April 27, 1965

C. BANZET

3,179,987

FLEXIBLE DOOR SEAL

Filed April 16, 1962

2 Sheets-Sheet 1

Fig. 1

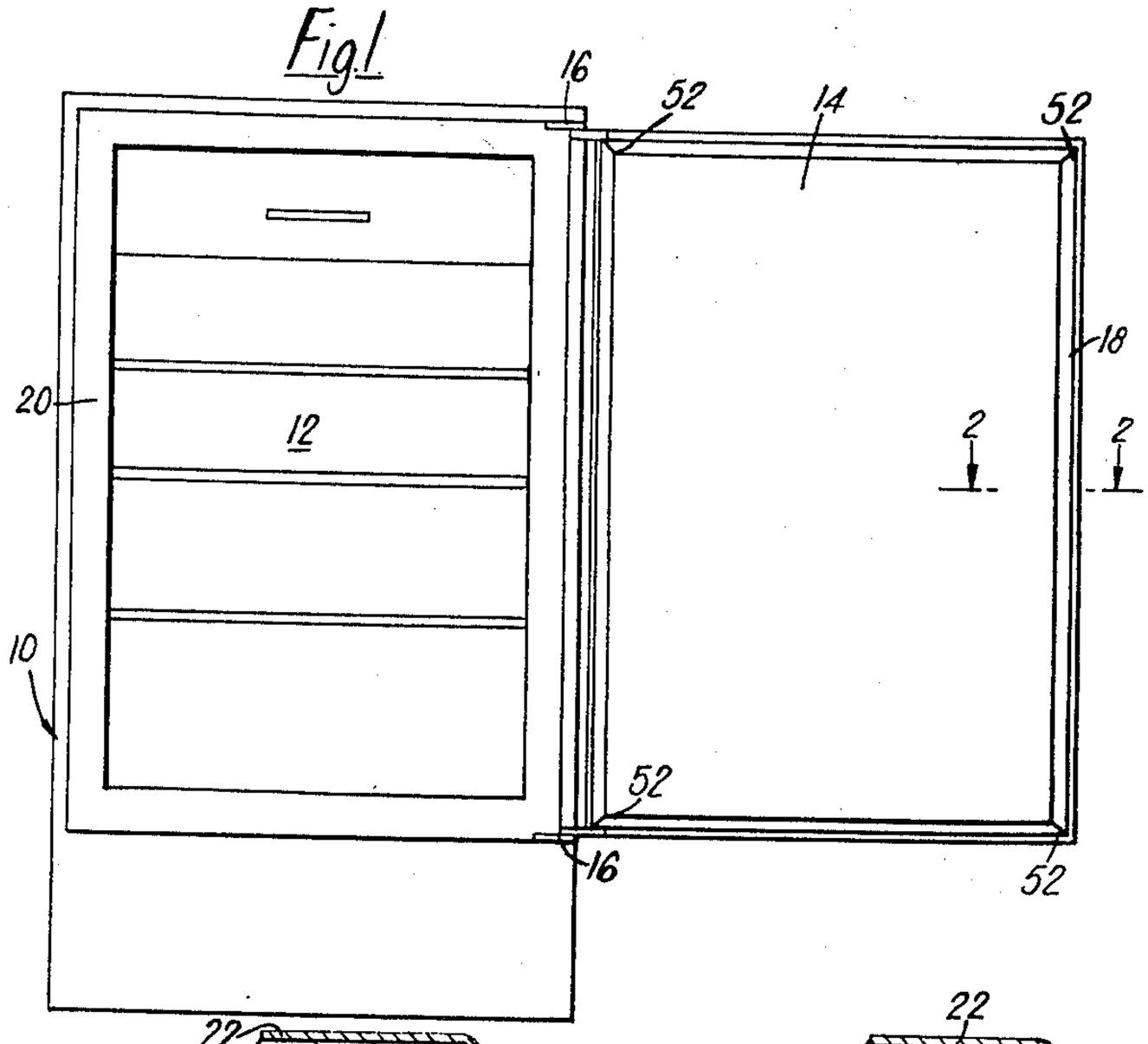

Fig. 2

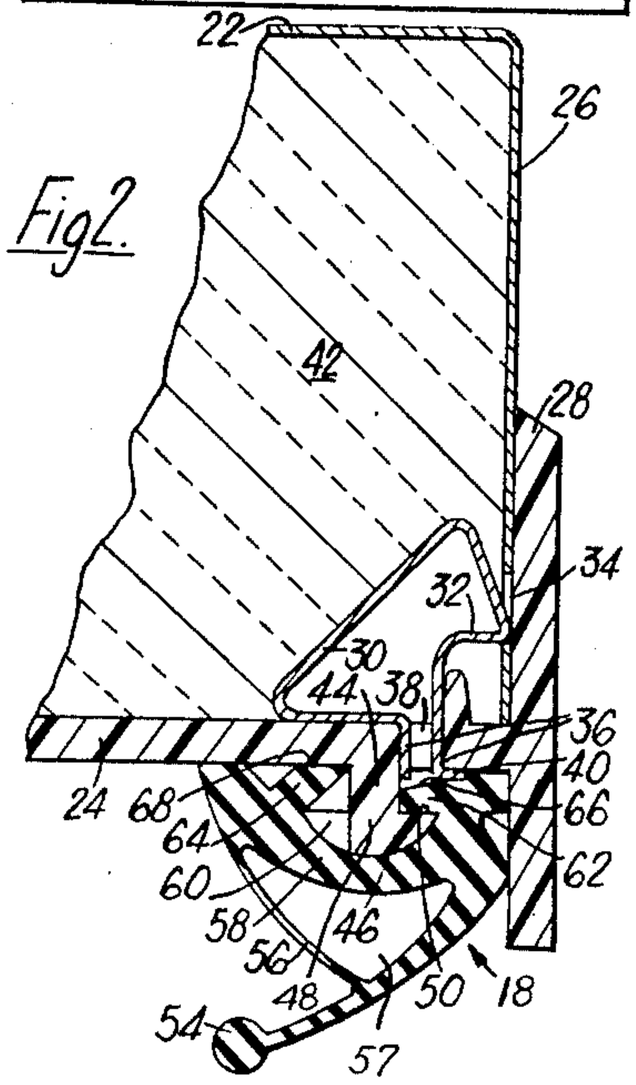

Fig. 3

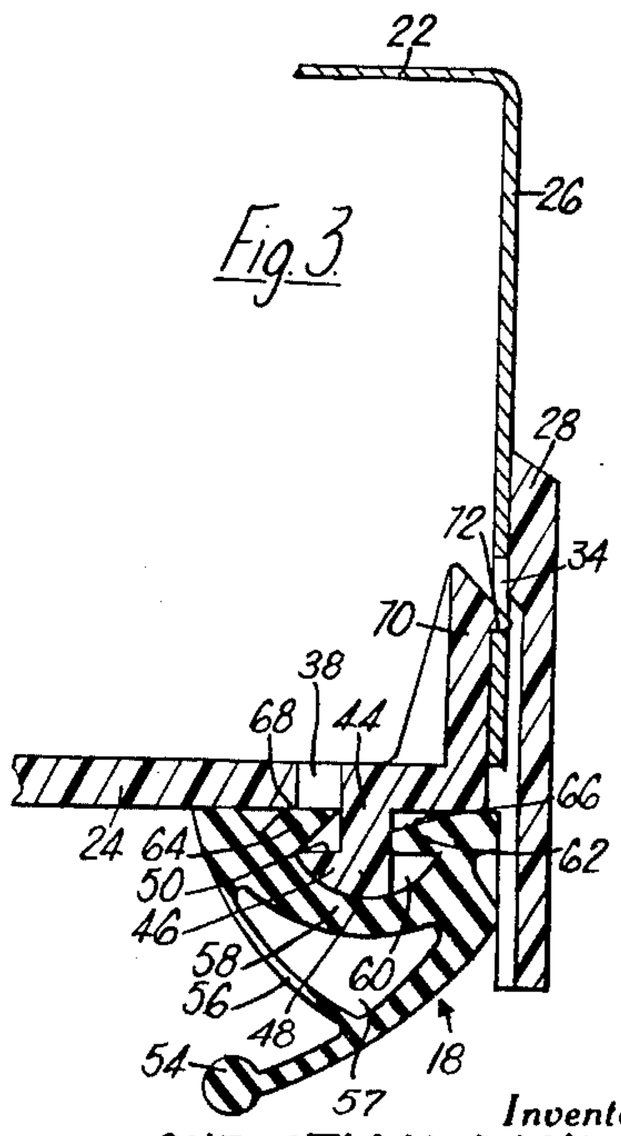

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Fig. 4

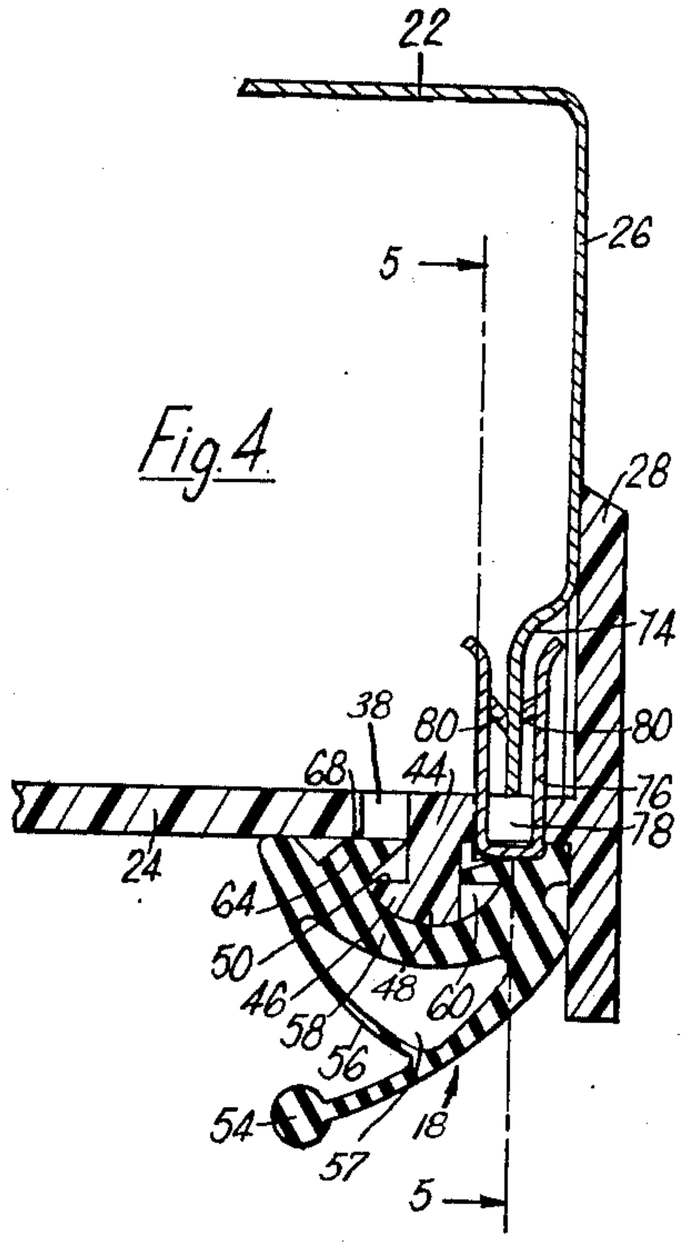


Fig. 5

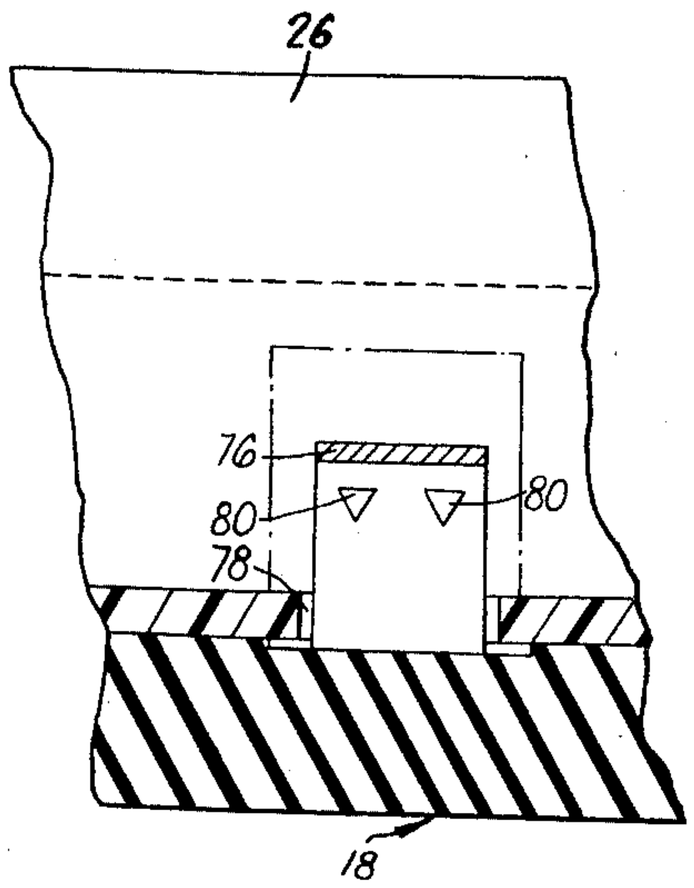
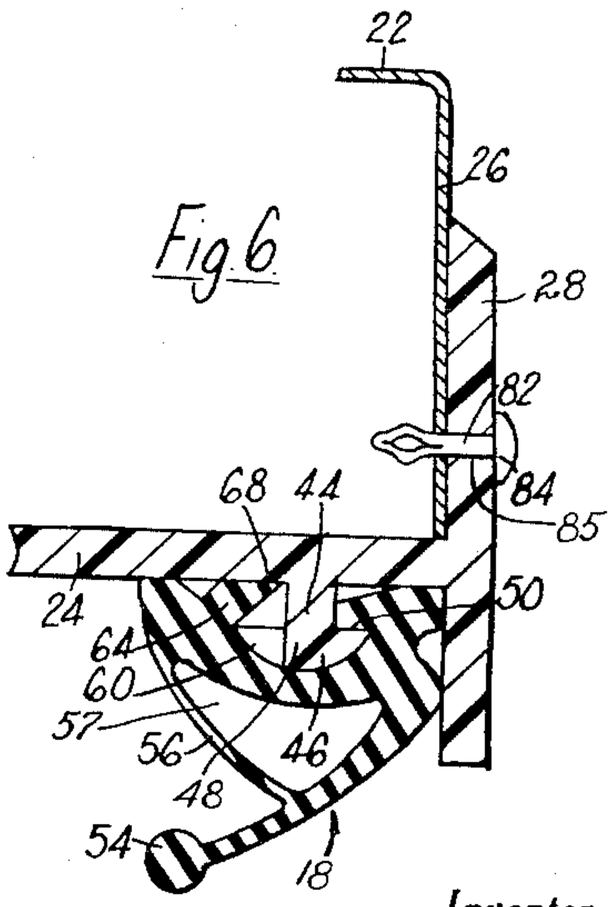


Fig. 6



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3,179,987

Patented Apr. 27, 1965

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3,179,987

FLEXIBLE DOOR SEAL

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Filed Apr. 16, 1962, Ser. No. 187,537

Claims priority, application Great Britain, Apr. 24, 1961, 14,694/61

7 Claims. (Cl. 20—35)

This invention relates to door seal-strips and to composite door structures for use therewith.

Such seal-strips are of utility for cabinets, cupboards and recesses which require airtight closure; they are of particular utility for refrigerator cabinets.

A seal-strip is attached to one of the opposed closure surfaces, that of the door inner surface or of the door jamb. By this invention it is possible to simplify the attachment and avoid the use of clips, rivets or the like for that purpose: and it is thereby possible to simplify the door structure itself and economise in the number of parts and manufacturing operations.

A seal-strip according to the invention, made of resilient material, is formed with a lip for effecting sealing contact against a surface and with a channel having inwardly directed flanges each shaped so as to flex over and be retained by a beaded projection on another, opposed surface.

