

March 16, 1971

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3,570,201

DOOR STRUCTURE WITH A CLOSABLE BREATHER TUBE

Filed June 19, 1969

2 Sheets-Sheet 1

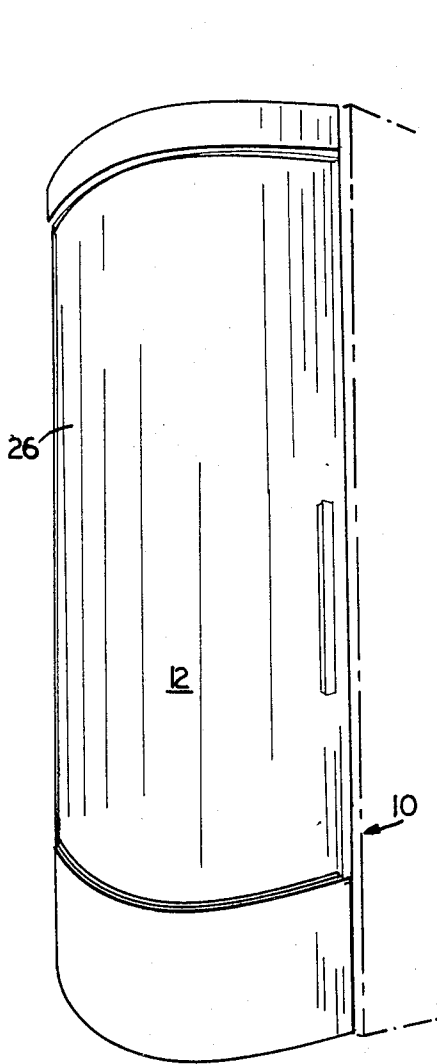


FIG_1

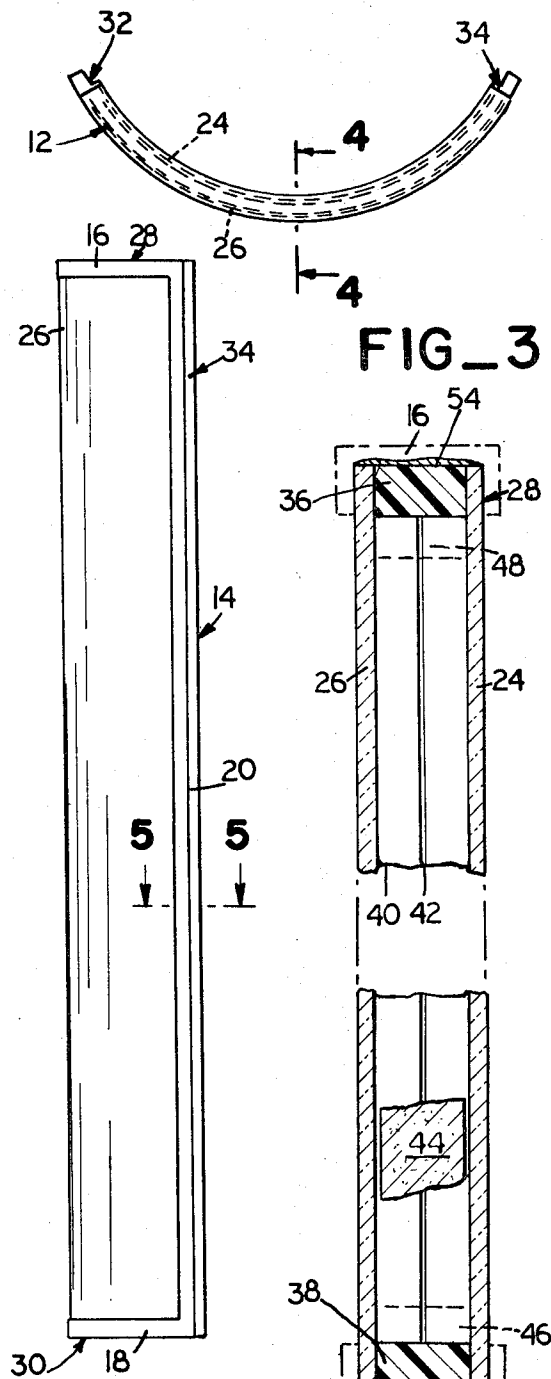


FIG_2

FIG_4

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2 Sheets-Sheet 2

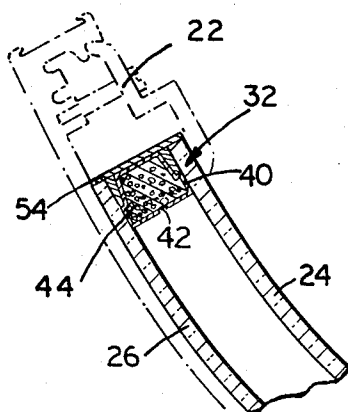


FIG_5

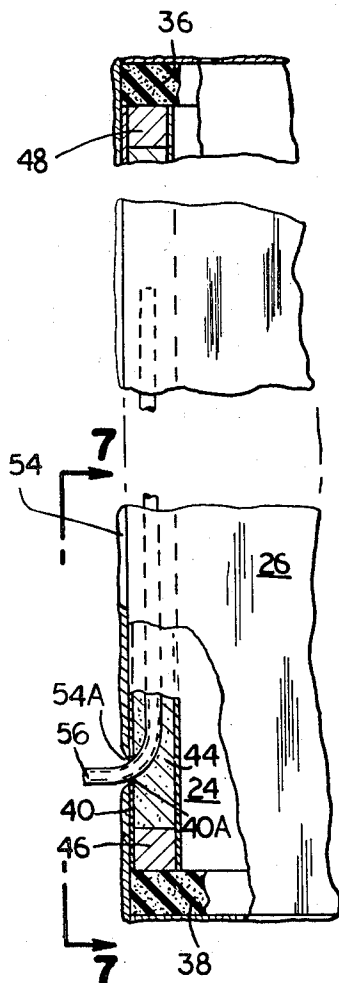
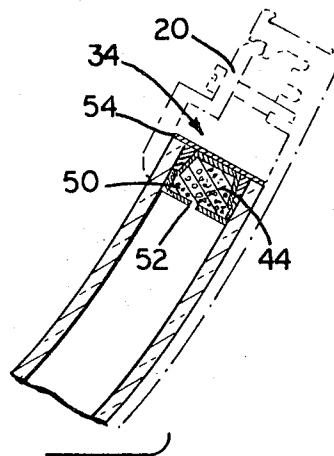


FIG_6

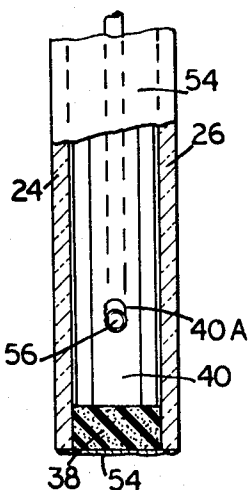


FIG_7

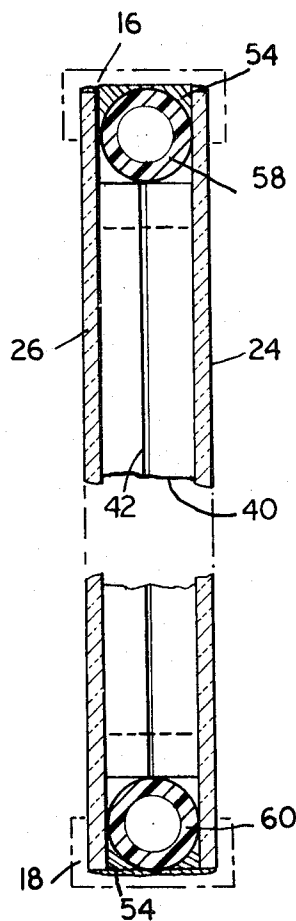


FIG_8

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3,570,201

DOOR STRUCTURE WITH A CLOSABLE BREATHING TUBE

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2 Claims

ABSTRACT OF THE DISCLOSURE

A door has two curved glass plates in spaced relation to each other. Resilient sponge strips are disposed between the glass plates adjacent the bottom and top edges of the door. Along the sides of the door, between the glass plates, are tubes having slits which communicate with the space between the glass plates. Sealing means are included about the entire periphery of the door, and the tubes contain moisture-absorbent material such as silica gel, to absorb moisture which may be sealed in between the glass plates. A breather tube is built into the door and allows atmospheric pressure into the space between the glass plates. Such breather tube allows for differences in atmospheric pressure when shipping the door, and is sealed off when the door is in a substantially stabilized condition of atmospheric pressure.

