

EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

Published:

- *with international search report (Art. 21(3))*

HINGE SUPPORT ASSEMBLY FOR A VACUUM INSULATED APPLIANCE CABINET**FIELD OF THE DEVICE**

[0001] The device is in the field of insulation structures for appliances, and more specifically, a metallic frame incorporated as part of the insulation structure for supporting hinges for rotationally operable doors.

[0002]

SUMMARY

[0003] In at least one aspect, an appliance includes a cabinet having an outer wrapper, an inner liner and a trim breaker defining a joint between the outer wrapper and inner liner. The outer wrapper, inner liner and trim breaker define an insulating cavity. A vacuum insulated structure is disposed within the insulating cavity. A metallic frame is in communication with the outer wrapper, wherein the metallic frame includes at least one upper hinge mount and at least one lower hinge mount that are connected by at least one vertical frame member, wherein the metallic frame is at least partially disposed within the insulating cavity. At least one door panel is rotationally mounted to the cabinet via an upper hinge mounted to the at least one upper hinge mount and a lower hinge mounted to the at least one lower hinge mount.

[0004] In at least another aspect, an appliance includes a cabinet having a metallic frame that defines a plurality of hinge mounts, an outer wrapper that is engaged with the metallic frame, an inner liner that cooperates with the outer wrapper to define an insulating cavity and a trim breaker that defines a joint between the inner liner and outer wrapper. The metallic frame is at least partially disposed within the insulating cavity and maintains the hinge mounts distal from the trim breaker, and wherein the metallic frame includes upper and lower lateral frames that are connected by a vertical frame member.

[0005] In at least another aspect, a cabinet structure of an appliance includes an outer wrapper. A metallic frame is disposed in at least partial engagement with the outer wrapper and defines a plurality of hinge mounts. A trim breaker engages the outer wrapper. The metallic frame is positioned to maintain the plurality of hinge mounts distal from the trim breaker. An inner liner cooperates with the outer wrapper and the trim breaker to define a hermetically sealed insulating cavity defining an at least partial vacuum, wherein the hinge mounts are at least partially disposed within the insulating

cavity and are adapted to receive hinge fasteners and maintain the at least partial vacuum of the insulating cavity.

[0006] These and other features, advantages, and objects of the present device will be further understood and appreciated by those skilled in the art upon studying the following specification, claims, and appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0007] In the drawings:
- [0008] FIG. 1 is a front elevational view of an appliance incorporating an aspect of the hinge support frame with the doors in a closed position;
- [0009] FIG. 2 is a front perspective view of the appliance of FIG. 1 with the doors in an open position;
- [0010] FIG. 3 is a front elevational view of an aspect of the hinge support frame incorporated as part of the cabinet structure of the appliance;
- [0011] FIG. 4 is a cross-sectional view of the appliance of FIG. 1 taken along line IV-IV;
- [0012] FIG. 5 is a cross-sectional view of the appliance of FIG. 1 taken along line V-V;
- [0013] FIG. 6 is a partially exploded top perspective view of an upper hinge and upper hinge mount incorporated within an aspect of the hinge support frame;
- [0014] FIG. 7 is a cross-sectional perspective view of an aspect of the hinge support frame;
- [0015] FIG. 8 is a cross-sectional perspective view of an aspect of a hinge breaker for the hinge support frame; and
- [0016] FIG. 9 is a cross-sectional view of the appliance of FIG. 4 taken at area IX.

DETAILED DESCRIPTION OF EMBODIMENTS

[0017] For purposes of description herein the terms "upper," "lower," "right," "left," "rear," "front," "vertical," "horizontal," and derivatives thereof shall relate to the device as oriented in FIG. 1. However, it is to be understood that the device may assume various alternative orientations and step sequences, except where expressly specified to the contrary. It is also to be understood that the specific devices and processes illustrated in the attached drawings, and described in the following specification are simply exemplary embodiments of the inventive concepts defined in the appended claims. Hence, specific

dimensions and other physical characteristics relating to the embodiments disclosed herein are not to be considered as limiting, unless the claims expressly state otherwise.

[0018] As illustrated in FIGS. 1-9, reference numeral 10 generally refers to a hinge support frame that is incorporated as part of a cabinet 12 for the appliance 14. The appliance 14 can include the cabinet 12, where the cabinet 12 includes an outer wrapper 16, an inner liner 18 and a trim breaker 20 that defines a joint 22 extending between portions of the outer wrapper 16 and inner liner 18. The outer wrapper 16, the inner liner 18 and the trim breaker 20 serve to define an insulating cavity 24 within the cabinet 12. A vacuum insulated structure 26 can be disposed within the insulating cavity 24. It is contemplated that the vacuum insulated structure 26 can be a vacuum insulated panel disposed within the insulating cavity 24. The vacuum insulated structure 26 can also be defined by an insulating material 28 disposed within the insulating cavity 24, where gas is expressed from the insulating cavity 24 to define an at least partial vacuum of the vacuum insulated structure 26.

