Nov. 9, 1971 H. E. VICKERMAN 3,618,274

VARIABLE DIMENSION DOOR LINER PANEL

Filed Jan. 16, 1970 2 Sheets-Sheet 1

FIG_1

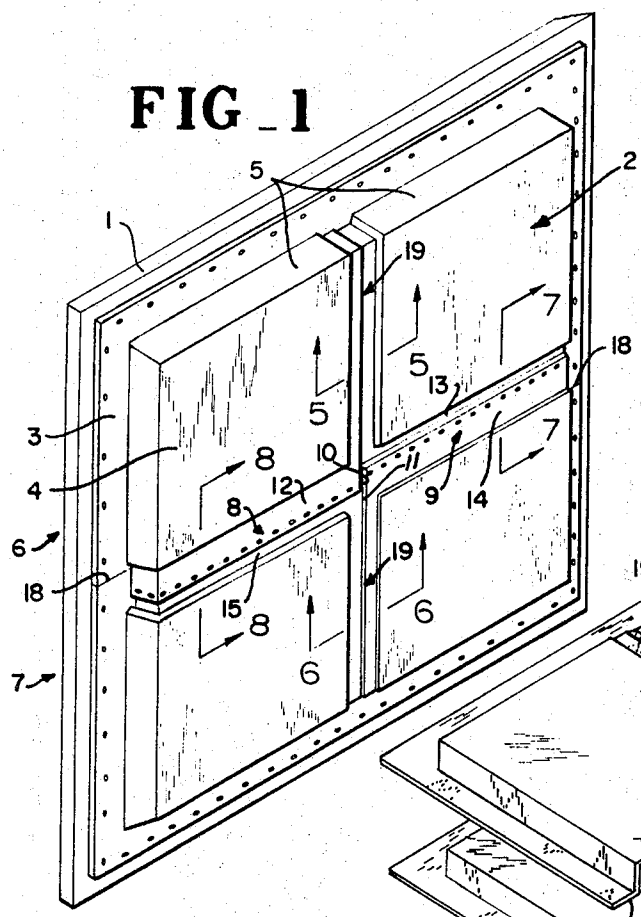
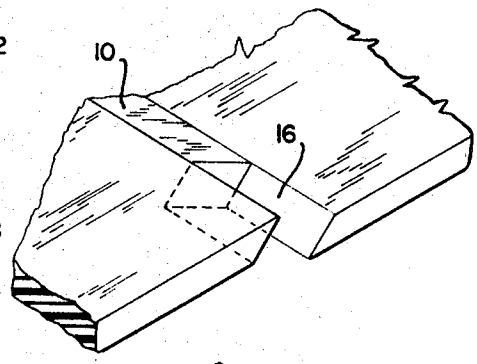