The channel is preferably of part-circular cross-section and each flange, along the chord of the section, is preferably bevelled so as to facilitate the flex-fitting on to the beaded projection.

The scope of the invention is defined by the appended claims; and how it can be performed is hereinafter particularly described with reference to the accompanying drawings in which:

FIGURE 1 is a front elevation of a refrigerator cabinet with its door open and having seal-strip according to the invention at its inner surface to effect sealing contact against the opposed door jamb surface when the door is closed;

FIGURE 2 is an enlarged fragmentary section on the line 2—2 in FIGURE 1 showing one form of door assembly;

FIGURE 3 is an enlarged fragmentary section, similar to the section shown in FIGURE 2, through a second form of door assembly according to the invention;

FIGURE 4 is an enlarged fragmentary section, similar to the section shown in FIGURE 2, through a third form of door assembly according to the invention;

FIGURE 5 is a fragmentary section on the line 5—5 in FIGURE 4; and

FIGURE 6 is an enlarged fragmentary section, similar to the section shown in FIGURE 2, through a fourth form of door assembly according to the invention.

In the drawings the same reference numerals have been used for like items.

FIGURE 1 shows a refrigerator cabinet 10 having a food storage compartment 12 and a door 14 mounted on the cabinet by hinges 16.

The door 14 carries seal-strip 18 to effect sealing contact against the door jamb surface 20.

FIGURE 2 shows the door assembly in detail. The door 14 comprises an outer sheet metal panel 22 and an inner panel 24 of moulded, rigid polymeric material. The outer panel 22 has a back-turned flange 26 and the inner panel has an integral edge strip 28 adapted to lie against the back-turned flange 26. With such a composite structure there is no need for a second, inturned flange; and a second pressing operation on the outer panel is therefore avoided.

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The outer and inner panels are attached to one another by polygonal, spring wire clips such as 30. Each clip 30 has a shoulder 32 which engages the edge of a hole 34 in the back-turned flange 26. Each clip 30 has ends 36 received in a hole 38 in the inner moulded panel 24. One of the ends 36 has an outwardly bent foot 40 to retain the clip in the hole 38. The aperture or hole 34 in the back turned flange of the outer panel 22 locates the clip 30 as well as providing a means for preventing the accidental or casual disengagement of the back turned flange 26 of the outer panel 22 from the inner panel 24.

Insulation 42 is provided in the space between the outer and inner panels.

The inner panel 24 is formed with spaced elongated projections 44 on its inner surface. Each projection 44 is beaded in form: that is to say it has a curved enlarged head 46 on a stem piece 48. The cross-section of the bead 46 is part-circular.

Each projection 44 has a single shoulder or hook portion 50 and the shoulders on successive projections extend on opposite sides of the stem pieces. The holes or apertures 38 are disposed on alternate sides of the stem pieces 48 on the side of the shoulder 50 and as there disposed act as a positive retaining means for the clip 30 in its engagement with the inner panel 24.

Seal-strip 18 of resilient material is retained on the door by the projections 44. The seal strip comprises four lengths of strip with their adjacent ends joined at mitred joints 52.

The seal-strip 18 has a lip 54, carried by a thin wall portion 56 forming a hollow chamber 57 on the outer surface of the body 58 of the strip. This hollow chamber 57 provides an adjustable seal for the door when it is closed as well as serving to cushion the door closing impact. It is obvious that the hollow chamber 57 constitutes insulating air space.

The seal-strip 18 is formed with a channel 60, of part-circular cross-section, and inwardly directed flanges 62, 64 each shaped so as to flex over and be retained by a beaded projection 44. The flange 62 is bevelled at 66 and the flange 64 is bevelled at 68 to facilitate the flexing over of the strip onto the beaded projections 44.

The inside surface of the flange 62 abuts closely against the shoulders of alternate projections 44, these shoulders being on one side of the stem pieces of the projections, and the inside surface of the flange 64 engages outer margins of the shoulders of alternate projections intermediate the other projections and on the other side of the stem-pieces.

In fitting the seal-strip, it is fitted on to the first projection and then folded and pushed onto successive projections by a reverse-peeling action.