[0019] Referring again to FIGS. 1-9, a metallic frame 40 is disposed in communication with the outer wrapper 16. The metallic frame 40 can include at least one upper hinge mount 42 and at least one lower hinge mount 44 that are connected by at least one vertical frame member 46. It is contemplated that the metallic frame 40 is at least partially disposed within the insulating cavity 24. According to various aspects, the entire metallic frame 40 can be disposed within the insulating cavity 24. At least one door 48 is rotationally mounted to the cabinet 12 via an upper hinge 50 attached to the at least one upper hinge mount 42 and a lower hinge 52 attached to the at least one lower hinge mount 44. The upper and lower hinge mounts 42, 44 receive downward forces 54 and rotational forces 56 exerted by the door 48 onto the cabinet 12. The upper and lower hinge mounts 42, 44 transfer these downward and rotational forces 54, 56 to the vertical frame member 46 and away from the trim breaker 20.

[0020] Referring again to FIGS. 3-9, it is contemplated that the metallic frame 40 can include an upper lateral frame member 70 that extends across a top edge 72 of the cabinet 12 and defines the at least one upper hinge mount 42. It is contemplated that the at least one upper hinge mount 42 can include a pair of upper hinge mounts 42 that are positioned proximate opposing left and right sidewalls 74, 76, respectively, of the cabinet 12. The metallic frame 40 can also include a lower lateral frame member 78 that

defines the at least one lower hinge mount 44. It is contemplated that the at least one lower hinge mount 44 can include a pair of lower hinge mounts 44 that are positioned proximate the right and left sidewalls 76, 74, respectively, and in alignment with the pair of upper hinge mounts 42 to provide mounting locations for a pair of French doors 48 that are opposingly and rotationally operable between open and closed positions 80, 82. It is contemplated that the at least one vertical frame member 46 can include right and left vertical frame members 84, 86 that extend from the upper lateral frame member 70 and attach to the lower lateral frame member 78. According to the various embodiments, the various vertical frame members 46, including the right and left vertical frame members 84, 86, can extend from the top edge 72 of the cabinet 12 down to a base 88 of a cabinet 12 such that various loads placed upon the metallic frame 40 can be transferred to the base 88 of the appliance 14 and into feet or rollers of the appliance 14 to be transferred to the floor, ground, or other substrate surface.

[0021] According to the various embodiments, as exemplified in FIGS. 3-9, the inclusion of the metallic frame 40 and the upper and lower hinge mounts 42, 44 incorporated therein serve to provide hinge attachment points to which the various upper and lower hinges 50, 52 of the appliance 14 can be fixed and secured. In this manner, when doors 48 are attached to the upper and lower hinges 50, 52, the weight of the doors 48 is transferred to the metallic frame 40. In this manner, the weight of the doors 48 being received by the metallic frame 40 serves to direct the downward and rotational forces 54, 56 exerted by the doors 48 away from the trim breaker 20, the inner liner 18, and the insulating material 28 disposed within the insulating cavity 24. Accordingly, the weight of the doors 48 and the weight of contents placed within the doors 48 is directed to the metallic frame 40, such that these downward forces 54 applied by the doors 48 do not affect the structural integrity of the vacuum insulated structure 26 of the appliance 14.

[0022] According to the various embodiments, as exemplified in FIGS. 3-8, the upper lateral frame member 70 defines the pair of upper hinge mounts 42 to which the upper hinges 50 are attached. Forces exerted upon the upper hinge mounts 42 through the use and operation of the doors 48 of the appliance 14 are transferred through the upper hinge mounts 42 and into the upper lateral frame member 70. These forces are then transferred from the upper lateral frame member 70 to the various vertical frame members 46 and downward through the appliance 14 and away from the trim breaker 20

and the insulating material 28. It is contemplated that the metallic frame 40 can be integrated within support feet or rollers of the appliance 14 such that vertical forces are directed through the metallic frame 40 and to the base 88 of the appliance 14. It is also contemplated that the vertical forces can be directed through the metallic frame 40 and into a structural portion of the outer wrapper 16 that is adapted to receive such forces and direct such forces to a base 88 of the appliance 14.

[0023] Referring again to FIGS. 2-4 and 9, the cabinet 12 of the appliance 14 can include an interior mullion 100 that extends through a central portion 130 of the cabinet 12 and defines a plurality of interior compartments, such as an upper refrigerating compartment 102 and a lower freezing compartment 104 of the appliance 14, as an example. In such an embodiment, the lower lateral frame member 78 can be disposed within the interior mullion 100. It is also contemplated that the trim breaker 20 can also define a portion of the interior mullion 100. According to various embodiments, it is contemplated that the interior mullion 100 can include an upper trim breaker 106 and a lower trim breaker 108, where the lower lateral frame member 78 extends vertically between the upper and lower trim breakers 106, 108. In such an embodiment, it is contemplated that the upper trim breaker 106 can at least partially define an upper aperture 110 for defining the refrigerating compartment 102 and the lower trim breaker 108 can at least partially define the lower aperture 112 for defining the freezing compartment 104 of the appliance 14.

[0024] Referring again to FIGS. 2-4 and 9, the interior mullion 100 can be defined by the inner liner 18, the trim breaker 20, including the upper and lower trim breakers 106, 108, and the lower lateral frame member 78. The interior mullion 100 can be configured to extend laterally between portions of the outer wrapper 16 disposed proximate the left and right sidewalls 74, 76, respectively. It is contemplated that the vertical frame members 46 can attach to opposing ends 120 of the lower lateral frame member 78 to secure the vertical position of the lower lateral frame member 78 within the interior mullion 100. The lower lateral frame member 78 can include the one or more lower hinge mounts 44 within a front face 122 of the lower lateral frame member 78. As discussed above with respect to the upper hinge mounts 42, the lower hinge mounts 44 receive lower hinges 52 that serve to vertically and rotationally support the various doors 48 of the appliance 14 and contents disposed within the doors 48 of the appliance 14.

