

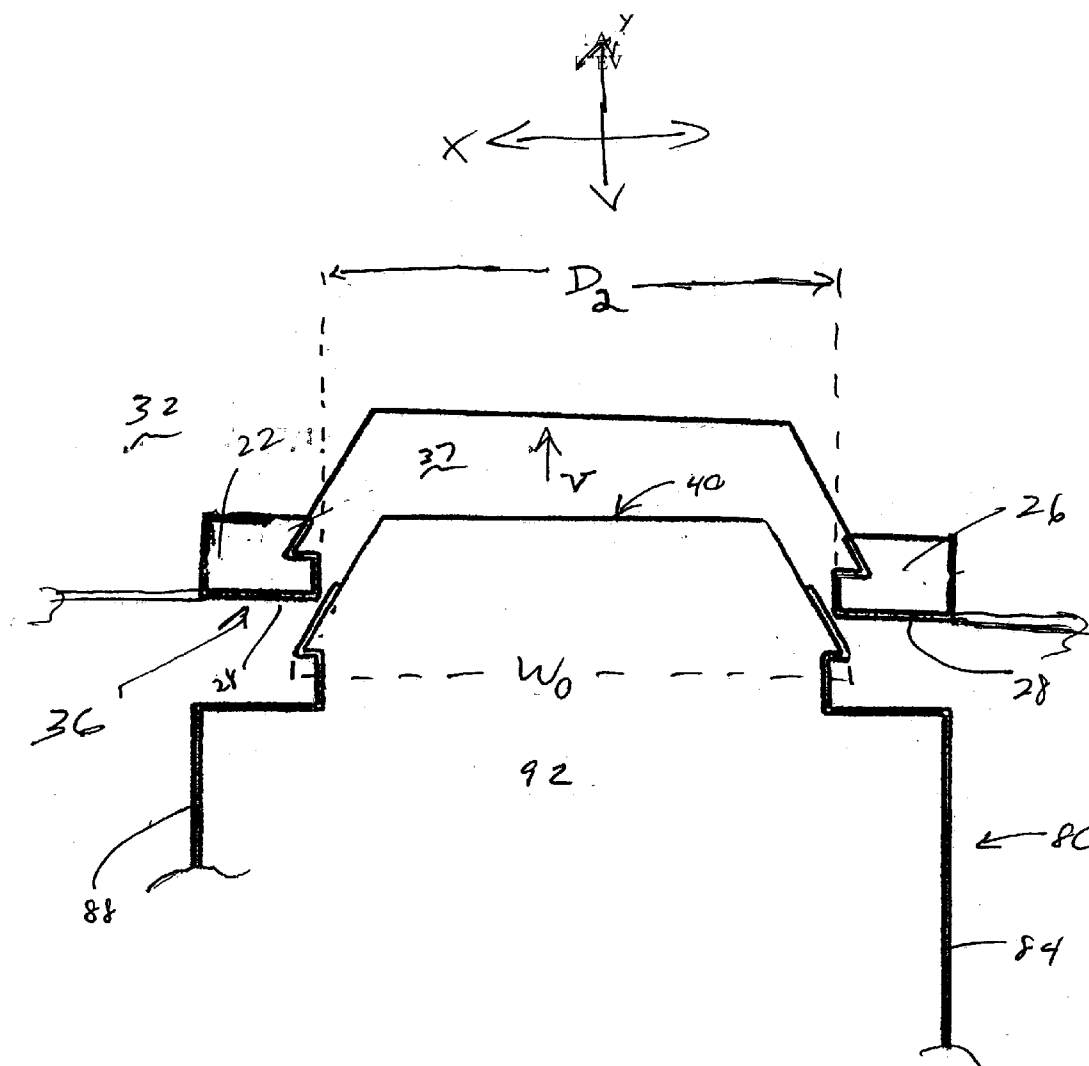


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(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0034419 A1****Randall, SR. et al.**(43) **Pub. Date: Feb. 17, 2005**(54) **SNAP-IN PANEL DESIGN FOR A REFRIGERATION COOLER**(52) **U.S. Cl. 52/782.1**(76) **Inventors: Grant E. Randall SR., Memphis, TN (US); Brent A. Gilliland, Olive Branch, MS (US)**(57) **ABSTRACT**

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An insulated refrigeration panel has a first skin and a second skin. The second skin is spaced generally parallel to the first skin. A first insulating body is sandwiched by the first skin and the second skin. The first skin, the second skin and the insulating body form a panel unit. A first snap fit connector and a second snap fit connector is integrally formed with the panel unit. The first snap-fit connector allows engagement of a mating connector along the first direction while the second snap-fit connector allows flexible engagement of a second mating connector along the second direction transfers to the first direction.

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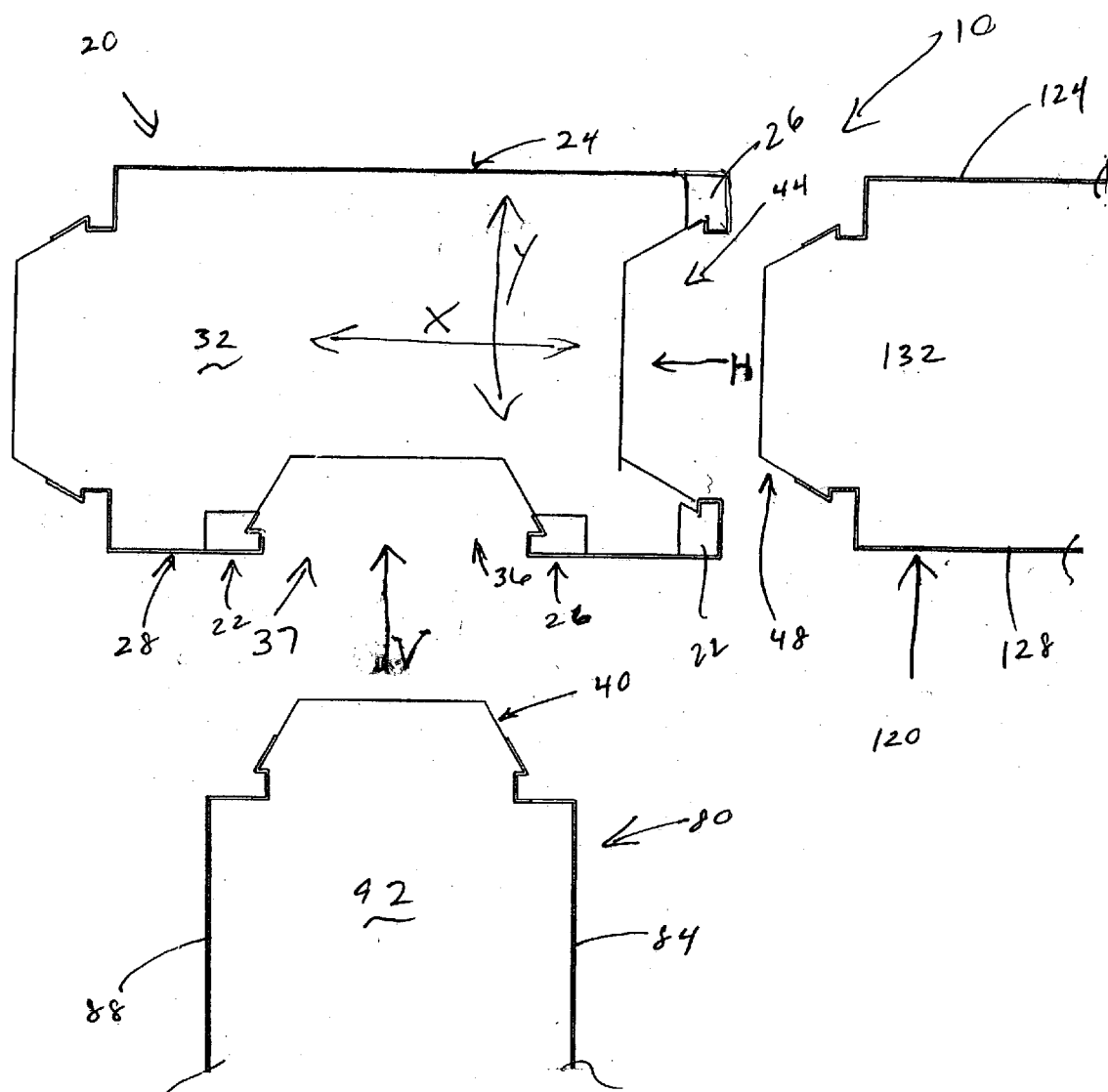


