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SPLICE JOINT DOOR LINER PANEL

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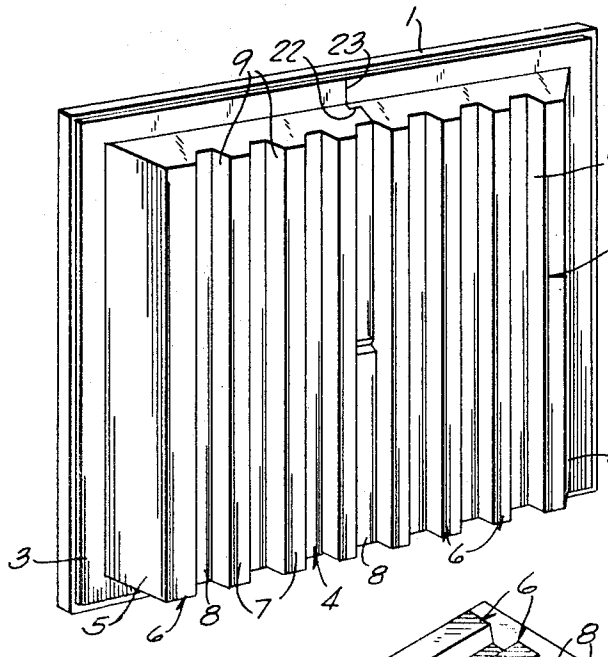


Fig. 1

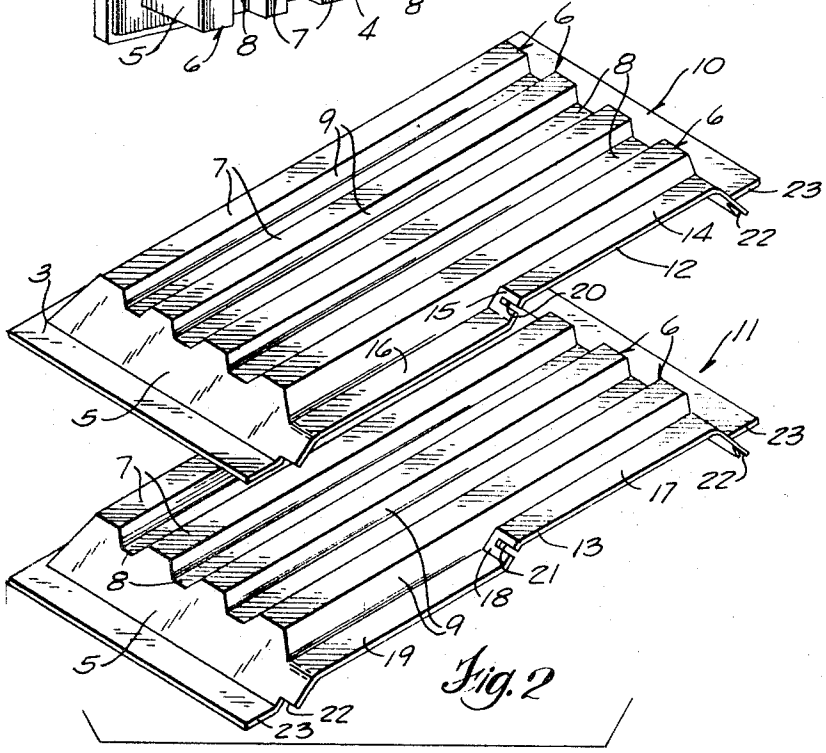


Fig. 2

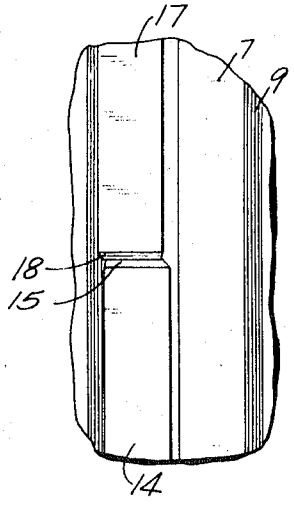


Fig. 3

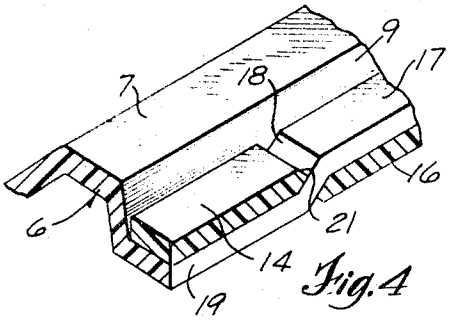


Fig. 4

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SPLICE JOINT DOOR LINER PANEL