The downward forces 54 and rotational forces 56 exerted by the door 48 onto the upper and lower hinges 50, 52 are transferred from the lower hinges 52 and into the lower lateral frame member 78. These forces are then transferred from the lower lateral frame member 78 to the right and left vertical frame members 84, 86 of the metallic frame 40. These forces can then be transferred through the right and left vertical frame members 84, 86 to a base 88 of the appliance 14 or out to structural portions of the outer wrapper 16 and then to the base 88 of the appliance 14.

[0025] According to the various embodiments, the right and left vertical frame members 84, 86 can extend from a top wall of the cabinet 12 proximate the upper hinge mounts 42 and can extend downward to the lower lateral frame member 78 and, in various embodiments, all the way to the base 88 of the cabinet 12. It is contemplated that the lower lateral frame member 78 can extend between the right and left vertical frame members 84, 86 and is attached at central portions 130 of the right and left vertical frame members 84, 86, respectively. Where the right and left vertical frame members 84, 86 extend only to the lower lateral frame member 78, the lower lateral frame member 78 attaches to bottom portions of the right and left vertical frame members 84, 86.

[0026] Referring again to FIGS. 3-9, it is contemplated that the insulating cavity 24 defined by the outer wrapper 16, inner liner 18 and trim breaker 20 can be a hermetically sealed cavity. It is also contemplated that the upper hinge mounts 42 and the lower hinge mounts 44 can include attachment receptacles 140 that serve to receive the upper and lower hinges 50, 52, respectively. Through this engagement, the attachment receptacles 140 are adapted to maintain the upper and lower hinges 50, 52 separate from the insulating cavity 24, which may be hermetically sealed. In this manner, when the upper and lower hinges 50, 52 are attached to the upper and lower hinge mounts 42, 44, fasteners 142 that extend through the upper and lower hinges 50, 52 and into the upper and lower hinge mounts 42, 44 extend into the attachment receptacles 140. Accordingly, the fasteners 142 are maintained separate from the hermetically sealed insulating cavity 24. Through this configuration, the use of fasteners 142 does not puncture, or otherwise damage the integrity of the vacuum insulated structure 26. Accordingly, the attachment receptacles 140 incorporated as part of the upper and lower

hinge mounts 42, 44 can at least partially define the insulating cavity 24 of the cabinet 12.

[0027] Referring now to FIGS. 4-8, in the case of the upper hinge mounts 42, the upper lateral frame member 70 can be disposed within the insulating cavity 24 and can be directly attached to a portion of the outer wrapper 16. In this manner, the attachment receptacle 140 can be directly attached or integrated within a portion of the outer wrapper 16 proximate the upper hinge mounts 42. When the upper hinge 50 is attached to the attachment receptacles 140 of the upper hinge mounts 42, the attachment receptacles 140 may be visible through the outer wrapper 16. An attachment aperture 150 within the outer wrapper 16 proximate the upper hinge mount 42 allows for a portion of the attachment receptacle 140 to extend through the outer wrapper 16 to receive the fastener 142. The attachment receptacle 140 can be welded, adhered, or otherwise sealingly attached to a portion of the outer wrapper 16, such that the hermetic seal of the insulating cavity 24 is maintained during and after attachment of the upper hinge 50 to the upper hinge mount 42. When the various fasteners 142 are attached from the upper or lower hinge 50, 52 to the attachment receptacle 140, the various fasteners 142 can extend through a portion of the outer wrapper 16 and into the attachment receptacle 140. However, the fasteners 142 remain within the attachment receptacle 140 and do not penetrate into the insulating cavity 24. Accordingly, the upper lateral frame member 70 of the metallic frame 40 fixes the position of the upper hinge 50 and receives the downward and rotational forces 54, 56 exerted upon the upper hinge 50 by the door 48. These downward and rotational forces 54, 56 can then be transferred through the metallic frame 40 and kept away from other components of the cabinet 12 such as the trim breaker 20, inner liner 18 and insulating material 28. In this manner, the various downward and rotational forces 54, 56 transferred through the hinges and into the cabinet 12 are substantially transferred to the metallic frame 40 to maintain the integrity of the vacuum insulated structure 26 of the cabinet 12.

[0028] Referring again to FIGS. 4-8, it is contemplated that the inclusion of the metallic frame 40 within the insulating cavity 24 can also serve to reinforce the cabinet 12 at the edges 160 of the various sidewalls 162 of the cabinet 12 proximate the trim breaker 20. Accordingly, the metallic frame 40 can extend from the outer wrapper 16 to at least one of the inner liner 18 and trim breaker 20 to maintain the spacing and configuration of the

outer wrapper 16, trim breaker 20 and inner liner 18 at the edges 160 of each sidewall 162 of the cabinet 12. As discussed above, this configuration serves to reinforce the sidewalls 162 and minimize the stresses exerted upon the trim breaker 20 and the inner liner 18 as a result of downward and rotational forces 54, 56 exerted upon the cabinet 12 by the door 48 of the appliance 14.