Figure 1

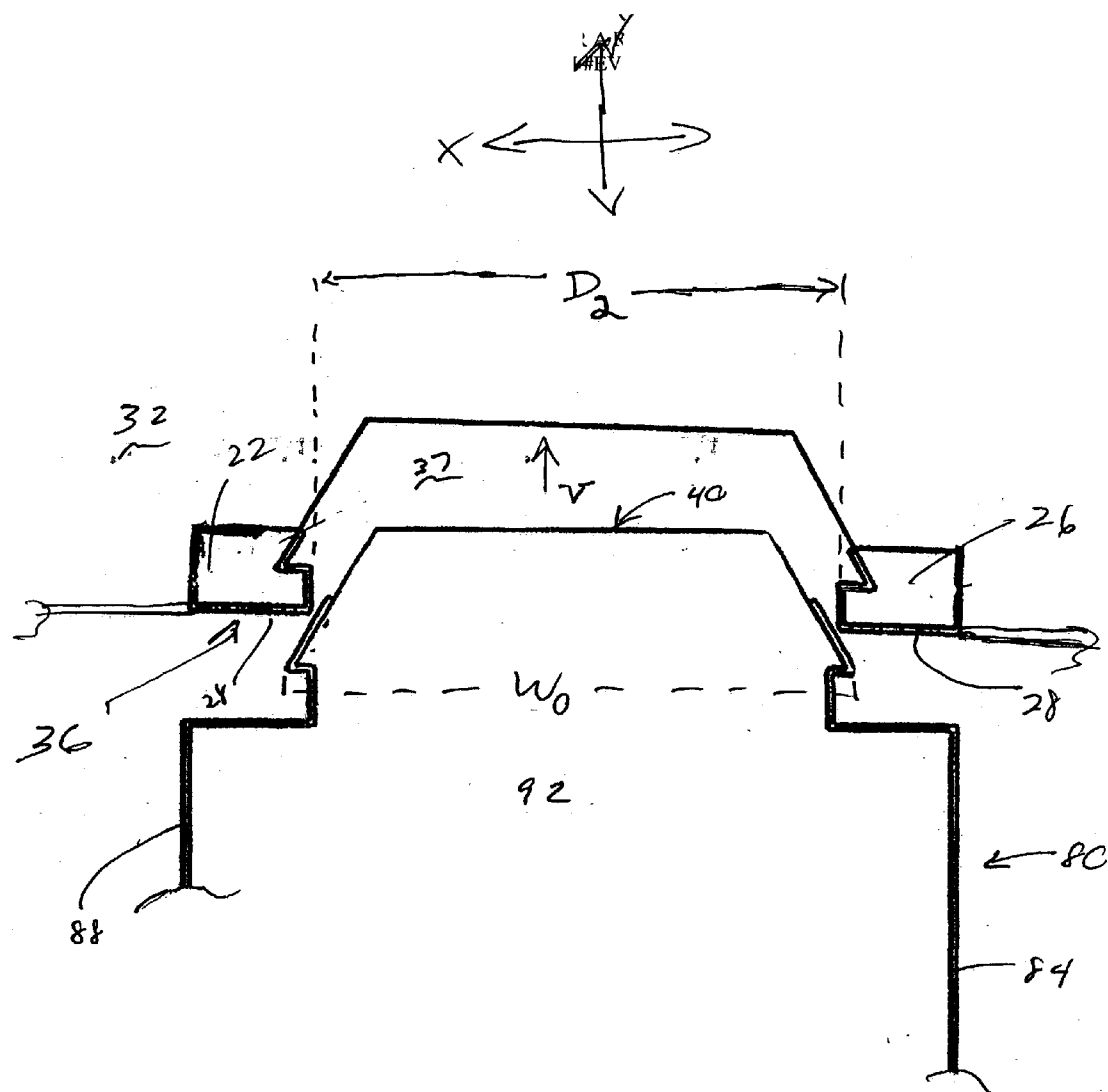


Figure 2

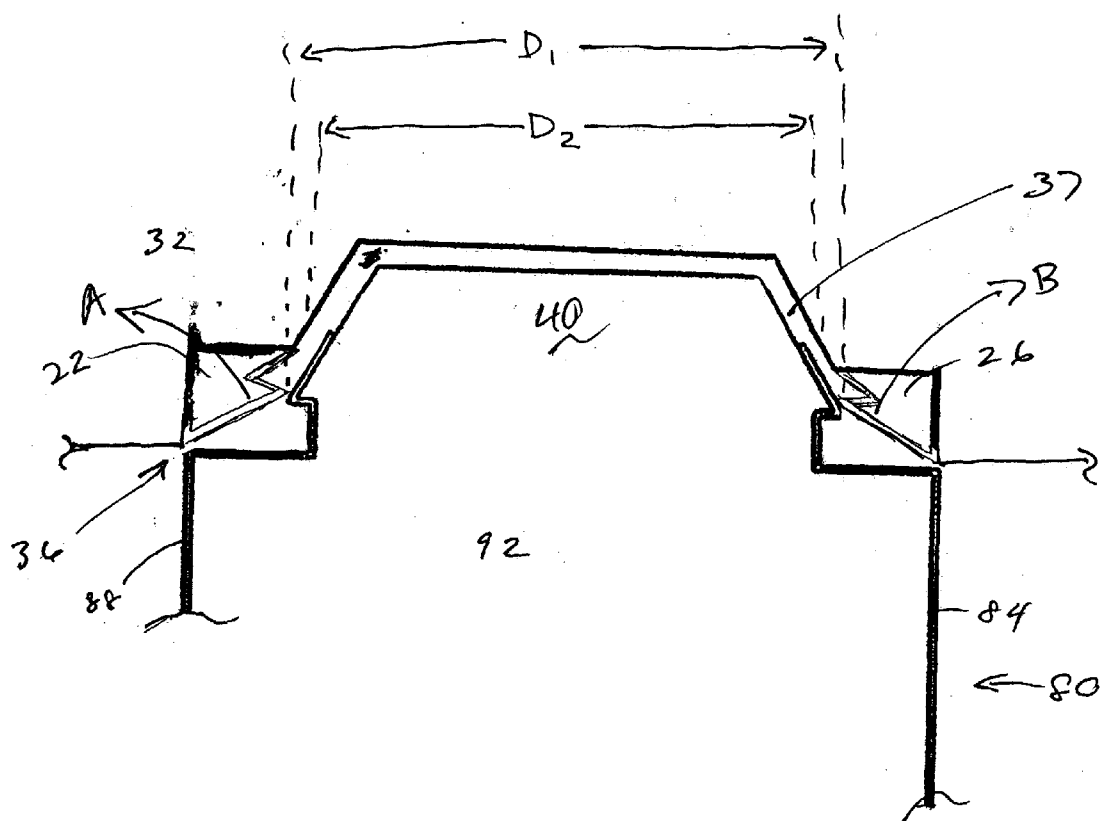


Figure 3

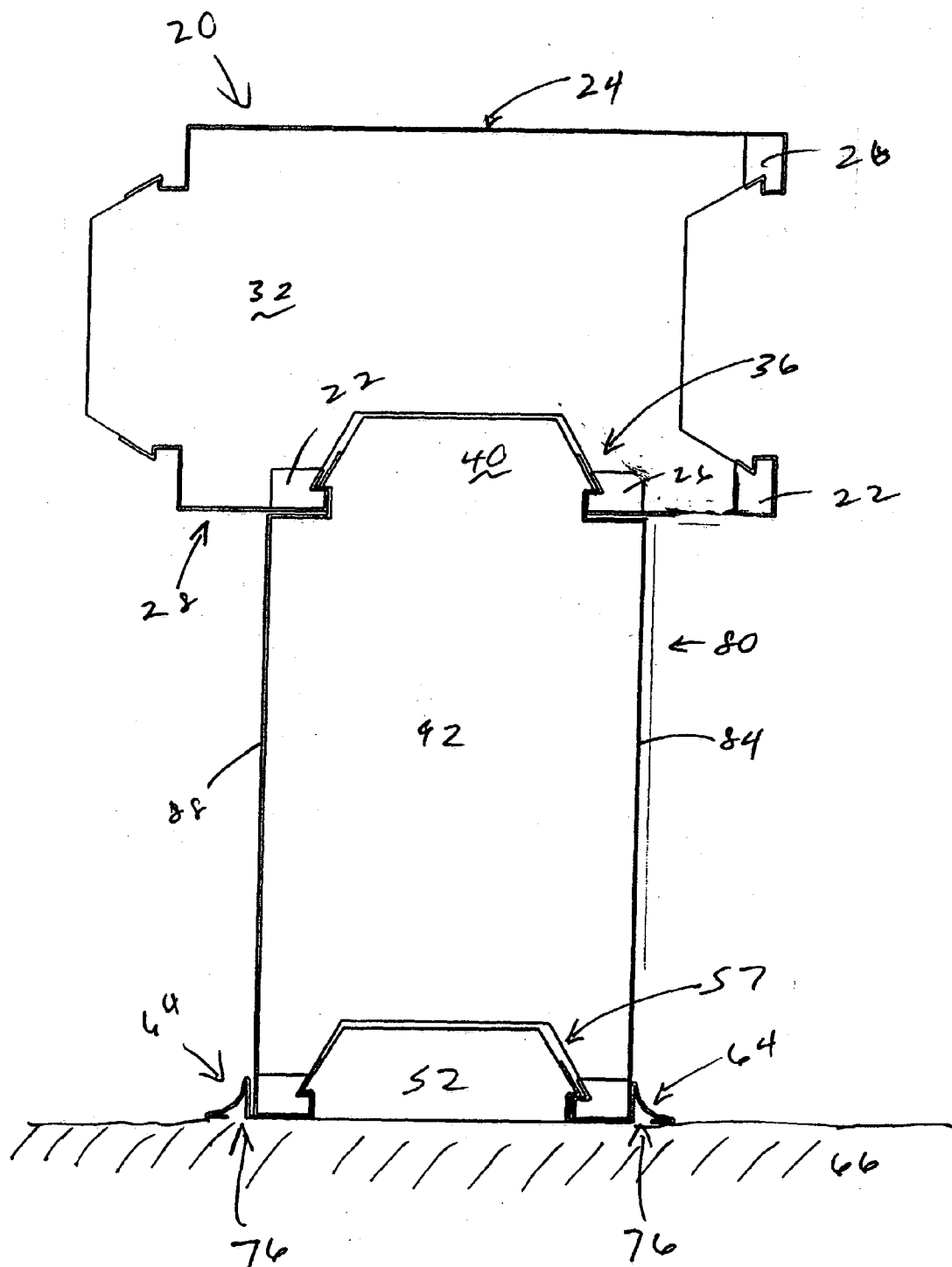