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ABSTRACT OF THE DISCLOSURE

A door liner, such as one which would be used in a railroad refrigerator car, is formed of two half panels which are joined in a lap joint splice along a center line of the liner. Along the center line, the half panels have opposing matching half-ribs extending from opposing ends to meet at the midpoint on the line, where the ribs are offset to provide opposing, matching, underlying webs extending to opposite ends of the center line. Complementary splice slots disposed at the offsets permit interlocking of the half panels so that the half rib of the first panel overlaps the matching underlying web of the second panel and the matching rib of the second panel overlaps the underlying web of the first panel.

This invention relates to door liners for compartment doors, and more particularly to door liners for railroad refrigerator cars.

BACKGROUND OF THE INVENTION

Railroad freight cars designed to be refrigerated commonly have door liners attached to the sides of their sliding doors. These liners provide heat insulation by means of an air space between the panel which makes up the body of the liner and the door. The panel and air space are generally desired to be coextensive with the car door, thus requiring rather large panels in the range of ten feet high by ten feet wide.

The liners would be advantageously formed from fiber reinforced plastic sheets in a matched metal die molding process to form a plurality of protruding ribs within the body panel. However, the large size requirements for railroad car liners are generally beyond the capability of such a die molding process, necessitating the design of smaller panels which may be separately formed and then joined to construct a full liner.

SUMMARY OF THE INVENTION

The invention is a structurally sound liner formed of two half panels which may be molded in the same die mold. Other advantages of the liner will be apparent from the illustration and the detailed description.

Tooling expense can be saved if the half panels can be formed in the same mold. However, difficulties inherent in the design requirements for door liners used in refrigerated compartments would, at first glance, preclude the use of one mold to form both parts. The structure of the invention surmounts this problem and at the same time provides an advantageous and simple structure.

Interlocking and overlapping of the half panels has the advantage of structural soundness. Two separate molds could be used to provide two different panels, one of which would have an integral part for overlapping the other. To do this with one mold is another matter, as an overlapping relation of identical panels could not normally be provided without the bending and stressing of parts, which would compromise the desirable rigidity and thickness requirements of the panels. The construction is further complicated because it is desired to have a sealed connection between the panels to maintain the heat isolation for which the liner is used.

The structure of the invention has all the advantages of having an interlocking and overlapping joint, providing an airtight structure with substantial thickness, and involving no bending of parts. Yet, the half panels may be formed in one die mold.

These advantages are accomplished by a liner formed of two half panels joined at corresponding lap joint edges extending along a center line of the full liner. Each panel has a half rib along a first half of the lap joint edge. An offset portion extends from the rib to an underlying web portion which occupies the other half of the lap joint edge. The half panels are generally identical in this configuration and when one panel is inverted 180°, still remaining upright, the full liner is provided with matching ribs on opposing halves of the lap joint edge as well as matching underlying webs on opposing halves of the edge.

To permit interlocking and overlap, a slot is provided in the offset portion of each half panel, and each panel has an indentation on both ends of the lap joint edge. The panels are interlocked at the slots so that the half rib on one half panel is in contiguous overlapping relation with the matching underlying web of the second half panel, and the matching half rib of the second panel is in overlapping contiguous relation with the underlying web of the first half panel.

A structurally sound, airtight door liner is thus provided and may be formed of two half panels which may be made in the same die mold.

The drawings illustrate the best mode presently contemplated of carrying out the invention.

In the drawings:

FIG. 1 is a perspective view of an assembled panel attached to a compartment door;

FIG. 2 is a perspective view of the two half panels when disasssembled;

FIG. 3 is an enlarged top view of a portion of the assembled panel showing the lapping splice joint; and

FIG. 4 is an enlarged perspective view of the lapping splice joint.

DESCRIPTION

The drawings illustrate a railroad car door **1** adapted to be slidably attached on the side of a railroad refrigerator car, not shown. Door **1**, as in the conventional railroad car has a rectangular configuration and is flat.