[0029] Referring again to FIGS. 4 and 9, similar to the upper hinge mount 42, the lower hinge mount 44 is integrated within the lower lateral frame member 78 and includes the attachment receptacles 140 for receiving fasteners 142 for attaching the lower hinges 52 to the lower hinge mounts 44. It is contemplated that the interior mullion 100 can include a vacuum insulated panel, or can define the vacuum insulated structure 26 through a hermetically sealed engagement between the trim breakers 20, inner liner 18 and lower lateral frame member 78. Again, the use of the attachment receptacles 140 can at least partially define the hermetically sealed insulating cavity 24 at the interior mullion 100. It is also contemplated that the interior mullion 100 can include a foamed-in insulating material 28 that is kept at atmosphere and is not hermetically sealed or pressurized. In such an embodiment, the use of the attachment receptacles 140 for sealing the engagement between the lower hinges 52 and the lower hinge mounts 44 is still effective at minimizing the transfer of gas and thermal energy through the attachment points defined by the lower hinge mounts 44. The attachment receptacles 140, as with the upper hinge mounts 42 are adapted to receive the fastener 142 for the lower hinges 52 and prevent the fasteners 142 from extending through the attachment receptacles 140, such that the fasteners 142 do not extend into the insulating cavity 24 within the interior mullion 100.

[0030] Referring again to FIGS. 3, 4 and 9, the implementation of the lower lateral frame member 78 for defining the lower hinge mounts 44 again serves to allow the lower lateral frame member 78 of the metallic frame 40 to receive the downward and rotational forces 54, 56 exerted upon the lower hinges 52 by the doors 48 of the appliance 14. This configuration serves to divert these forces away from the trim breakers 20 and inner liner 18 of the cabinet 12. Additionally, the lower lateral frame member 78 serves to maintain the spacing and configuration of the upper and lower trim breakers 106, 108 and the inner liner 18 of the cabinet 12. The metallic frame 40 also reinforces and provides additional structural integrity to the interior mullion 100 of the

cabinet 12 to prevent deflection and damage as a result of deflection during use of the appliance 14.

[0031] Referring again to FIGS. 4-9, it is contemplated that the metallic frame 40 can be directly attached to the outer wrapper 16 of the cabinet 12. It is also contemplated that the metallic frame 40 can be incorporated as a thickened or reinforced portion of the outer wrapper 16. The thickening or reinforcement of the outer wrapper 16 can be accomplished through the addition of structural material at the portions described above or through folding over of the outer wrapper 16 to form thickened portions of the outer wrapper 16.

[0032] Referring again to FIGS. 4-9, the positioning of the metallic frame 40 serves to place the upper and lower hinge mounts 42, 44 at a position distal from the trim breakers 20 and inner liner of the appliance 14 to prevent the transfer of downward and rotational forces 54, 56 from the doors 48 and into these portions of the appliance 14. It is contemplated that the trim breaker 20 and inner liner 18 can be made of plastic, polymer, or other similar deflectable and potentially crackable material. Accordingly, the use of the metallic frame 40 which is adapted to receive downward and rotational forces 54, 56 exerted upon the cabinet 12 by the doors 48, can direct these forces through the metallic frame 40 and away from the trim breakers 20 and inner liner 18 of the appliance 14.

[0033] Referring again to FIGS. 4-9, the cabinet 12 can include the metallic frame 40 that defines the plurality of hinge mounts, such as the upper and lower hinge mounts 42, 44. The outer wrapper 16 can then be engaged with the metallic frame 40. The inner liner 18 serves to cooperate with the outer wrapper 16 to define an insulating cavity 24. The trim breaker 20 can then define a joint 22 between the inner liner 18 and outer wrapper 16. The metallic frame 40 is at least partially disposed within the insulating cavity 24 and serves to maintain the upper and lower hinge mounts 42, 44 distal from the trim breaker 20. The metallic frame 40 includes upper and lower lateral frame members 70, 78 that are connected by vertical frame members 46.

[0034] Referring again to FIGS. 3-9, the cabinet 12 of the appliance 14 can include the outer wrapper 16 and a metallic frame 40 that is disposed in at least partial engagement with the outer wrapper 16. The metallic frame 40 can serve to define a plurality of upper and lower hinge mounts 42, 44. The trim breaker 20 engages the outer wrapper 16

where the trim breaker 20 and metallic frame 40 are positioned to maintain the plurality of upper and lower hinge mounts 44, 46 distal from the trim breaker 20. The inner liner 18 serves to cooperate with the outer wrapper 16 and the trim breaker 20 to define the hermetically sealed insulating cavity 24 that defines an at least partial vacuum. As discussed above, the upper and lower hinge mounts 42, 44 are at least partially disposed within the insulating cavity 24 and are adapted to receive fasteners 142 for attaching the upper and lower hinges 50, 52. The upper and lower hinge mounts 42, 44 serve to receive the fasteners 142 in a manner that maintains the at least partial vacuum within the insulating cavity 24.

