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54 **Door for refrigerator, freezer or the like.**

57 A door for a refrigerator, freezer or the like comprises an outer panel (1), an inner panel (3) of plastics material and thermal insulation (8) between the panels. Around the periphery of the door is a seal (9) comprising a resiliently flexible sealing portion (20) and a lip (10) which is made of a stiffer material than the sealing portion and which is held between an inwardly directed flange (2) on the outer door panel (1) and a flange (5) of channel-like cross-section on the inner door panel (3). The lip (10) has a raised portion which engages in the channel of the flange (5) on the inner door panel to retain the lip between the two flanges, and the flange (5) on the inner panel is deflexible to allow the lip to be pulled from between the flanges when the seal is to be replaced. Diagonal slots (21) are formed in the lip at the corners of the door to facilitate the insertion and removal of the seal.

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"Door for a refrigerator, freezer or the like."

This invention relates to a door for a refrigerator, freezer or the like, comprising an outer panel, an inner panel of thermoplastic material, thermal insulation material interposed between the panels, and a seal extending around the periphery of the door and comprising
5 a resiliently flexible sealing portion and a lip which is held between a peripheral flange on the inner panel and an inwardly directed peripheral flange on the outer panel, the flange on the inner panel having in a side
10 thereof which faces the flange on the outer panel a channel which receives a raised portion of the lip of the seal to retain the lip between the two flanges.

Such a door with a removable seal is disclosed in U.S. Patent No. 2,700,194. For attracting this known
15 seal to the door a number of resilient clips are needed. To remove the seal for replacement a flat bar has to be inserted between the lip of the seal and the flange on the outer door panel so as to deflect a leg of each clip inside the insulating material. This allows the flange to
20 be deflected into the insulating material so that the lip of the seal can be pulled out. This operation is inconvenient and it may often happen that the seal fractures at the lip.

It is an object of the invention to provide a
25 door for a refrigerator or freezer having a seal which requires no fastening elements, such as screws or clips, and which can be easily fitted and removed without the use of tools.

According to the invention there is provided
30 a door for a refrigerator, freezer or the like, comprising an outer panel, an inner panel of thermoplastic material, thermal insulation material interposed between the panels, and a seal extending around the periphery of the door and

comprising a resiliently flexible sealing portion and a lip which is held between a peripheral flange on the inner panel and an inwardly directed peripheral flange on the outer panel, the flange on the inner panel having in a side thereof which faces the flange on the outer panel a channel which receives a raised portion of the lip of the seal to retain the lip between the two flanges, wherein the lip is made of a stiffer material than the sealing portion of the seal, and the lip has slots in it at the corners of the door, and wherein the flange on the inner panel is deflexible to allow the lip to be inserted and withdrawn from between the flanges.

With this construction the seal can be fitted to the door simply by applying a modest pressure manually to the seal to push the lip of the seal between the flanges on the two door panels until the raised portion of the lip enters the channel in the flange on the inner door panel. Similarly, a modest pulling force on the seal is all that is needed to withdraw the lip from between the flanges when it is necessary to remove the seal for replacement. In each case the stiffness of the lip is sufficient to deflect the flange on the inner door panel to allow the raised portion of the lip to enter or leave respectively the channel in this flange. The slots in the lip at the corners of the door further facilitate the fitting or removal of the seal.

German Utility Model No. 7115601 discloses a seal having a resiliently flexible sealing portion and a securing portion which is made of a stiffer material than the sealing portion.

In one embodiment of the invention a gap which exists between the free edge of the flange on the outer panel and a part of the inner panel which faces this edge is closed by an edge portion of the lip of the seal, which portion is thinner than the remainder of the lip. This prevents insulating material entering the channel in the flange on the inner door panel during the forming of the thermal insulation, which is carried out after the

initial fitting of the door seal.

Preferably, the raised portion of the lip of the seal is hollow and a part of the lip adjacent said edge portion thereof has sealing contact with the flange on the outer panel. With a hollow construction the raised portion of the lip can be readily elastically deformed when the lip is being inserted or withdrawn from between the flanges on the door panels, which further facilitates the fitting or removal of the seal. By arranging a part of the seal adjacent the edge portion thereof a sealing contact with the flange on the outer door panel, insulating material is also prevented from entering the space inside the hollow raised portion of the lip.

An embodiment of the invention will now be described by way of example with reference to the accompanying drawings, in which

Figure 1 is a sectional view drawn to an enlarged scale, of the peripheral portion of a door according to the invention, and

Figure 2 is a sectional view taken on the line II-II of Figure 1, at a corner of the door.