BACKGROUND OF THE INVENTION

Generally, in the construction of doors having a pair of curved, or semicylindrical, spaced glass plates, a number of problems exist. First, the proper spacing between plates must, of course, be maintained. In the past, curved rods have been disposed in the space between the glass plates at the top and bottom edges of the door, with the curve thereof generally matching the curve of the plates. This has proved to be quite troublesome, since the rod, being quite rigid, did not allow for slight imperfections in the curvature of the glass plates. Consequently, the glass plates would quite often crack.

Second, sealing means were generally applied about the edges of the door to seal off the space between the glass plates from the atmosphere. This was done at the factory, and when the door was shipped to an area of different atmospheric pressure (i.e., for example, to the mountains), the difference in pressure on either side of each glass plate would often cause cracking thereof.

Third, it has been found that moisture trapped and sealed in between the glass plates collects on the glass plates. Such moisture, of course, undesirably clouds up the glass plates.

It is an object of this invention to provide a door including a pair of spaced, curved glass plates, and means for properly providing spacing between them such that minor imperfections in the glass are allowed for.

It is a still further object of this invention to provide a door which, while fulfilling the above objects, provides means for preventing cracking of the glass plates thereof as the door is shipped to an area of different atmospheric pressure after manufacture.

It is a still further object of this invention to provide a door which, while fulfilling the above objects, provides means for preventing moisture between the glass plates from clouding up the plates.

It is a still further object of this invention to provide a door which, while fulfilling the above objects, is quite simple in design and construction.

SUMMARY OF THE INVENTION

Broadly stated, the inventive panel for use as a door or the like comprises a frame, and a first semicylindrical

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substantially transparent plate is supported by the frames in spaced relation to the first plate. Resilient spacer means are disposed between the first and second plates to define such space therebetween. Seal means are included to seal off the space between the first and second plates from the atmosphere, and moisture-absorbent means are included to absorb moisture from between the first and second plates. Further included is a closable breather tube running from between the first and second plates to the atmosphere.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects of the invention will become apparent from a study of the following specification and drawings, in which:

FIG. 1 is a perspective view of the inventive door, being used as a refrigerator door;

FIG. 2 is a side elevation of the door;

FIG. 3 is a plan view of the door;

FIG. 4 is a sectional view, with portions removed, taken along the line 4-4 of FIG. 3;

FIG. 5 is a sectional view, with portions removed, taken along the line 5-5 of FIG. 2;

FIG. 6 is an enlarged view, partially broken away, of a corner of the door;

FIG. 7 is a view taken along the line 7-7 of FIG. 6;

FIG. 8 is a sectional view similar to that of FIG. 4, but showing an alternative spacer means.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Shown generally in FIG. 1 is a refrigerator 10 which utilizes the inventive door 12. Such door 12 is shown in detail in FIGS. 2-7. Door 12 includes a frame 14 made up of top and bottom members 16, 18 and side members 20, 22. Supported by the frame 14 are a pair of substantially semicylindrical, or curved, glass plates 24, 26. These glass plates 24, 26 have substantially the same radius of curvature. The door 12 defines top and bottom curved edges 28, 30, and substantially straight side edges 32, 34.

The glass plates 24, 26 are in spaced relation, and spacer means are disposed between the glass plates 24, 26 to define such space therebetween. Such spacer means comprise resilient sponge strips 36, 38. Strip 36 is positioned between the glass plates 24, 26, adjacent and along the top curved edge 28, having adhesive along one side thereof so that it may be affixed to the glass plate 24. Resilient sponge strip 38 is positioned between the glass plates 24, 26 adjacent and along the bottom curved edge 30, having a similar adhesive along one side for fixing it in position.

Running along side edge 32, between the glass plates 24, 26 is a rigid tube 40 (FIG. 5). Such rigid tube 40 defines a longitudinal opening or gap 42 inward of the side edge 32 and communicating with the space between the glass plates 24, 26. The tube 40 is filled with moisture absorbent material 44, such as silica gel, and has felt plugs 46, 48 in either end. Another rigid tube 50, defining a gap 52, and containing silica gel 44, is associated with side edge 34. Glue 54 is provided about the top and bottom edges 28, 30, and side edges 32, 34 to seal off the space between the glass plates 24, 26 (including rigid tubes 40, 50 and resilient sponge strips 36, 38) from the atmosphere.