FIG_4



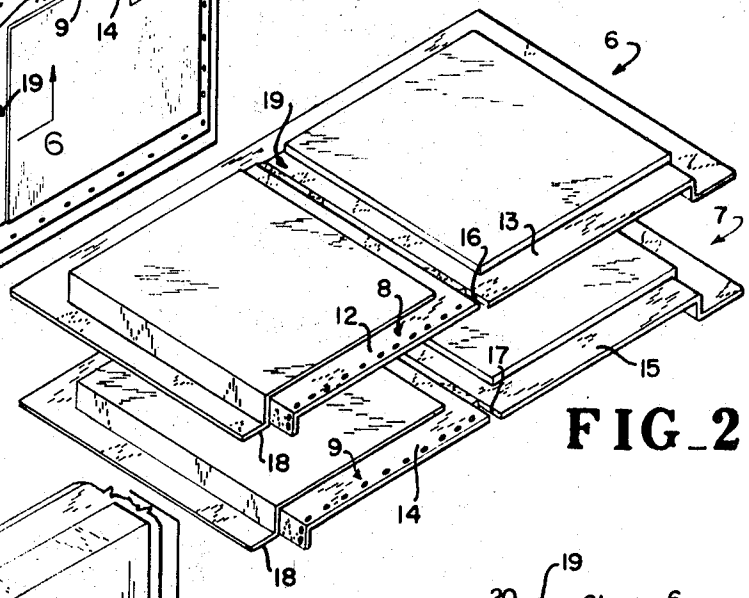


FIG_2

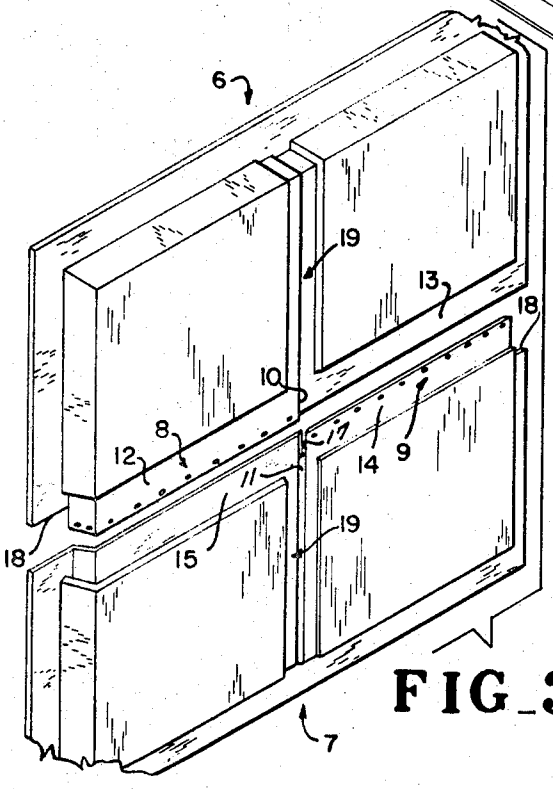


FIG_3

FIG_5

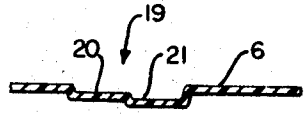


FIG_6

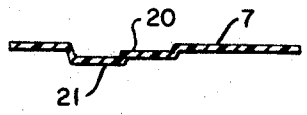


FIG_7

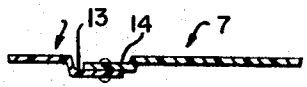
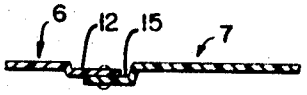


FIG_8



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VARIABLE DIMENSION DOOR LINER PANEL