[0035] Referring again to FIGS. 3-9, the appliance 14 can include a heat loop 180 that is disposed within a loop channel 182 defined within a trim breaker 20 proximate a contact surface 184 of the cabinet 12. A door engagement member 186 can be attached to the trim breaker 20 and is configured to extend over the loop channel 182 to define the contact surface 184 of the cabinet 12. According to the various embodiments, the contact surface 184 is adapted to receive a door seal 188 of the various doors 48 of the appliance 14 when the doors 48 are in the closed position 82. It is contemplated that the contact surface 184 of the door engagement member 186 is placed in thermal communication with the heat loop 180. The heat loop 180 can include a conduit through which a thermal material is delivered for transferring heat from the heat loop 180 to the contact surface 184. This transfer of heat from the heat loop 180 to the contact surface 184 serves to minimize condensation forming on the contact surface 184 which may affect the sealing engagement between the door seals 188 and the cabinet 12. It is contemplated that the heat loop 180 can also include a resistive heat element that extends through the loop channel 182 defined within the trim breaker 20.

[0036] Referring again to FIG. 3, it is contemplated that the heat loop 180 can extend through each of the sidewalls 162 and also through a front portion 190 of the interior mullion 100 where various portions of the contact surface 184 engage door seals 188 for the appliance 14. The heat loop 180 can be defined by a continuous loop that extends proximate the contact surface 184.

[0037] Referring again to FIGS. 4-9, it is contemplated that the trim breaker 20 can include a wrapper channel 200 that serves to engage the outer wrapper 16 and extend around an edge of the outer wrapper 16. Accordingly, the wrapper channel 200 can

include a sealing and/or adhesive material 202 that seals the engagement between the outer wrapper 16 and the trim breaker 20 at the wrapper channel 200 for defining a hermetic seal of the cabinet 12. Similarly, the trim breaker 20 can also include a liner channel 204 that receives a portion of the inner liner 18. The liner channel 204 can include a sealant and/or adhesive that receives and hermetically seals the inner liner 18 to the trim breaker 20 for defining the at least partial vacuum within the insulating cavity 24 of the cabinet 12.

[0038] Referring again to FIGS. 4-9, it is contemplated that the wrapper and liner channels 200, 204 of the trim breaker 20 can be placed in an offset configuration to define a frame recess 210 within which a portion of the metallic frame 40 can be disposed. In such an embodiment, the trim breaker 20 and metallic frame 40 within the frame recess 210 can define a reinforced trim breaker 212 that extends around the edges 160 of the sidewalls 162 of the cabinet 12. The placement of the metallic frame 40 within the frame recess 210 can also reinforce the positions and configuration of the outer wrapper 16 and inner liner 18 at the reinforced trim breaker 212.

[0039] Referring again to FIGS. 4-7, it is contemplated that the metallic frame 40 can include a unitary assembly that is formed from a shaped metallic formation. It is also contemplated that the upper and lower lateral frame members 70, 78 can be separate metallic members that are attached to the right and left vertical frame members 84, 86 through welding, fasteners 142, combinations thereof, or other similar attachment mechanisms.

[0040] According to the various embodiments, it is contemplated that the hinge support frame 10 described herein can be incorporated within various appliances that can include, but are not limited to, refrigerating appliances, freezers, humidors, ovens, laundry appliances, water heaters, various other household appliances and fixtures and other similar household and commercial applications.

[0041] It will be understood by one having ordinary skill in the art that construction of the described device and other components is not limited to any specific material. Other exemplary embodiments of the device disclosed herein may be formed from a wide variety of materials, unless described otherwise herein.

[0042] For purposes of this disclosure, the term "coupled" (in all of its forms, couple, coupling, coupled, etc.) generally means the joining of two components (electrical or

mechanical) directly or indirectly to one another. Such joining may be stationary in nature or movable in nature. Such joining may be achieved with the two components (electrical or mechanical) and any additional intermediate members being integrally formed as a single unitary body with one another or with the two components. Such joining may be permanent in nature or may be removable or releasable in nature unless otherwise stated.

[0043] It is also important to note that the construction and arrangement of the elements of the device as shown in the exemplary embodiments is illustrative only. Although only a few embodiments of the present innovations have been described in detail in this disclosure, those skilled in the art who review this disclosure will readily appreciate that many modifications are possible (e.g., variations in sizes, dimensions, structures, shapes and proportions of the various elements, values of parameters, mounting arrangements, use of materials, colors, orientations, etc.) without materially departing from the novel teachings and advantages of the subject matter recited. For example, elements shown as integrally formed may be constructed of multiple parts or elements shown as multiple parts may be integrally formed, the operation of the interfaces may be reversed or otherwise varied, the length or width of the structures and/or members or connector or other elements of the system may be varied, the nature or number of adjustment positions provided between the elements may be varied. It should be noted that the elements and/or assemblies of the system may be constructed from any of a wide variety of materials that provide sufficient strength or durability, in any of a wide variety of colors, textures, and combinations. Accordingly, all such modifications are intended to be included within the scope of the present innovations. Other substitutions, modifications, changes, and omissions may be made in the design, operating conditions, and arrangement of the desired and other exemplary embodiments without departing from the spirit of the present innovations.

[0044] It will be understood that any described processes or steps within described processes may be combined with other disclosed processes or steps to form structures within the scope of the present device. The exemplary structures and processes disclosed herein are for illustrative purposes and are not to be construed as limiting.

[0045] It is also to be understood that variations and modifications can be made on the aforementioned structures and methods without departing from the concepts of the

present device, and further it is to be understood that such concepts are intended to be covered by the following claims unless these claims by their language expressly state otherwise.

[0046] The above description is considered that of the illustrated embodiments only. Modifications of the device will occur to those skilled in the art and to those who make or use the device. Therefore, it is understood that the embodiments shown in the drawings and described above is merely for illustrative purposes and not intended to limit the scope of the device, which is defined by the following claims as interpreted according to the principles of patent law, including the Doctrine of Equivalents.