FIGURE 3 shows a second form of door assembly in which the clips described above are eliminated. Instead, the inner door panel 24 is formed with an inturned flange 70 having projections 72 each of which engages the edge of the hole 34 in the back-turned flange 26 of the outer panel.

The seal-strip 18 is retained on the door as already described but FIGURE 3 differs slightly from FIGURE 2 in this respect in that it is a section taken at a slightly different position along the strip so that the beaded projection shown has a shoulder 50 which is on the other side of the stem-piece 48.

FIGURES 4 and 5 show a third form of door assembly in which tags 74 are cut and bent inwardly from the back-turned flange 26 of the outer door panel 22. The tags 74 are straddled by U-clips 76 each fitted in a hole or aperture 78 in the inner panel 24. Each U-clip 76 has tangs 80 which engage the corresponding tag 74.

In the door assemblies described above the attachment between the outer and inner panels is invisible and provide a neat appearance.

FIGURE 6 shows a fourth form of door assembly in which peg spring studs 82 each with its head 84 against the outer face of the integral edge strip of the inner panel 24, pass through the integral edge strip into the back-turned flange 26 of the outer panel 22. In this embodiment the back turned flange 26 of the outer panel 22 and the integral edge strip 28 of the inner panel 24 are formed with apertures 85 which are adapted to accept the studs 82 passing therethrough. In this form of door assembly the attachment, namely the studs 82, between the panels is visible.

I claim:

1. The combination comprising a door assembly and a seal strip, said door assembly including an outer panel having a back-turned flange and an inner panel having an integral edge strip and outwardly protruding beaded projections, said outer panel being in biased attachment to said inner panel, and said seal strip being of resilient material and sealing two opposed surfaces, said seal strip including a body, a hollow chamber formed on said body, a beaded flange carried by said hollow chamber as an extension of one wall thereof, said body having a channel formed therein and two inwardly directed flanges disposed at the edges of said channel, said inwardly directed flanges being compressed by the door assembly on closing thereby forming a flexed closure means around said beaded projections, said inwardly directed flanges having bevelled portions, said bevelled portions allowing a controlled deformation during sealing around said beaded projections effecting a positive seal therewith, said hollow chamber and said beaded flange cooperating to effect pivotal movement from said body by said beaded flange during sealing.

2. The combination comprising a door assembly and a seal strip, said door assembly including an outer panel, an inner panel, and a plurality of polygonal spring clips, said outer panel having a back-turned flange and spaced apertures on said back-turned flange, said inner panel having an integral edge strip, outwardly protruding beaded projections, and spaced apertures, said plurality of polygonal spring clips cooperating with said outer panel apertures and said inner panel apertures to provide an attaching means for said panels, said outwardly protruding beaded projections engaging said seal strip in firm attachment to said door assembly, said seal strip being of resilient material and sealing two opposed surfaces, said seal strip including a body, a shock absorbing chamber carried by said body, a beaded flange on said chamber, said body having a channel formed therein and two inwardly directed flanges disposed at the edges of said channel, said inwardly directed flanges being compressed by the door assembly on closing thereby forming a flexed closure means around said beaded projections, said inwardly directed flanges having bevelled portions, said bevelled portions allowing a controlled deformation during sealing around said beaded projections effecting a positive seal therewith, said shock absorbing chamber and said beaded flange cooperating to effect pivotal movement from said body by said beaded flange during sealing.

3. The combination comprising a door assembly and a seal strip, said door assembly including an outer panel and an inner panel, said outer panel having a back-turned flange, said back-turned flange having a plurality of spaced apertures, said inner panel having an integral edge strip, a plurality of beaded projections, and an inturned flange having a plurality of projections, said last named projections cooperating with said plurality of spaced apertures to provide an attaching means, said beaded projections protruding outwardly from said inner panel and engaging said seal strip in firm attachment to said door assembly, said seal strip being of resilient material and sealing two opposed surfaces, said seal strip including a body, an insulating chamber carried by said body, a beaded flange

on said chamber, said body having a channel formed therein and two inwardly directed flanges disposed at the edges of said channel, said inwardly directed flanges being compressed by the door assembly on closing thereby forming a flexed closure means around said beaded projections, said inwardly directed flanges having bevelled portions, said bevelled portions allowing a controlled deformation during sealing around said beaded projections effecting a positive seal therewith, said insulating chamber and said beaded flange cooperating to effect pivotal movement from said body by said beaded flange during sealing.