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FIG_9

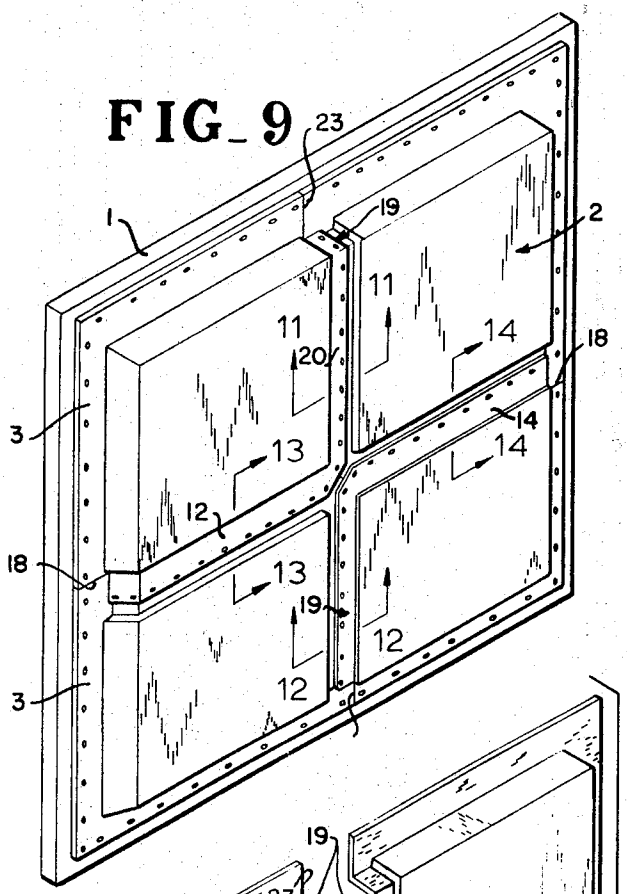


FIG_11

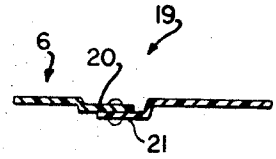


FIG_12

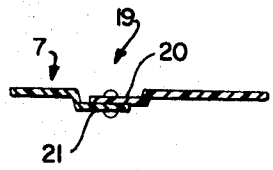


FIG_13

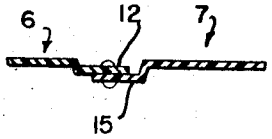


FIG_14

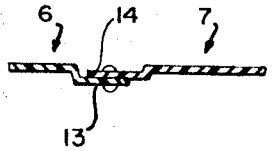
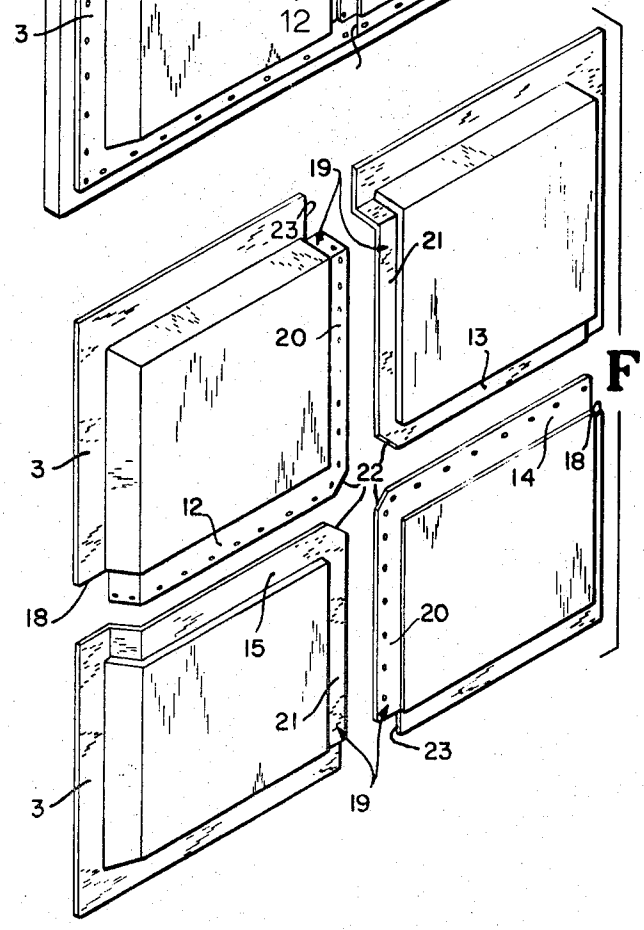


FIG_10



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VARIABLE DIMENSION DOOR LINER PANEL

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Int. Cl. B61d 17/18
U.S. Cl. 52—98 4 Claims

ABSTRACT OF THE DISCLOSURE

A door liner, such as would be employed on railroad refrigerator cars is formed of two half panels which are fabricated in the same mold and may be joined in a lap joint splice along a horizontal center line of the panel. The lap joint splice is provided by complementary, offset, lap joint edges, with each half panel overlapping part of the offset lap joint edge of the other. The half panels have center channels along their vertical center lines, the channels having a central offset to divide the channels into two levels. In order to vary the width of the door liner, each half panel is sawed into two quarter panels along the offset in the center channels, thus forming lap joint edges which may be overlapped and joined as with the horizontal lap joints to form the full door liner.

BACKGROUND OF THE INVENTION

This invention relates to door liners for compartment doors and has particular advantages in use with railroad car doors.

Railroad refrigerator cars commonly have door liners attached to the sides of their sliding doors. These liners provide an insulation space between the door and the panel which comprises the body of the liner, to thus insulate from heat transfer. The panel and insulation space are generally desired to be coextensive with the exterior of the car door, which often has dimensions of 10 feet in width by 10 feet in height.