What is claimed is:

1. An appliance comprising:
 - a cabinet having an outer wrapper, an inner liner and a trim breaker defining a joint between the outer wrapper and inner liner, wherein the outer wrapper, the inner liner and the trim breaker define an insulating cavity;
 - a vacuum insulated structure disposed within the insulating cavity;
 - a metallic frame in communication with the outer wrapper, wherein the metallic frame includes at least one upper hinge mount and at least one lower hinge mount that are connected by at least one vertical frame member, wherein the metallic frame is at least partially disposed within the insulating cavity; and
 - at least one door panel rotationally mounted to the cabinet via an upper hinge mounted to the at least one upper hinge mount and a lower hinge mounted to the at least one lower hinge mount.
2. The appliance of claim 1, wherein the metallic frame includes an upper lateral frame member that defines the at least one upper hinge mount and a lower lateral frame member that defines the at least one lower hinge mount, and wherein the at least one vertical frame member extends from the upper lateral frame member and attaches to the lower lateral frame member.
3. The appliance of any one or more of claims 1 and 2, wherein the at least one upper hinge mount includes a pair of upper hinge mounts that are positioned proximate opposing left and right sidewalls, respectively, of the cabinet, and wherein the at least one lower hinge mount includes a pair of lower hinge mounts that are positioned proximate the right and left sidewalls, respectively, and wherein the at least one door panel includes a pair of French doors.
4. The appliance of any one or more of claims 1-3, wherein the at least one vertical frame member includes left and right frame vertical members that are positioned within the right and left sidewalls, respectively.

5. The appliance of any one or more of claims 1-4, further comprising:
an interior mullion extending through a central portion of the cabinet and defining a plurality of interior compartments, wherein the lower lateral frame member is disposed within the interior mullion, and wherein the trim breaker defines a portion of the interior mullion.
6. The appliance of claim 5, wherein the interior mullion is defined by the inner liner, the trim breaker and the lower lateral frame member, wherein the interior mullion extends from between portions of the outer wrapper disposed proximate the right and left sidewalls, respectively.
7. The appliance of any one or more of claims 4-6, wherein the right and left vertical frame members extend from a top wall of the cabinet to a position proximate a base of the cabinet, wherein the lower lateral frame member extends between the right and left vertical frame members and is attached at central portions of the right and left frame members, respectively.
8. The appliance of any one or more of claims 1-7, wherein the insulating cavity is a hermetically sealed cavity, and wherein at least one upper hinge mount and the at least one lower hinge mount includes attachment receptacles that receive upper and lower hinges, respectively, wherein the attachment receptacles maintain the upper and lower hinges separate from the insulating cavity.
9. The appliance of claim 8, wherein the attachment receptacles at least partially define the insulating cavity.
10. The appliance of any one or more of claims 1-9, wherein the metallic frame is directly attached to the outer wrapper of the cabinet, and wherein the at least one upper hinge mount and the at least one lower hinge mount are positioned within the metallic frame and distal from the trim breaker.
11. The appliance of any one or more of claims 1-10, further comprising:

a heat loop disposed within a loop channel defined within the trim breaker proximate a contact surface; and

a door engagement member that extends over the loop channel and defines the contact surface, wherein the contact surface receives a door seal of the at least one door panel when the at least one door panel is in a closed position, and wherein the contact surface of the door engagement member is in thermal communication with the heat loop.

12. The appliance of any one or more of claims 1-11, wherein the trim breaker includes a wrapper channel that engages the outer wrapper with the trim breaker and a liner channel that engages the inner liner with the trim breaker.

13. The appliance of any one or more of claims 1-12, wherein the metallic frame extends from the outer wrapper to at least one of the inner liner and the trim breaker.

14. The appliance of any one or more of claims 1-13, wherein engagement of the upper hinge with the at least one upper hinge mount maintains an at least partial vacuum within the insulating cavity.

15. The appliance of any one or more of claims 5-14, wherein the interior mullion includes an upper trim breaker and a lower trim breaker, wherein the lower lateral frame member extends vertically between the upper and lower trim breakers.