4. The combination comprising a door assembly and a seal strip, said door assembly including an outer panel and an inner panel connected by a plurality of U-shaped spring clips, said outer panel having a back-turned flange, said back-turned flange having an in-curved end with a plurality of tags, said inner panel having an integral end strip, a plurality of outwardly protruding beaded projections and a plurality of spaced apertures, said U-shaped spring clips having tangs on the inside portion of said U, the legs of said U-shaped clip being biased inwardly, said inner and outer panels being held in firm attachment by the cooperation of said apertures, said outer panel tags, said U-shaped clip tangs, and said biased U-shaped clip, said plurality of outwardly protruding beaded projections engaging said seal strip in firm attachment to said door assembly, said seal strip being of resilient material and sealing two opposed surfaces, said seal strip including a body, a hollow chamber carried by said body, a beaded flange formed as a wall extension of said chamber, said body having a channel formed therein and two inwardly directed flanges disposed at the edges of said channel, said inwardly directed flanges being compressed by the door assembly on closing thereby forming a flexed closure means around said beaded projections, said inwardly directed flanges having bevelled portions, said bevelled portions allowing a controlled deformation during sealing around said beaded projections effecting a positive seal therewith, said hollow chamber and said beaded flange cooperating to effect pivotal movement from said body by said beaded flange during sealing whereby said hollow chamber is compressed into a smaller area to provide a positive seal for said door assembly.

5. The combination comprising a door assembly and a seal strip, said door assembly including an outer panel, an inner panel, and a plurality of peg spring studs, said outer panel having a back-turned flange, said back-turned flange having a plurality of apertures, said inner panel having an integral end strip and a plurality of outwardly protruding beaded projections, said integral end strip having a plurality of apertures, said peg spring studs cooperating with apertures in said integral end strip and apertures in said back-turned flange to hold said outer and inner panels in firm attachment, said plurality of outwardly protruding beaded projections engaging said seal strip in firm attachment to said door assembly, said seal strip being of resilient material and sealing two opposed surfaces, said seal strip including a body, a hollow chamber carried by said body, a beaded flange carried as an extension of one wall of said hollow chamber, said body having a channel formed therein and two inwardly directed flanges disposed at the edges of said channel, said inwardly directed flanges being compressed by the door assembly on closing thereby forming a flexed closure means around said beaded projections, said inwardly directed flanges having bevelled portions, said bevelled portions allowing a controlled deformation during sealing around said beaded projections effecting a positive seal therewith, said hollow chamber and said beaded flange cooperating to effect pivotal movement from said body by said beaded flange during sealing.

6. A seal strip of resilient material for sealing two opposed surfaces at least one of which moves toward the other, one of said surfaces having spaced beaded projections, said seal strip including a body, an insulating hollow chamber carried by said body, a beaded flange on said

chamber, said body having a channel formed therein and two inwardly directed flanges disposed at the edges of said channel, said flanges forming a flexed closure means adapted to grip said beaded projections on a support for said seal strip, said inwardly directed flanges having bevelled portions, said bevelled portions allowing a controlled deformation during sealing around said beaded projections, effecting a positive seal therewith.

7. A seal strip of resilient material for sealing two opposed surfaces one of which is adapted to move toward the other, one of said surfaces having spaced beaded projections, said seal strip including a body, a hollow portion carried by said body, a beaded flange on said hollow portion, said body having a channel formed therein and two inwardly directed flanges disposed at the edges of said channel, said flanges forming a flexed closure means around said beaded projections, said inwardly directed flanges having bevelled portions, said bevelled portions allowing a controlled deformation during sealing around said beaded projections, effecting a positive seal therewith, said beaded flange being driven into sealing engagement with said hollow portion by the moving opposed surface as it approaches the other opposed surface, said beaded flange thereby pivotally moving toward said body to form a positive seal therewith.

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