In Figure 1, the reference numeral 1 indicates an outer door panel, which is made, for example of sheet metal and which at its periphery has an inwardly directed flange 2. The door also comprises an inner panel 3 which is constructed of plastics material by vacuum forming and which is formed integrally at its periphery with an outwardly directed flange 5 which extends over the flange 2 on the outer panel 1. The flange 5 is of channel-like cross-section so that in its side which faces the flange 2 there is a channel 6. The cross-section of the flange 5 is composed of a number of sections which are inclined relative to one another so that the channel 6 has sloping walls. The flange 5 is connected to the main part of the panel 3 by a channel-shaped part 4, the bottom of which, as viewed in Figure 1, lies below the plane A-A of the flange 2 on the panel 1. Between the free edge of the flange 2 and that side wall of the channel-shaped part 4

of the panel 3 which adjoins the flange 5, which side wall faces the free edge of the flange 2, is a gap 7 of modest width, of the order of 2 mm, which allows the outer panel 1 and the inner panel 3 to be centered relative to one another before the polyurethane mixture which constitutes the thermal insulation 8 for the door is injected and then polymerised in-situ between the outer panel 1 and the inner panel 3.

Extending around the periphery of the door is a seal 9 which comprises a resiliently flexible sealing portion 20 for cooperation with the edge of the cabinet on which the door is to be hung, and a lip 10 which is held between the flanges 2 and 5 on the outer and inner door panels 1 and 3. The sealing portion 20 of the seal comprises a compartment 21 into which a magnetic strip can be inserted for cooperation with the edge of the cabinet to hold the door closed. The sealing portion 20 and the lip 10 are formed together by co-extrusion but the lip is made of a stiffer material than the sealing portion. The lip 10 comprises a flat portion 12 which is clamped between the flange 2 on the outer door panel and the free edge of the flange 5 on the inner door panel. Adjoining the flat portion 12 is a hollow raised portion 13 which extends along the length of the lip 10 and which has a cross-section similar to that of the flange 5 so that this raised portion has sloping walls like the channel 6 in the flange 5. The raised portion 13 is received in the channel 6 to retain the lip 10 between the flanges 2 and 5 but is elastically deformable to permit withdrawal of the lip from between the flanges when the seal is to be replaced, as will be explained later herein. A part of the lip 10 near the free edge thereof bears with sealing contact against the flange 2, and beyond the free edge of this flange the lip 10 has an edge portion 14 which is much thinner than the remainder of the lip and which abuts the adjacent side wall of the channel-shaped part 4 of the inner door panel 3 to bridge the gap 7 between the part 4 and the flange 2. Preferably, the edge portion 14 of the

lip 10 is much softer than the rest of the lip. The result of this construction is to prevent the polyurethan during the forming of the thermal insulation 8 from entering the channel 6 in the flange 5 and the space inside the raised portion 13 of the lip 10 and possibly impeding elastic deformation of this portion of the lip.

When the seal 9 has to be removed for replacement, it is necessary only to exert a modest pull on the seal in the direction of the arrow F in Figure 1 to withdraw the lip 10 from between the flanges 2 and 5. During this withdrawal the raised portion 13 of the lip 10 is elastically deformed and the flange 5 is deflected, the deformation and deflection being facilitated by cooperation between the sloping walls of the raised portion of the lip and the channel 6 in the flange 5. A new seal is fitted by applying a modest pressure to the lip of the seal in the direction of the arrow F1 to insert the seal between the flanges 2 and 5.

At each of the four corners 22 of the door a slot 21 is formed in the lip only of the seal, the slot extending preferably along a diagonal of the rectangle of the door. These slots facilitate the operation of replacing the seal, which can be carried out easily by the user without the use of special tools.

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1. A door for a refrigerator, freezer or the like, comprising an outer panel, an inner panel of thermoplastic material, thermal insulation material interposed between the panels, and a seal extending around the periphery of the door and comprising a resiliently flexible sealing portion and a lip which is held between a peripheral flange on the inner panel and an inwardly directed peripheral flange on the outer panel, the flange on the inner panel having in a side thereof which faces the flange on the outer panel a channel which receives a raised portion of the lip of the seal to retain the lip between the two flanges, wherein the lip is made of a stiffer material than the sealing portion of the seal, and the lip has slots in it at the corners of the door, and wherein the flange on the inner panel is deflexible to allow the lip to be inserted and withdrawn from between the flanges.

2. A door as claimed in Claim 1, wherein a gap which exists between the free edge of the flange on the outer panel and a part of the inner panel which faces this edge is closed by an edge portion of the lip of the seal, which portion is thinner than the remainder of the lip.

3. A door as claimed in Claim 2, wherein the raised portion of the lip of the seal is hollow and a part of the lip adjacent said edge portion thereof has sealing contact with the flange on the outer panel.

4. A door as claimed in Claim 2 or 3, wherein said edge portion of the lip is made of a material of lower stiffness than the rest of the lip.

5. A door for a refrigerator, freezer or the like, substantially as herein described with reference to the accompanying drawings.