It has been proposed by a recent inventor, who has filed an application, Ser. No. 820,956, on May 1, 1969 and assigned his application to the assignee of the present application, that the panels be made in halves and splice jointed together. If the half panels are made with offset lap joint edges which complement each other, the half panels may be made in a matched metal die molding process using the same die mold. This prior inventor showed that from two identical half panels of this type, one could be turned around and the two could be spliced together to form a structurally sound, air tight, full door liner.

Thus, it was shown that matched metal die processes could conveniently and economically produce large door liners. However, much of the advantages of this prior invention disappear if a manufacturer is required to develop new matched metal die molds for each customer. Railroad cars have variation in their door sizes and thus require different size door liners. This would normally necessitate the development of the proper size mold for each type of door liner manufactured.

SUMMARY OF THE INVENTION

The invention is a solution to the above problems in the art and further advantages appear in the description and drawings.

The invention is a door liner which may be varied in height and width to fit the particular door. The liner may be formed in half panels in the same mold and then spliced together to form a structurally sound full liner. This structure provides one variable dimension, and to obtain a capability of variance in the other dimension, the half

panels may be cut into quarter panels and spliced together at the position required to fit the door.

To accomplish the first variable dimensioning, the half panels have offset lap joint edges as in the prior invention discussed previously. The variance in the other dimension is accomplished by forming the half panels with a central channel dissecting the half panels normal to that direction. The central channels is offset along its center line to divide the channel into an upper channel level and a lower channel level. When the second dimension is desired to be shortened, the half panels are sawed in half along the offset in the channel and the upper portion becomes a lap joint edge which is extended over the lower portion, being now another lap joint edge, and joined together. The same is done for the second half panel, which is oriented 180° around from the first.

The liner is thus divided into quarter panels which may be splice jointed to each other to provide a door liner with a double overlap jointed structure, one overlap for each dimension. To facilitate the double overlap, the central portion of the lap joint edges, where the edge of the vertical and horizontal lap joint edges meet, is cut diagonally across. Quarter panels on each two diagonally opposed corners will thus meet at the central point and two diagonally opposed quarter panels will contiguously overlap the edges of the other two diagonally opposed quarter panels.

The invention thus provides a doubly variable dimension door liner. The overlapping edges and diagonal cut at the central point result in an airtight and structurally sound liner, without the binding and stressing of parts. Still, the half panels may be formed in one mold, as a matched metal die mold, to save on tooling expense. Further saving of tooling expense is the result of being able to provide variable dimensions in two directions from the same basic panels formed in the one mold.

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

In the drawings:

FIG. 1 is a perspective view of the invention;

FIG. 2 is a perspective view of the structure shown in FIG. 1 with the half panels disassembled;

FIG. 3 is an exploded perspective of the structure shown in FIG. 1;

FIG. 4 is an enlarged view of a portion of FIG. 2;

FIG. 5 is a section taken along lines 5—5 of FIG. 1;

FIG. 6 is a section taken along lines 6—6 of FIG. 1;

FIG. 7 is a section taken along lines 7—7 of FIG. 1;

FIG. 8 is a section taken along lines 8—8 of FIG. 1;

FIG. 9 is a perspective view of the invention showing its use in a second form;

FIG. 10 is an exploded perspective of the structure in FIG. 9;

FIG. 11 is a section taken along lines 11—11 of FIG. 9;

FIG. 12 is a section taken along lines 12—12 of FIG. 9;

FIG. 13 is a section taken along lines 13—13 of FIG. 9; and

FIG. 14 is a section taken along lines 14—14 of FIG. 9.

DESCRIPTION

The drawings illustrate a railroad car door 1 adapted to be slidably attached over a car door opening of a railroad refrigerator car, not shown. Door 1 is a conventional, flat sliding door, which may be rectangular or square as shown.