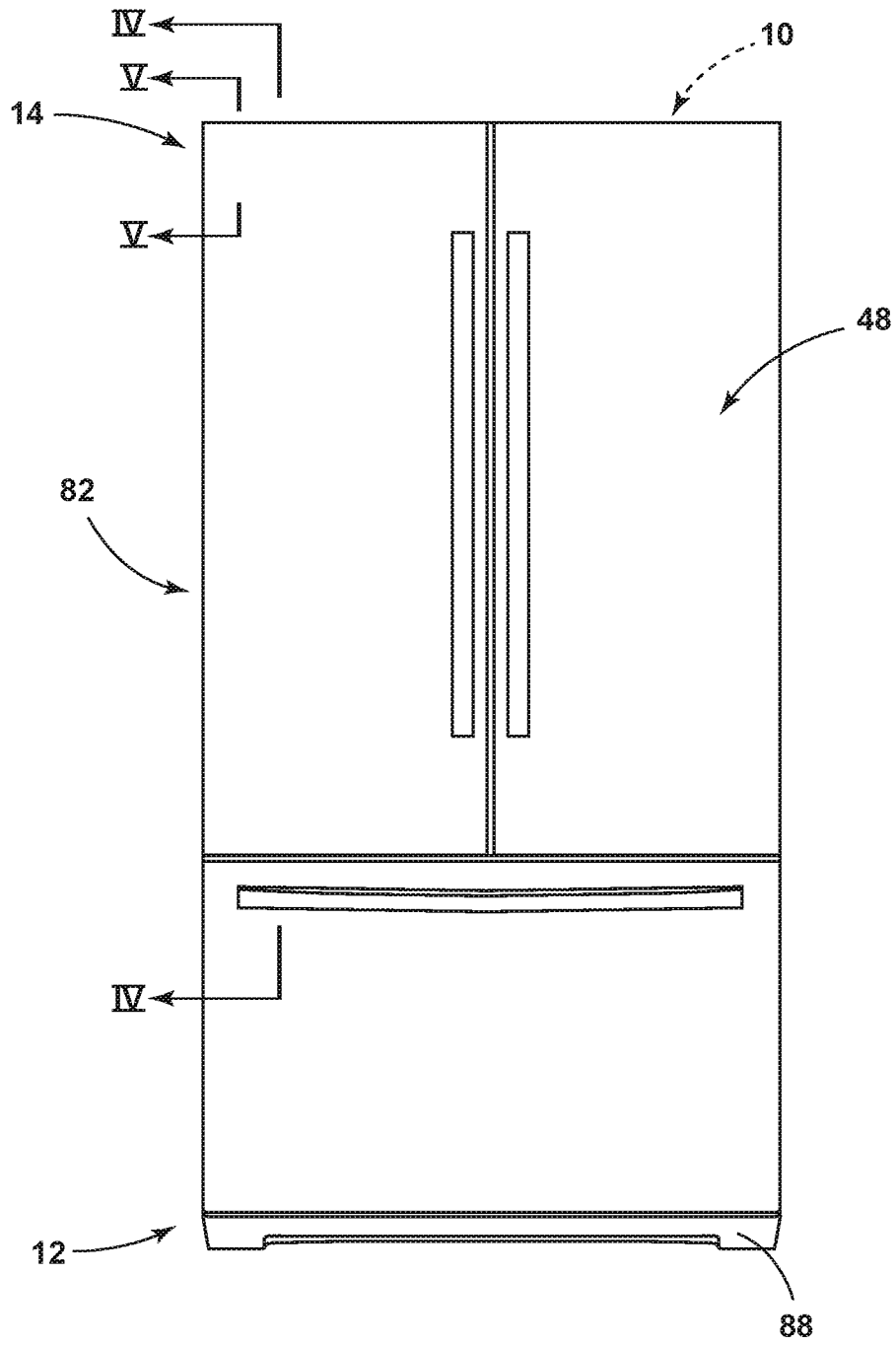


FIG. 1

2/7

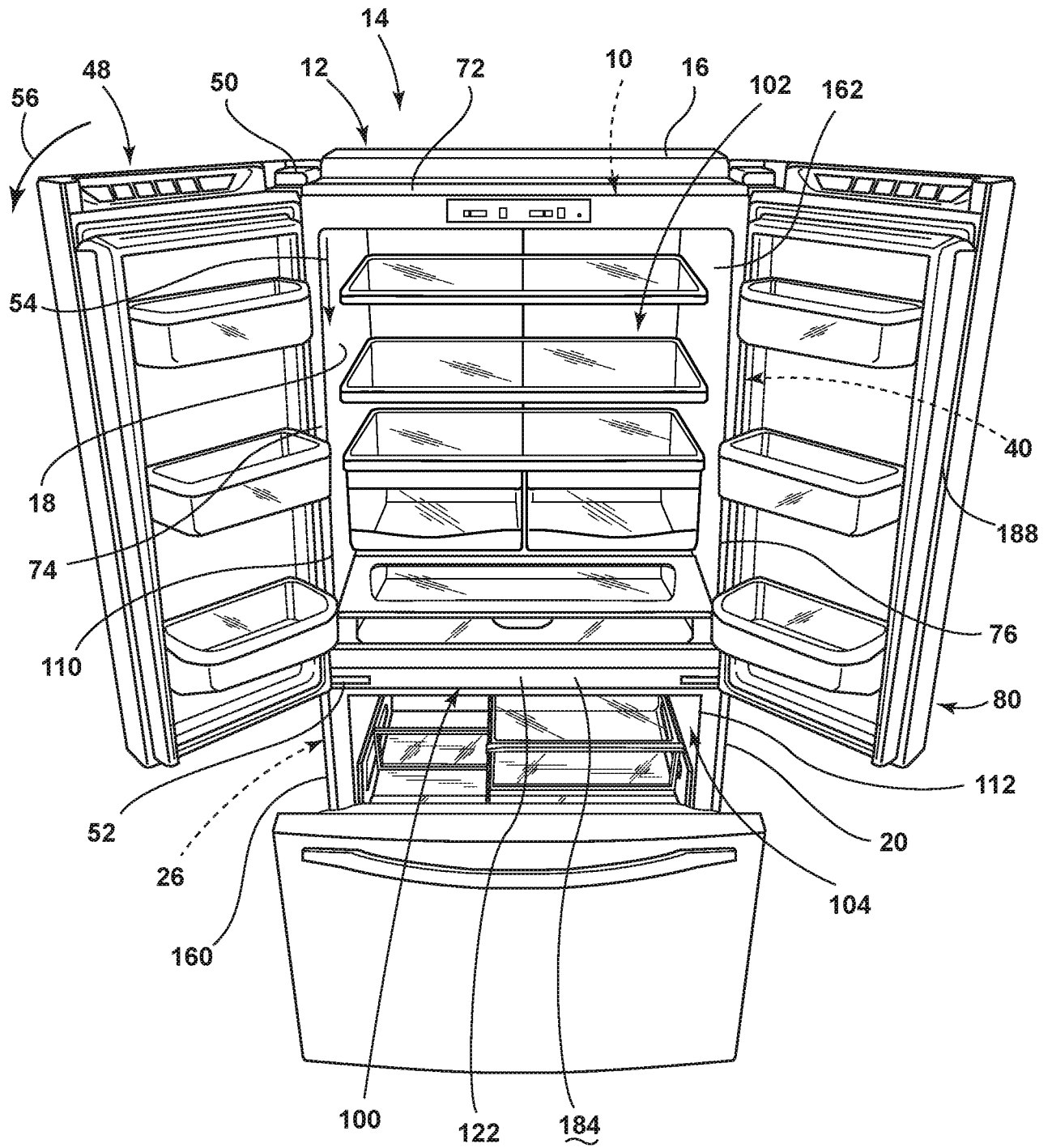