A plastic breather tube 56 extends through an opening 54A in the glue 54, through an opening 40A in the tube 40, and into the silica gel 44 inside the tube 40. Such tube 40 allows communication between the space between the glass plates 24, 26 and the atmosphere.

In the use of the door 12, it has been found, first, that minor imperfections of the curve in glass plates 24, 26 do not result in breakage thereof, as previous. This

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is so because the resilient sponge strips 36, 38, allow for such imperfection without putting excessive force on the glass plates themselves. The strips 36, 38 are easily compressed, and take the shape of the plates 24, 26 and their imperfections. FIG. 8 shows the substitution of resilient tubing 58, 60 for the strips 36, 38. Such tubing 58, 60, being resilient, provides substantially the same advantages as the strips 36, 38.

Thin sponge strips (not shown) may be fixed to opposite sides of the rigid tubes 40, 50, to allow for imperfections along the straight, side edges of the glass plates 24, 26.

The door 12 is constructed so that breather tube 56 is open, allowing equalization of pressure inside and outside the door. Such tube 56 remains open until after the door 12 has reached its destination. The breather tube 56 is then sealed off by, for example, heat from a match, and it is insured that the pressure between the plates 24, 26, now fixed, cannot be too different from the atmospheric pressure. This being the case, no problem of cracking of the glass plates 24, 26 due to a great inequality of air pressure thereon, can occur.

The moisture-absorbent silica gel 44 absorbs moisture which may be trapped in the space between the glass plates 24, 26 after breather tube 56 is closed. Such absorption of moisture prevents undesirable collection thereof on the glass plates 24, 26.

I claim:

1. A panel defining top and bottom curved edges and substantially straight side edges for use as a door or the like comprising:

- (a) a rigid frame;
- (b) a first substantially transparent glass plate substantially semicylindrical in configuration supported by the frame, and a second substantially transparent glass plate substantially semicylindrical in configuration supported by the frame and in spaced relation to the first plate, said second plate having substantially the same radius of curvature as said first plate;
- (d) resilient spacer means disposed between the first and second plates to define such space therebetween, said spacer means comprising a first resilient sponge strip positioned between the first and second plates adjacent and along the top curved edge and running from adjacent one side edge to adjacent the other, and a second resilient sponge strip positioned between the first and second plates adjacent and along the bottom curved edge and running from adjacent one side edge to adjacent the other;
- (e) a pair of rigid tubes running along the side edges between the first and second plates, seal means about the top, bottom and side edges to seal off the space between the first and second plates including the rigid tubes and resilient sponge strips from the atmosphere, and moisture-absorbent means within the rigid tubes to absorb moisture from between the first and second plates; and

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(f) a closable breather tube running from between the first and second plates to the atmosphere.

2. A panel defining top and bottom curved edges and substantially straight side edges for use as a door or the like comprising:

- (a) a rigid frame;
- (b) a first substantially transparent glass plate substantially semicylindrical in configuration supported by the frame, and a second substantially transparent glass plate substantially semicylindrical in configuration supported by the frame and in spaced relation to the first plate, said second plate having substantially the same radius of curvature as said first plate;
- (d) resilient spacer means disposed between the first and second plates to define such space therebetween, said spacer means comprising a first resilient tube positioned between the first and second plates adjacent and along the top curved edge and running from adjacent one side edge to adjacent the other, and a second tube positioned between the first and second plates adjacent and along the bottom curved edge and running from adjacent one side edge to adjacent the other;
- (e) a pair of rigid tubes running along the side edges between the first and second plates, seal means about the top, bottom and side edges to seal off the space between the first and second plates including the rigid tubes and resilient tubes from the atmosphere, and moisture-absorbent means within the rigid tubes to absorb moisture from between the first and second plates; and
- (f) a selectively closable breather tube running from between the first and second plates to the atmosphere.

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JOHN E. MURTAGH, Primary Examiner

U.S. Cl. X.R.

52—209, 249, 304, 398