The car door has a full door liner 2, which is constructed in accordance with the invention, and attached to one flat side. Liner 2 is generally coextensive with the flat side of the car door and has a complementary rectangular configuration. Shown turned 270° clockwise from the liner in the aforementioned copending application, liner 2 can be oriented as desired.

The general apearance of liner **2** is that of the conventional liner, having a base **3** around the perimeter and a raised body panel **4** connected to the base by side walls **5**. In assembly, base **3** is secured to door **1** and together, the door and liner provide an insulating space over the flat face of the door.

As in some present door liners, liner **2** may be formed of fiber reinforced plastic sheets which are shaped in die molds. If desired, body panel **4** may have a corrugated surface, with a plurality of raised ribs, which are not shown in the embodiment in the drawings.

In accordance with the invention, liner **2** is comprised of two identical half panels **6** and **7**, panel **7** being turned 180° from panel **6** in assembly. Being identical, the same mold may be utilized to form both panels in a matched metal die molding process performed on fiber reinforced plastic sheets. The liner shown in FIGS. 1–8, has its panels **6** and **7** lap jointed only in the horizontal direction to illustrate the configuration of the liner when full width is desired.

In this configuration, half panel **6** and half panel **7** have adjacent and complementary lap joint edges **8** and **9**, respectively, which are joined in contiguous overlapping relation along the horizontal center lines of the liner. Lap joint edges **8** and **9** are offset at offset faces **10** and **11**, respectively, which are oppositely slanted portions of the edges disposed at the midpoint of the liner. Offset **10** divides lap joint edge **8** into a raised edge portion **12** and a recessed edge portion **13** and, in complement, edge **9** has raised portion **14** offset from recessed edge portion **15**.

Offset faces **10** and **11** have complementary slots **16** and **17** so that the panels may be spliced together such that raised edge portion **12** contiguously overlaps the matching recessed edge portion **15** of panel **7**, and similarly, raised edge portion **14** overlaps recessed edge **13** on the other side of the horizontal center line.

Also, to permit this overlap, each panel has at one end of its edge **8** or **9**, an indentation **18** in its base **3** and extending into the base of raised edge portion **12** or **14**. Thus, the base of each half panel will meet as the half panels are spliced together. Fasteners or epoxy can secure the lap joints together as desired.

Thus in this orientation, the height of line **2** can be varied by adjusting the overlap of edges **8** and **9**. It is contemplated that, once adjusted, the door liner would not often be changed again. This being the case, it would be preferable to mold the half panels without the slots and indentations. When the door size is determined, the appropriate size slots and indentations may be cut out. Assembly of liner **2** is then accomplished by simply turning one panel 180° from the other and interlocking the slots. The fasteners or epoxy are then affixed to provide a rigid liner.

For assembly of liner **2** in this orientation for a door with less width, the half panels **6** and **7** are cut to form quarter panels after the half panels have been molded. The configuration of the liner in this use is shown in FIGS. 9–14. Each half panel has, for this purpose, a cross lap joint area, comprising a center channel **19**, which extends from top to bottom along a vertical center line of the half panel **6** or **7**. Along the vertical center line, which extends through offset face **10** or **11**, each channel **19** is offset to the same degree, therefore dividing its channel bottom into a raised channel portion **20** and a recessed channel portion **21** along the length of the channel. The raised portions **20** are in the quarters having raised lap edge portions **12** and **14** and the recessed channel portions **21** are in the quarters having the recessed lap portions **13** and **15**. Thus, the panels are made identically in one mold and when readied for assembly, one is reversed in position to complement the raised and lowered portions of the other panel so that overlap may be provided.

When a liner of less width is desired, each half panel **6** and **7** is severed along the offsets of channels **19** to provide quarter panels. When this is done, raised channel

portions **20** become raised lap edges and recessed channel portions **21** become recessed lap edges. Two quarter panels then have raised lap edges at the center lines and two quarter panels have recessed lap edges at the center lines. The quarter panels are assembled in the desired dimension by extending each of the raised lap edges into contiguous overlapping relation with the appropriate recessed edges on opposing quarter panels.