Figure 4

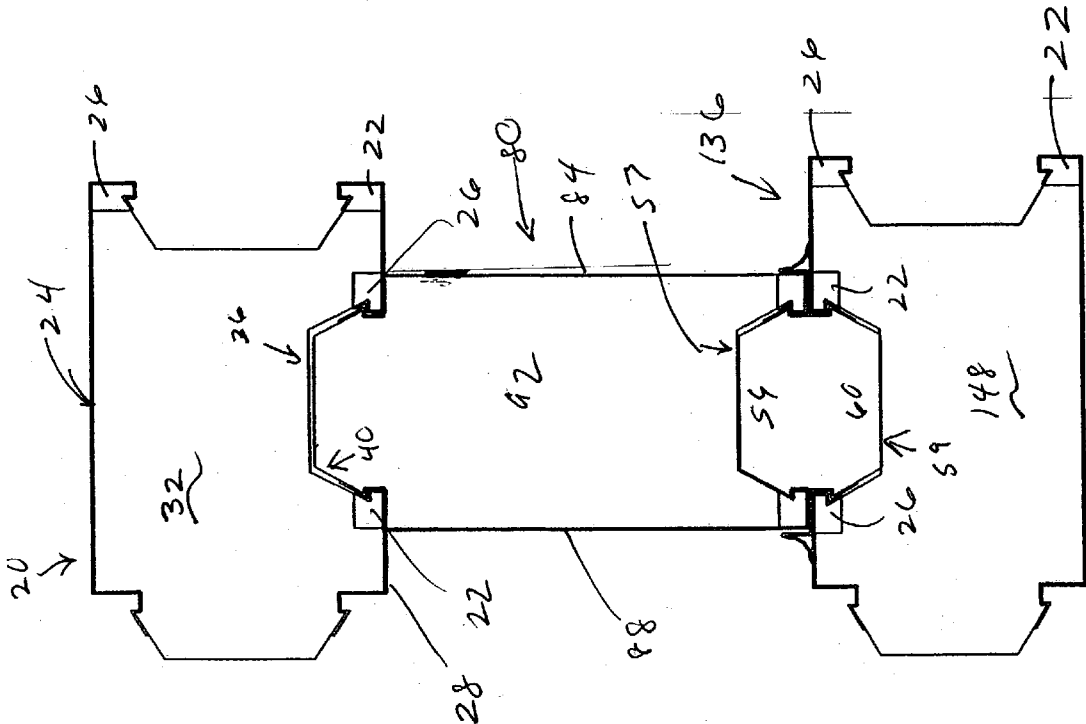


Figure 5

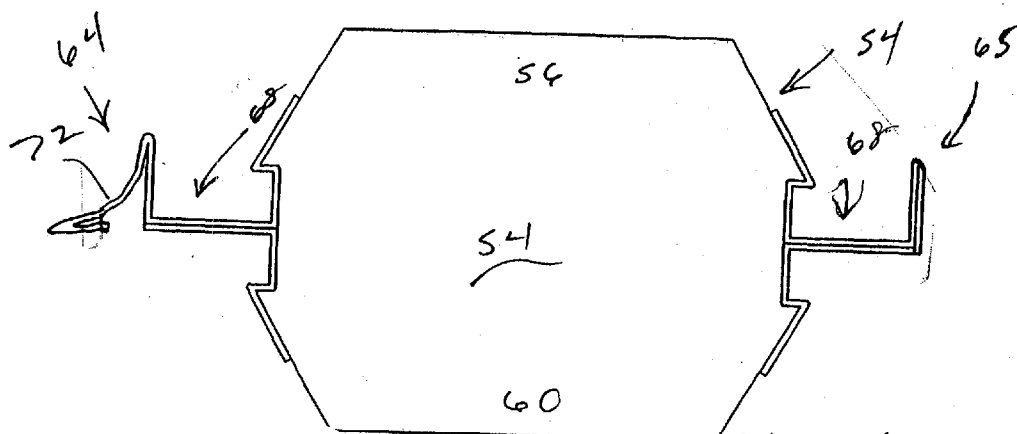


Figure 6A