The car door has the full door liner **2** of the invention attached to one flat side, the liner being generally coextensive with the door and having a complementary rectangular configuration.

The general characteristics of full liner **1** are like those of liners presently in use, having a base **3** around the perimeter and a body panel **4** connected with base **3** by side walls **5**. Base **3** is attached to a flat side of door **1** as by rivets, welds or bonding. When attached, door **1** and liner **2** define an insulating air space between body panel **4** and the door.

As in some present liners, body panel **4** may be formed of fiber reinforced plastic sheets shaped in die molds to provide base **3**, side walls **5** and body panel **4**. Also formed in body panel **4** are a plurality of vertical ribs **6** extending fully across the panel.

This construction provides a liner **2** having generally uniform thickness and a corrugated appearance with raised rib surfaces **7** alternating with lower surfaces **8**, with slanted, rib side walls **9** completing the outer surface of body panel **4**.

In accordance with the invention, liner **2** is comprised of two identical half panels, a first panel **10**, and a second panel **11** which is turned 180° with respect to the first for purposes of joining the half panels. Half panels **10** and **11** may be formed from fiber reinforced plastic sheets

in a matched metal die molding process utilizing only one mold.

When assembled, half panel **10** and half panel **11** have adjacent lap joint edges **12** and **13** disposed along the vertical center line of liner **2**. For overlapping the two half panels, half panel **10** has a half rib portion **14** at lap edge **12**. Rib portion **14** extends from the bottom of edge **12** to a point approximately midway on the center line. There, edge **12** is offset, defining a slanting offset face **15**. The offset extends inwardly to an underlying web portion **16** provided as part of lap edge **12** and which extends from offset face **15** to the other end of lap edge **12**. Thus, half rib **14** and web **16** define an offset configuration for lap edge **12**, with the surface of raised rib **14** offset outward from the surface of web **16**. Additionally, the surface of half rib **14** is in a parallel plane with rib surfaces **7**, but will not normally be in the same plane. The surface of web **15** may be disposed the same as are lower surfaces **8**. Offset face **5**, web **16** and half rib **14** extend outwardly from a rib side wall **9** of the rib next adjacent to lap edge **12** on half panel **10**.

Matching rib and web structure is provided in the other half panel **11**. Turned 180° in assembly, but otherwise the same as for half panel **10**, lap edge **13** of half panel **11** is offset to complement the offset in lap edge **12** of half panel **10**. A matching half rib **17**, defining a raised rib surface extends along edge **13** from the opposite end of the center line as rib **14** when assembled. The edge is offset at approximately the midpoint of the center line, defining a slanted matching offset face **18**, identical to but reversed from offset face **5**. A matching underlying web **19**, defining a web surface, completes the lap edge **13** as for the other half panel.

The extent of offset and thus the extent to which half ribs **14** and **17** are raised, is determined by the thickness of the half panel. It is contemplated that the lower surface of each half rib should be just outward of the outer surface of a web **16** or **19** for purposes of contiguous overlapping. Thus, the offset in lap edges **12** and **13** will generally correspond to the thickness of panels **10** and **11**, which thickness is generally uniform.

To permit overlap at lap edges **12** and **13**, offset face **15** of panel **10** has a slot **20**, and matching offset face **18** in panel **11** has a similar slot **21**. Slots **20** and **21** are located generally midway of offsets **15** and **18** and extend in a direction normal to the respective edges **12** and **13**. The slots may be molded as with the rest of panels **10** and **11**, or they may be cut as desired. The depth of the slots will determine the extent of overlays and the width of the slots must generally correspond to the thickness of the panels for a tight fit. Further, the angles with the respective lap edges to which the offsets are inclined will be supplementary of each other and thereby provide an even tighter fit.

Also, so the panels may be in overlapping relation, the bases **3** of half panels **10** and **11** are indented at the center line corresponding to lap edges **12** and **13**. This indentation is comprised of side wall indentations **22** in side walls **5** and base indentations **23** in perimeter base **3**. Four indentations are provided on the half panels, two each on a panel, and positioned at both ends of edges **12** and **13**. The extent of indentation from the center line is the same as the depth of slots **20** and **21**, thus providing a tight fitting overlapping lap joint connection between the half panels.

