on the exterior surface of the spout, as indicated at 60 and 61, respectively.

The sealing washers are quite flexible and when the tank is assembled to the refrigerator door, the sealing washers yieldably engage fixed portions of the door structure. For instance, sealing washer 58 engages a flanged opening 62 formed in door liner 2 while sealing washer 59 yieldably engages a flange 63 formed on the rear wall of the escutcheon plate 7.

Surrounding the discharge spout is a plastic cup 64 which is engaged behind the flanges at 62 and 63 to retain the insulation 65 which is provided within the door to reduce heat leakage.

The yieldable engagement of the sealing washers with the structure of the door forms a double seal to prevent leakage of ambient air into the refrigerator and also forms a dead air space within cup 64, which also has insulating value.

Since sealing washer 59 is slightly smaller in diameter than the flanged opening 62, passage of washer 59 through the opening will not be impeded and the tank may be readily removed from or assembled to the door without disturbing the efficacy of the seal when the tank is assembled to the door.

At this time it may be well to note that the discharge nozzle is made from plastic or other non-conducting material; thus, transfer of heat from the ambient air to the water within the tank is retarded and sweating of the externally exposed portions of the discharge nozzle is minimized. Any condensation of moisture that may occur on the discharge nozzle will drip from lip 11 into the catch basin 12 at the bottom of the escutcheon plate.

Pushbar actuating mechanism

The details of the pushbar mechanism may now be considered. Attention is first directed to Figure 1 which shows the front elevational view of the pushbar 5 in assembled relationship with escutcheon plate 7. It will be noted that the pushbar, for appearance purposes, has a V-shaped upper portion which corresponds to the V-shaped formation of the escutcheon plate. At each side adjacent an extremity of the V-shaped formation, there is provided a pivot pin, indicated at 6 in Figures 16 and 17. The full cross sectional view of the pushbar is best indicated in Figure 16, the central cross sectional view of the pushbar being shown in Figure 6.

With reference to this latter figure, it will be noted that a compression coil spring 66 extends between the rear face of the pushbar and the escutcheon plate, this spring constantly urging the pushbar away from the face of the door. Pressure applied anywhere to the lower portion of the pushbar, as to face 67, will rotate the pushbar about its pivotal supports and compress spring 66.

Formed integrally on the rear wall of the pushbar is a transverse projection 68 to which is bolted a valve actuating member 69 (see Figure 15). Member 69 has a valve actuating element 70 which is positioned within slot 71 formed at the outer end of the discharge spout. Element 70 engages the end of valve stem 15, as illustrated in Figure 15, force applied to the pushbar being transferred to the valve stem by element 70. The position of element 70 within slot 71 is indicated by Figure 14.

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As will be understood by those skilled in the art, assembly of the water tank to the door will automatically bring the extended end of valve stem 15 into bearing engagement with element 70, as illustrated in Figure 6. Because of the force of spring 66, the pushbar normally does not exert any pressure against the valve stem, and valve 14 is not actuated to release water from the tank until the pushbar is pressed into the door by the user.

In conclusion, it will be recognized that the present invention provides an improved form of water dispenser for a refrigerator door and one which makes it possible for the user to obtain a glass of cooled drinking water without opening the refrigerator door. When the water tank has been assembled to the door and filled, it is merely necessary for the user to apply pressure to the pushbar which will actuate the valve 14 and release water from the tank through the discharge spout and into a receptacle held within the concavity of the escutcheon plate.

It is important to recognize that the water tank may be readily removed from the refrigerator door and disassembled for cleaning purposes, although it is not necessary to remove the tank in order to fill it with a supply of water.

The construction and arrangement of the tank and discharge spout are such that they automatically form an airtight seal with the structural elements of the refrigerator door so that leakage and heat transfer into the refrigerator are reduced to a bare minimum.

Having described a preferred embodiment of my invention, I claim:

1. A water dispenser for installation on a refrigerator door having an outer shell, an inner liner, and insulation therebetween, said shell, insulation, and liner defining aligned openings therethrough, said water dispenser comprising a water tank; brackets secured to the liner for releasably supporting said tank; an inlet conduit pivotally secured to said tank for movement between an extended filling position and a closed position above said tank; a discharge spout secured to and projecting from said tank through the openings defined by the liner, insulation, and outer shell; an escutcheon plate secured to said outer shell having an opening surrounding said discharge spout; an open-bottomed cup disposed between said escutcheon plate and the liner for retaining the insulation; sealing washers secured to said spout, one of said sealing washers yieldably engaging the liner, the other sealing washer yieldably engaging said escutcheon plate adjacent the opening therein; said sealing washers and open-bottomed cup defining an insulating dead air space surrounding said discharge spout; valve means within said spout, said valve means including a valve stem projecting outwardly from said spout; a spring-loaded pushbar pivotally secured to said escutcheon plate adjacent said valve stem; and means on said pushbar for engaging said valve stem.

2. Apparatus as defined in claim 1 in which said brackets include spring-loaded latch means for releasably engaging said tank and holding said tank in supported relationship with said brackets.

3. A water tank assembly comprising a plastic molded water tank having an open top wall, a cover including a depending flange engaging the opening in said top wall, a cylindrical wall secured to and depending from said cover, an inlet conduit including a depending cylindrical wall in engagement with said cylindrical wall of said cover, a filling opening being defined by said cylindrical wall of said conduit, the engagement of said cylindrical wall forming a pivotal connection between said inlet conduit and said cover, a discharge spout secured to said tank and projecting therefrom, and valve means within said spout.

4. Apparatus as defined in claim 3 and, in addition, a transparent window formed in one wall of said water tank.

5. A water dispenser for installation on a refrigerator

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door having an outer shell, an inner liner, and insulation therebetween, said shell, insulation, and liner defining aligned openings therethrough, said water dispenser comprising a water tank; brackets secured to the liner for releasably supporting said tank; an inlet conduit pivotally secured to said tank for movement between an extended filling position and a closed position; a discharge spout secured to and projecting from said tank through the openings defined by the liner, insulation, and outer shell; an escutcheon plate secured to said outer shell surrounding said discharge spout; means extending between said escutcheon plate and the liner for retaining the insulation;

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resilient sealing means on said spout for preventing ingress and egress of air past said insulation retaining means; valve means within said spout; and a pivoted spring-loaded pushbar on the exterior of said door in position to impart movement to said valve means.

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