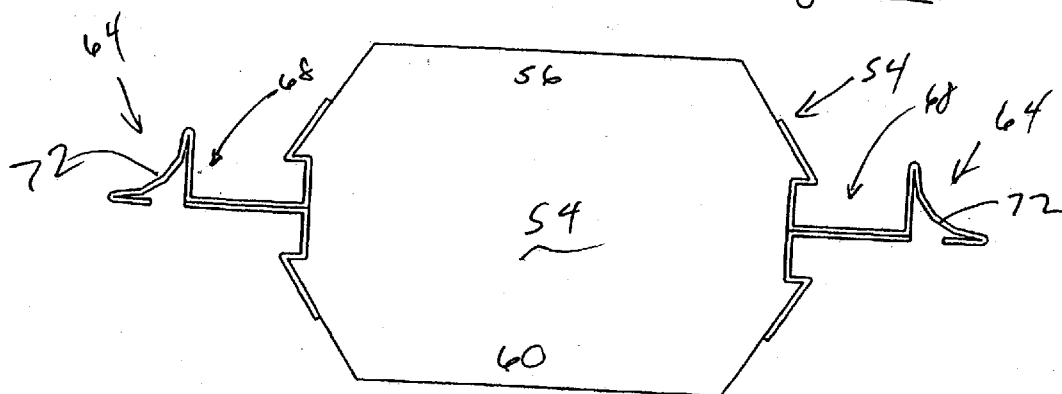


Figure 6B

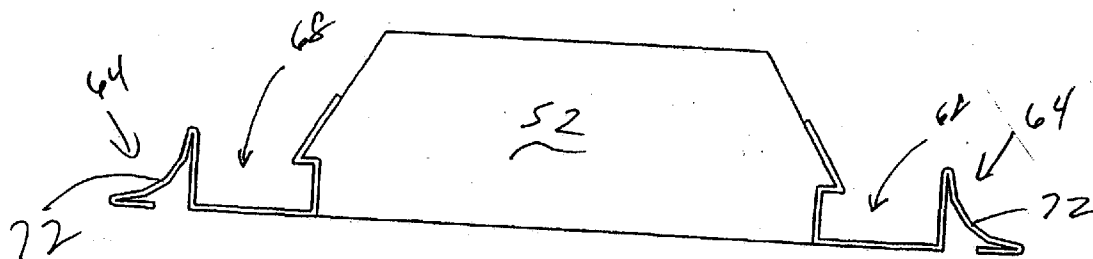
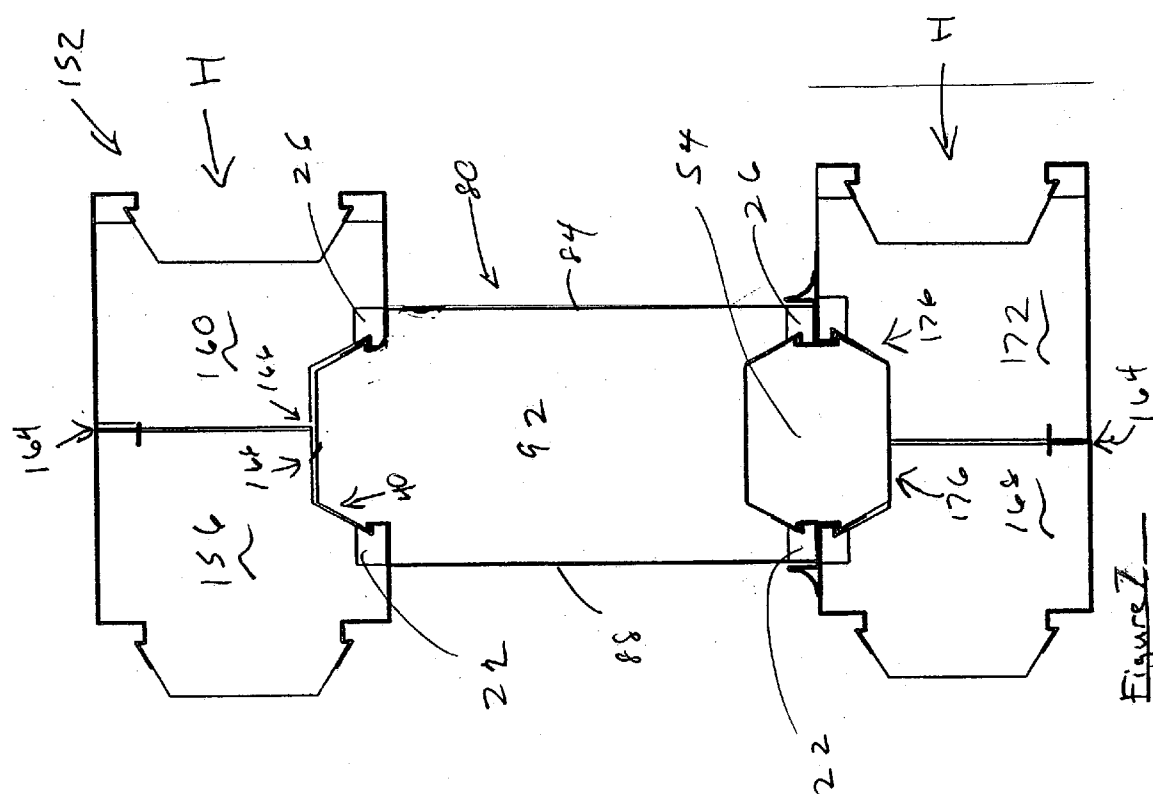