Half panels **10** and **11** are assembled by first disposing panel **11** in opposed matching relation with panel **10**. This means that half rib **14** will be disposed adjacent matching underlying web **19** of the other half panel, underlying web **16** will be adjacent matching half rib **17**, and offset faces **15** and **18** will be adjacent and at supplementing angles to each other. Interlocking slots **20** and **21** dispose the ribs and matching webs in contiguous overlapping relation, with rib **14** contiguously overlying the surface of matching web **19**, and matching rib **17** contiguously overlying the surface of web portion **16**.

The half panels are secured in this position by rivets or suitable plastic bonding. Similarly, the full liner **2** is then attached to door **1**.

The invention thus provides a structurally rigid door liner, which defines a sealed insulating chamber, from two half panels which may be formed in the same mold.

The described embodiment is the best example of the various modes of the invention which are presently contemplated. The scope of the invention is distinctly defined by the following claims.

I claim:

1. A liner panel for attachment to the side of a compartment door, the liner panel comprising:

a pair of half section panels joined along a center line of the liner panel and having generally identical configurations with one half panel being disposed 180 degrees in reverse with respect to the other in assembly; and

a lap edge extending along the length of said center line of each half section panel, each lap edge being linear and being divided into at least one pair of a raised portion and an equal length lower portion; each said raised portion contiguously overlying a corresponding lower portion on the opposing lap edge in assembly, whereby the generally identical half section panels are interconnected and overlapped.

2. The liner of claim **1**, wherein

each said pair of raised and lower portion comprises an elongated rib raised from the surface of an elongated web portion, both extending along the lap edge, each rib contiquously overlying a web portion on the opposing edge;

offset faces join the respective ribs and web portions, the offset faces being at a corresponding offset face on the opposing lap edge in assembly, the corresponding faces comprising a set; and

at least one of the offset faces in a set has a slot which receives the corresponding offset face in assembly.

3. The liner defined by claim **1**, wherein

the lap edge of each half panel has one pair of raised and lower portions and comprises an offset at the center of the liner, the offset defining an offset face between an elongated raised rib on a first half of the lap edge and an elongated web portion on the other half of the lap edge, and the two half section panels interlock at the offset faces with the ribs overlying the web portions of the opposing half panel.

4. The liner defined by claim **3**, wherein

the offset faces of opposing half panels are at an inclined angle with respect to the rest of the corresponding lap edge, said angles being the same and supplementing each other in assembly, and at least one of the faces has a slot disposed to receive the opposing face to interlock the half panels.

5. The liner defined by claim **3**, wherein each of the half panels have:

base portions disposed on the periphery of the panels and at both ends of the lap edges, the base portions being attached to the door in assembly;

a raised body panel portion attached to the base portion and defining a space between the door and half panel in assembly; and

wherein the lap edges are on the body panel portion; at least one offset face having a slot which receives the opposing lap edge to a predetermined depth, and the base portions are indented with respect to the lap edges at the portions of the base which are adjacent the lap edges, the depth of the indentation being generally the same as said predetermined depth.

6. In a fiber reinforced plastic door liner for a railroad refrigerator car door side, the door liner having a full body panel defining a heat insulating chamber together with the door, the liner being generally coexten-

sive with the car door side, the improvement comprising:

a first and second half panel dividing the liner along a center line, the half panels being joined in opposed matching relation to form the full body panel, the first half panel having at the center line a raised rib portion contiguously overlying a matched web portion of the second panel, and the second half panel having a matching raised rib portion contiguously overlying a web portion of the first half panel, the rib and web portions being elongated and extending adjacent the center line; the half panels having interlocking slots at the mid portion of the center line, with the disassembled half panels having generally identical configurations, and in assembly the second panel being 180 degrees reversed with respect to the first.

7. The structure of claim 6, wherein

each half panel has an offset lap edge extending along the full length of the center line; the lap edge defining the raised rib portion, an offset face at the mid point of the center line and an underlie web portion; the offset face dividing the lap edge generally equally between the rib and web portions.

8. The structure of claim 7, wherein

the half panels include base portions which are disposed against the door side in assembly, the base portions of opposing half panel abutting at the ends of the center line, and the base portion and lap edges being indented at the center line to an extent in accordance with the interlocking slots to permit uniform overlap.

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