This double overlap is facilitated by providing a diagonal corner **22** across the junctions of the laps edges **8** and **9** with the channels **19**. As seen best in FIG. 10, each quarter panel has a diagonal corner **22** across its lap edges at the central point of the full liner **2**. When assembled, two quarter panels will have their lap edges over the lap edges of two other quarter panels, and diagonal corner **22** of the top two quarter panels meet at the center. Underneath, the quarter panels which have bottom lap edges also meet each other at their corner **22** in the center.

Also facilitating the double overlap, indentations **23** are provided in the bases **3** and at the base of the raised channel portion **20** on the two quarter panels which overlap the other two. Thus, the raised channel lap edges may be extended over the complementary lower channel lap edges until the bases of the two quarter panels engage to provide the proper width for liner **2**.

In operation, two half panels **6** and **7** are made in the same die mold by a matched metal die molding process. The half panels may be in the configuration illustrated in FIG. 2 with the offset lap edges **8** and **9** and offset faces **10** and **11**. Channels **19** are also molded in the half panels but are, at this time, uncut.

If a full size door liner is desired, slots **16** and **17** and indentations **18** are then cut to the proper size. One half panel is turned 180° and slots **16** and **17** are interlocked. Epoxy is applied or holes bored and fasteners are put in place to rigidly assemble the linear. The height of the liner may be varied by varying the depth of slots **16** and **17** and indentations **18**. If reoriented 90° or 270°, the variance would be in width.

Where variance in the other dimension is desired for a door liner, the half panels may still be matched metal die molded in the same mold. However, after molding, the half panels are severed in two along the offset dividing channels **19**. Indentations **18** and **23** are cut to the proper depth and diagonal corners **22** are provided. The quarter panels then are assembled with epoxy or fasteners with the lap edges of two quarter panels contiguously overlapping each pair of lap edges in the other quarter panels. As the panels are secured, a rigid door liner results. The height and width of the door liner may be varied by proper variances in the depths of indentations **18** and **23** and diagonal corners **22** so that more or less overlap is provided.

Other methods of providing the slots and indentations and of halving the half panels may be employed. For example, suitable removable divider members or removable mold projections may be used in the matched metal dies, so that the panels will be in the halved or quartered condition with the proper depth of indentation and center cuts or slots as desired. The mold projections could be replaced to provide varied shapes and sizes.

Thus, the invention is a door liner which may be varied in height and width, yet may be assembled for structural soundness and for sealed enclosures from two half panels made in the same mold.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims which particularly point out and distinctly claim the subject matter which is regarded as the invention.

I claim:

1. In a liner panel for attachment to aside of a compartment door, the door liner being formed of two generally rectangular and identical half panels being turned 180° from each other and joined by complementary offset lap joints on each half panel along a first center

line in a first rectangular dimension; the improvement comprising:

two identical lap joint areas, one being on each half panel and one turned 180° from the other; said lap joint areas being disposed along a second center line in a second rectangular dimension; and said lap joint areas having an offset along said second center line to divide said areas into a raised portion and a recessed portion for selective severing along said offset to provide variance in said second rectangular dimension.

2. The invention of claim 1, wherein said raised portions extend outward from said recessed portion a distance such that said raised portions contiguously overlap said recessed portions when the panels have been severed along said offset and assembled.

3. The invention of claim 2, and including a base around the periphery of said liner, said half panels extending upward from said base; and wherein the base is indented at both ends of said second center line when the panels have been severed along said offset and said lap joint areas overlapped, the depth of indentation permitting said overlap of said lap joint areas.

4. The invention of claim 1, wherein the door liner is in quarter panels in disassembly when the panels have been severed along said offset, and each panel having a diagonal corner at the juncture of said quarter panels in the center of said door liner, whereby the center corners of diagonally opposing quarter panels meet along said diagonal corners in assembly.

References Cited

UNITED STATES PATENTS

1,119,778	12/1914	Conwell	52—618
3,488,900	1/1970	Reid	52—592

JOHN E. MURTAGH, Primary Examiner

U.S. Cl. X.R.

52—521, 592; 105—423