Figure 6C



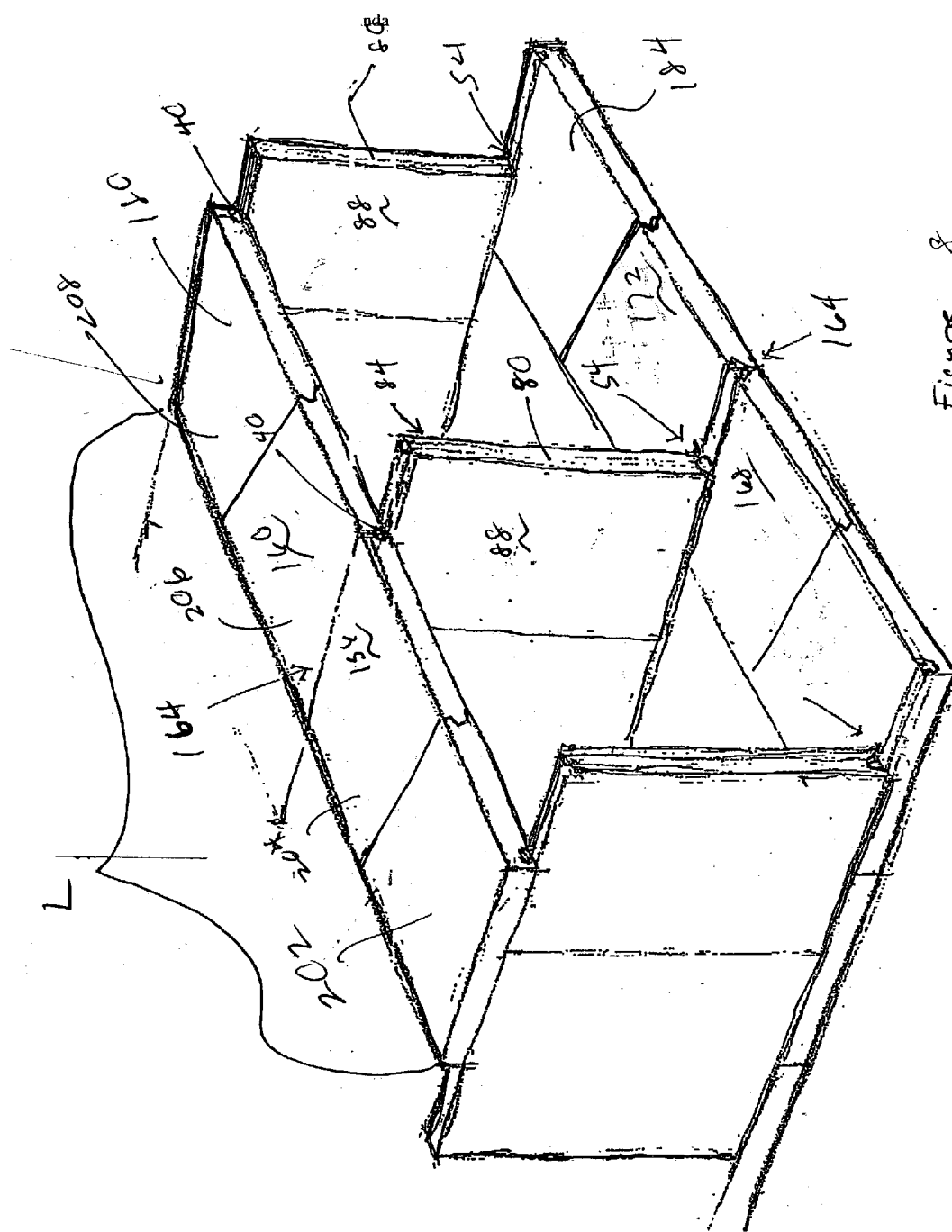


Figure 8

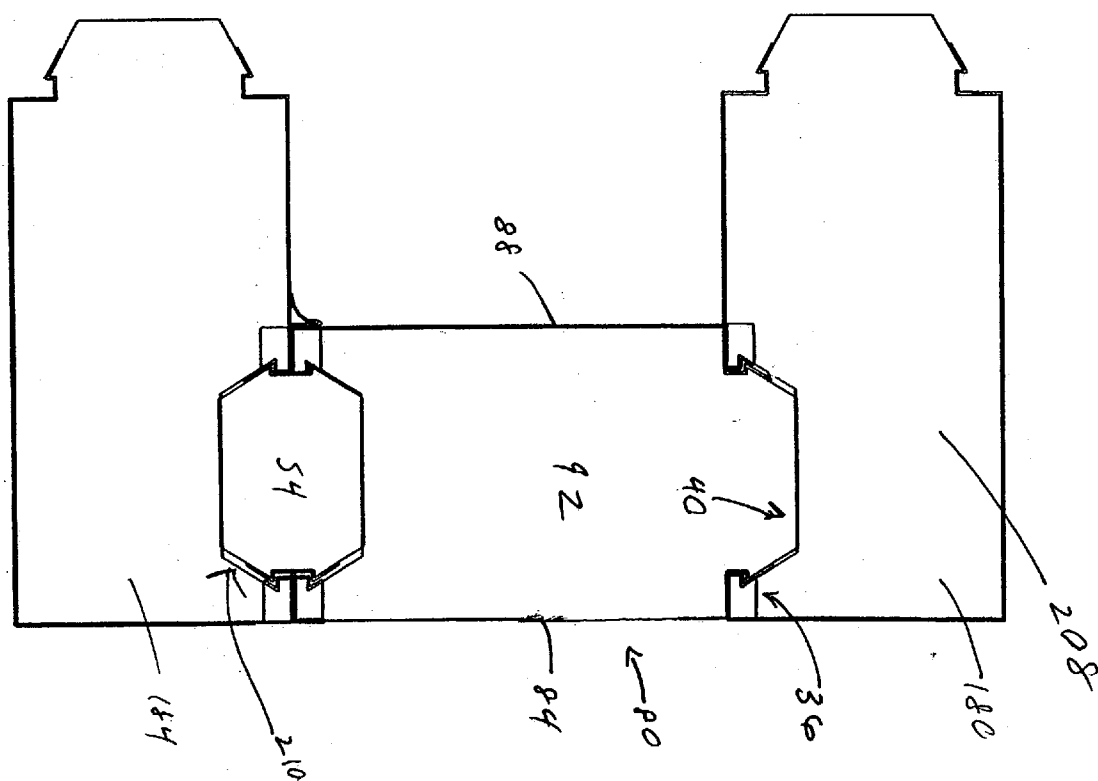


FIGURE 9

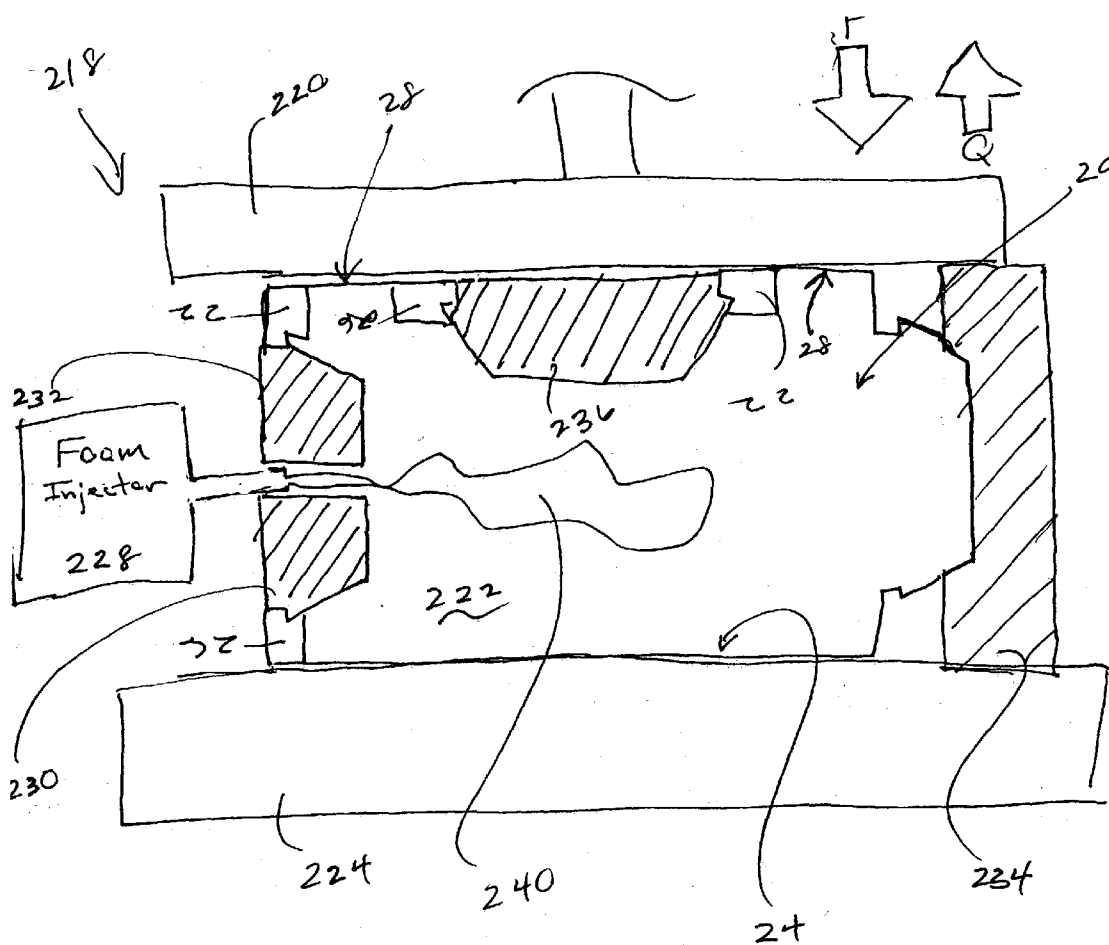


Figure 10

SNAP-IN PANEL DESIGN FOR A REFRIGERATION COOLER

BACKGROUND OF THE INVENTION

[0001] This invention relates to an insulated refrigeration panel assembly for an insulated cooling structure, such as a walk-in cooler, a refrigerated display cabinet, a beverage cooler and other insulated structure.

[0002] Refrigerated goods are typically stored in an insulated space prior to their use or consumption. Such a space, such as offered by a walk-in cooler, may be erected and/or constructed on-site from a number of panels. For example, a walk-in cooler is typically constructed from insulated refrigeration panels. Each insulated refrigeration panel has an inner and outer skin. These skins sandwich an insulated foam, such as urethane. The inner and outer skins provide a smooth surface for cleaning while the insulating foam serves to keep goods cool.

[0003] The insulated refrigeration panels may form the walls, the ceiling and the floor of the insulated space. For a walk-in cooler, the various wall, ceiling and floor panels are brought to the job site, erected, and then assembled using fasteners to attach the panels together. The fastening of these panels is both time consuming and costly. It is therefore desirable to eliminate the need for fasteners and to reduce the amount of time required to assemble these insulated refrigeration panels together.

[0004] One particular panel design eliminates the need for fasteners between panels by allowing the panels to be joined by a snap-fit connection at the end of each panel. Accordingly, each panel is inserted to another panel from end to end to create the walls or roof of the cooler. This design eliminates the need for separate fasteners.

[0005] These existing snap-fit panels are produced on a conveyor belt in sections. Because these panels are produced in this fashion, the snap-fit connectors are located only at the ends of the panel. Due to this limitation, the number of structural configurations that may be made from these snap-fit panels is also thereby limited.

[0006] A need therefore exists for an insulated refrigeration panel assembly that offers the convenience of a snap-fit connector without the limitation of the foregoing design.

SUMMARY OF THE INVENTION

[0007] The present invention comprises an insulated refrigeration panel assembly that offers a greater variety of panel configurations than existing designs. Like existing panel assemblies, the inventive insulated refrigeration panel has two skins that sandwich an insulating foam. In contrast to existing designs, however, integrated snap fit connectors permit connection of one panel to another panel not only along the panel but also across the panel. In this way, a single panel may be connected to two panels: one panel that fits end-to-end and another panel that intersects the other panel. Further, panels may engage one another in both a vertical and horizontal direction. Accordingly, a greater variety of structural configurations are available for the design of an insulated space.

[0008] The insulated refrigeration panel assembly has a first skin and a second skin spaced generally parallel to the

first skin. The skins sandwich an insulating body, such as a urethane foam. A first snap-fit connector allows flexible engagement of a mating connector along one direction while a second snap-fit connector allows flexible engagement of a second mating connector along another direction. The snap-fit connectors are formed by the panels themselves, i.e., skins and insulating body, rather than by any separate connector. In this way, assembly time of the insulated space is greatly reduced because there is no need to install separate connectors to attach one panel to another.

[0009] The snap-fit connector may have features that allow flexing between two different dimensions. One dimension of the snap-fit connector allows a mating connector to be received while the other dimension locks the two connectors together.

[0010] Like the snap fit connector, the mating connector may be an integrated part of a panel or may be just another insulating body. This second insulating body may have a first end portion and a second end portion. The first end portion fits within the snap-fit connector while the other end portion may allow another snap-fit connector to fit over. Accordingly, the mating connector may serve to join two of the same type of snap-fit connectors. A flange may be attached to the second insulating body that covers a joint between two panels. The flange may be curved. This flange serves to cover the seam between panels to facilitate clean-up of the refrigerated panels and prevent the collection of food between panels.

[0011] A panel may comprise two distinct bodies. One body may define part of the snap-fit connector while the other body may define the other part of the snap-fit connector. The snap-fit connector may further be a female member engageable to a mating connector, such as a male member which is insertable into the female member. The female member may flex between a first dimension larger than a second dimension to receive the male member. The male member may then be engaged to the female member when in the second dimension.

[0012] The inventive panel assembly may thus be constructed from three different panels, each comprising two skins sandwiching an insulating body. A single panel may be connected to two others in two different directions. In addition, the inventive refrigerated panel assembly permits another panel to intersect the single panel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The various features and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the currently preferred embodiment. The drawings that accompany the detailed description can be briefly described as follows:

[0014] **FIG. 1** illustrates a plan view of the inventive insulated refrigeration panel assembly.

[0015] **FIG. 2** illustrates a snap-fit connector prior to insertion of a mating connector.

[0016] **FIG. 3** illustrates the insertion of the mating connector into the snap-fit connector of **FIG. 2**.

[0017] **FIG. 4** illustrates the mating connector completely inserted into the snap-fit connector.

[0018] FIG. 5 illustrates the panel of FIGS. 1-4 attached to another panel with a mating connector.

[0019] FIGS. 6A-6C illustrates various mating connectors.

[0020] FIG. 7 illustrates panels constructed from two distinct bodies to form snap-fit connectors.

[0021] FIG. 8 illustrates panels forming an insulated refrigeration space.

[0022] FIG. 9 illustrates one panel simply intersecting another panel with the inventive features.

[0023] FIG. 10 illustrates a method of constructing the inventive insulated refrigeration panels.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0024] FIG. 1 illustrates inventive refrigeration panel assembly 10. Here, panel assembly 10 is made from three panel units: first panel unit 20, second panel unit 80, and third panel unit 120. First panel unit 20 has first skin 24 spaced generally parallel along the X-axis to second skin 28. First insulating body 32 is sandwiched between the two skins 24, 28. In contrast to existing wall panel assemblies, first panel unit 20 is made by placing panel skins 24 and 28 in a press with a foam, such as a urethane foam, shot between the two skins 24, 28. The urethane foam may have a density of two pounds per cubic foot. Because first panel unit 20 is constructed by a press rather than a conveyor operation, first panel unit 20 may have two snap-fit connectors: first snap-fit connector 36 is constructed to receive a mating connector along the Y-axis while second snap-fit connector 44 is constructed to receive a mating connector along the X-axis. Axes X and Y are transverse to each other.

[0025] Accordingly, first panel unit 20 may flexibly engage mating connectors in two different directions. One direction may be horizontal while the other direction may be vertical, for example. This increased freedom of engagement allows first panel unit 20 to be used for the construction of a wall to wall corner, a ceiling and wall corner, or a floor and wall corner.

[0026] Second panel unit 80 is constructed in like fashion to first panel unit 20. Third skin 84 and fourth skin 88 sandwich second insulating body 92, a urethane foam, and may form an integral first mating connector 40 that may be received in a snap-fit fashion by first snap-fit connector 36. Second panel unit 80 may have a snap-fit connector on the other end or alternatively another mating connector depending upon the particular configuration desired.

[0027] Likewise, third panel unit 120 has fifth skin 124 spaced generally parallel from sixth skin 128. A urethane insulating foam forms third insulating body 132. Fifth skin 124 and sixth skin 128 and third insulating body 132 form second mating connector 48 to be received by second snap-fit connector 44. Third panel unit 120 may also have another snap-fit connector on its other end or another mating connector. As shown in FIG. 1, first panel unit 20 may receive second panel unit 80 in the direction of arrow V along the Y-axis and receive third panel unit 120 in the direction of arrow H along the X-axis in a snap-fit fashion.

[0028] The snap-fit connection will now be explained. FIG. 2 illustrates how first snap-fit connector 36 may

flexibly engage with first mating connector 40. As shown, first snap fit connector 36 comprises a female member sized to mate with first mating connector 40, here a male member that is inserted along the direction of arrow Y into the female member. As mating connector 40 moves in the direction of arrow V along the Y-axis into first snap-fit connector 36, mating connector 40 will encounter first flexible portion 22 and second flexible portion 26. First flexible portion 22 and second flexible portion 26 each comprise a gasket or sponge placed between insulating body 32 and second skin 28. The space between first flexible portion 22 and second flexible portion 26 has dimension D_2 , which is smaller than the outer width W_0 of mating connector 40. Accordingly, as mating connector 40 is inserted into snap-fit connector 36, as shown in FIG. 3, mating connector 40 causes first flexible portion 22 and second flexible portion 26 to retreat in the direction of arrows A and B, respectively, to cause opening 37 to expand from dimension D_2 to dimension D_1 , which is the same dimension as width W_0 of first mating connector 40. Once first mating connector 40 is completely received within opening 37 of first snap fit connector 36, first flexible portion 22 and second flexible portion 26 spring back to their original form as shown in FIG. 4 to thereby engage or lock first mating connector 40 to first snap-fit connector 36. In this fashion, each snap-fit connector may engage with each mating connector.

[0029] As further shown in FIG. 4, second panel unit 80 may form a wall of a walk-in cooler or other refrigeration space while first panel unit 20 may form a top panel. In the event that second panel unit 80 is located on floor 66, second insulating body 52 may be used to fill another snap-fit connector 57 and provide a better foundation on floor 66. As shown, a joint or seam 76 is formed between floor 66 and second panel unit 80. Flange 64, having a curved portion, may cover joint/seam 76. Flange 64 prevents debris from collecting between panels and presents a rounded corner to facilitate cleaning.

[0030] As shown in FIG. 5, alternatively, rather than placing second panel unit 80 on floor 66, second panel unit 80 may intersect another panel unit, here floor panel unit 136, which is constructed in like fashion as the other panel units. Rather than use second insulating body 52, another insulating body 54 having first end portion 56 to mate with snap-fit connector 57 is provided as well as second end portion 60 to mate with another snap-fit connector 59. In this way, wall panel assembly 80 may be flexibly engaged to floor panel unit 148.

[0031] FIGS. 6A-6C illustrate in a close-up view of each of the unique insulating bodies used with snap-fit connector 57. FIG. 6A and 6B illustrate a close-up view of insulating body 54. The only difference between FIG. 6A and FIG. 6B is the type of flange employed. FIG. 6A has flange 64 and flange 65. Flange 64 has first portion 68 to receive second panel unit 80 as well as second portion 72, here a curved surface, to cover joint 76. Flange 65 merely has first portion 68. FIG. 6B illustrates insulating body 54 having two of the same flanges, here flange 64. FIG. 6C illustrates insulating body 52 of FIG. 4 having flange 64.

[0032] As shown in FIG. 7, panel units may be formed in sections. Here, top panel unit 152 comprises first body 156 and second body 160. First body 166 is pressed into second body 160 at border 164 in the direction of arrow H.

Similarly, second bottom panel unit **164** has third body **168** and fourth body **172**. Fourth body **172** is pressed into third body **168** at border **164** in the direction of arrow H as well. Because second body **160** is pressed into first body **156**, snap-fit connector **166** may still flexibly engage first mating connector **40** of second panel unit **80**. Similarly, because fourth body **172** is pressed into third body **168**, snap fit connector **176** may engage insulating body **54** in a snap-fit fashion.

[0033] FIG. 8 illustrates the increased construction flexibility offered by this particular design. This design permits panel units to be constructed in shorter lengths. Accordingly, rather than employ a single panel unit having a length L as shown in FIG. 8, four panel units **200**, **202**, **204** and **206**, may all be snap-fit together to form length L. Having shorter panel lengths facilitates the manufacturer of these panel units in a press.

[0034] As shown in FIG. 9, top panel unit **180** may be provided with only a single snap-fit connector **36** to receive panel unit **80**, here a wall panel, while floor panel **184** may have a single snap-fit connector **210** to receive insulating body **54**. Such a design may be used to define the wall ends of a walk-in cooler.

[0035] As shown in FIG. 10, a panel unit is constructed by a press, here press **218**. Press **218** is constructed from known designs and has moveable press **220**, which may be moved toward press table **224** in the direction of arrow P. As shown, first skin **24** and second skin **28** are spaced generally parallel from each other within press **218**. Spacers **230**, **232**, **234** and **236** are used to define the space between first skin **24** and second skin **28**. Cavity **222** is defined by spacers **230**, **232**, **234** and **236** as well as by first skin **24** and second skin **28**. In addition, first flexible portion **22** and second flexible portion **26** are placed in their proper positions in cavity **222**. Foam injector **228** then sprays foam **240**, here a urethane foam, into cavity **222** and fills cavity **222** under pressure from moveable press **220** as applied in the direction of arrow P. Once foam **240** has dried and hardened, press **220** is moved in the direction of arrow Q and spacers **230**, **232**, **234**, and **236** are removed from completed panel unit **220**.

[0036] While the foregoing designs are shown primarily in a top panel, wall panel and floor configuration, the invention encompasses the use of these panels in other configurations requiring an insulated panel assembly. Indeed, the aforementioned description is exemplary rather than limiting. Many modifications and variations of the present invention are possible in light of the above teachings. The preferred embodiments of this invention have been disclosed. However, one of ordinary skill in the art would recognize that certain modifications would come within the scope of this invention. Hence, within the scope of the appended claims, the invention may be practiced otherwise than as specifically described. For this reason the following claims should be studied to determine the true scope and content of this invention.

What is claimed is:

1. An insulated refrigeration panel assembly comprising:
 - a first skin;
 - a second skin spaced generally parallel to said first skin;

- a first insulating body sandwiched between said first skin and said second skin, said first skin, said second skin and said first insulating body forming a first panel unit;

- a first snap fit connector for flexibly engaging a first mating connector along a first direction, said first snap fit connector attached to said first panel unit; and

- a second snap fit connector for flexibly engaging a second mating connector along a second direction transverse to said first direction, said second snap fit connector attached to said first panel unit wherein said first snap fit connector and said second snap fit connector comprise at least one of said first skin, said second skin, and said first insulating body.

2. The insulated refrigeration panel assembly of claim 1 wherein at least one of said first snap fit connector and said first mating connector flexes between a first dimension and a second dimension, said first dimension larger than said second dimension and said first snap fit connector engaged to said mating connector when in said second dimension.

3. The insulated refrigeration panel assembly of claim 1 wherein said first mating connector comprises a second insulating body.

4. The insulated refrigeration panel assembly of claim 3 wherein said second insulating body has a first end portion and a second end portion, said first end portion comprising said first mating connector and said second end portion comprising a third mating connector.

5. The insulated refrigeration panel assembly of claim 3 including a flange attached to said second insulating body, said flange having a first portion for receiving said first panel unit and a second portion for covering a joint.

6. The insulated refrigeration panel assembly of claim 5 wherein said second portion is curved.

7. The insulated refrigeration panel assembly of claim 1 including a second panel unit comprising said first mating connector, a third skin, a fourth skin and a second insulating body, said third skin spaced generally parallel to said fourth skin and said second insulating body sandwiched between said third skin and said fourth skin.

8. The insulated refrigeration panel assembly of claim 7 wherein said first mating connector comprises at least one of said third skin, said fourth skin and said second insulating body.

9. The insulated refrigeration panel assembly of claim 1 wherein said first direction is a vertical direction and said second direction is a horizontal direction.

10. The insulated refrigeration panel assembly of claim 1 wherein said first panel unit comprises a first body and a second body, said first body defining a first part of said first snap fit connector and said second body defining a second part of said second snap fit connector.

11. The insulated refrigeration panel assembly of claim 1 wherein said first snap fit connector comprises a female member and said first mating connector comprises a male member insertable into said female member.

12. The insulated refrigeration panel assembly of claim 11 wherein said female member flexes between a first female member dimension larger than a second female member dimension to receive said male member, said male member engaged to said female member in said second female member dimension.

13. An insulated refrigeration panel assembly, comprising:

a first panel unit comprising a first skin, a second skin spaced generally parallel to said first skin, and a first insulating body sandwiched between said first skin and said second skin;

a second panel unit comprising a third skin, a fourth skin spaced generally parallel to said third skin and a second insulating body sandwiched between said third skin and said fourth skin;

a third panel unit comprising a fifth skin, a sixth skin spaced generally parallel to said fifth skin and a third insulating body sandwiched between said fifth skin and said sixth skin;

wherein said first panel unit comprises a first snap fit connector and said second panel unit comprises a first mating connector, said first snap fit connector for flexibly engaging said first mating connector along a first direction; and

wherein said first panel unit comprises a second snap fit connector and said third panel unit comprises a second mating connector, said second snap fit connector for flexibly engaging said second mating connector along a second direction transverse to said first direction.

14. The insulated refrigeration panel assembly of claim 13 wherein said first snap fit connector and said second snap fit connector comprise at least one of said first skin, said second skin, and said first insulating body.

15. The insulated refrigeration panel assembly of claim 14 wherein said second mating connector comprises at least one of said third skin, said fourth skin, and said second insulating

body and said third mating connector comprises at least one of said fifth skin, said sixth skin, and said third insulating body.

16. The insulated refrigeration panel assembly of claim 13 wherein said second insulating body has a first end portion and a second end portion, said first end portion comprising said first mating connector and said second end portion comprising a third mating connector.

17. The insulated refrigeration panel assembly of claim 13 wherein said first panel unit and said second panel unit form a seam, said seam covered by a curved flange supported by said first panel unit.

18. The insulated refrigeration panel assembly of claim 13 wherein said first direction is a vertical direction and said second direction is a horizontal direction.

19. The insulated refrigeration panel assembly of claim 13 wherein said first panel unit comprises a first body and a second body, said first portion defining said first snap fit connector and said second portion defining said second snap fit connector.

20. An insulated refrigeration panel assembly comprising:

at least one skin;

an insulating body spaced next to said at least one skin, said insulating body extending generally parallel along a first axis; and

a snap fit connector for flexibly engaging a mating connector along a second axis transverse to said first axis, said snap fit connector comprising said at least one skin and said insulating body.

* * * * *