FIG. 2

3/7

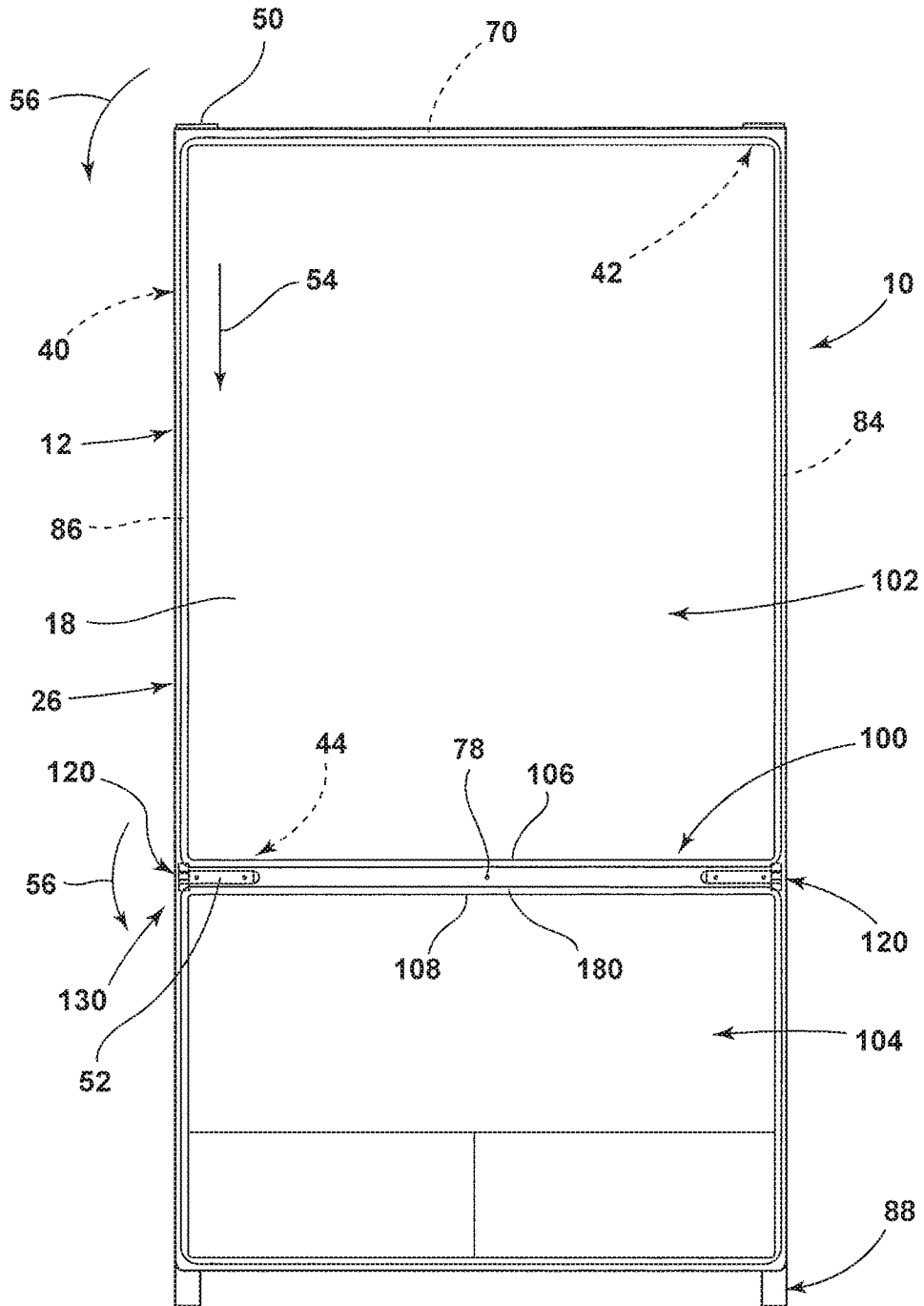


FIG. 3

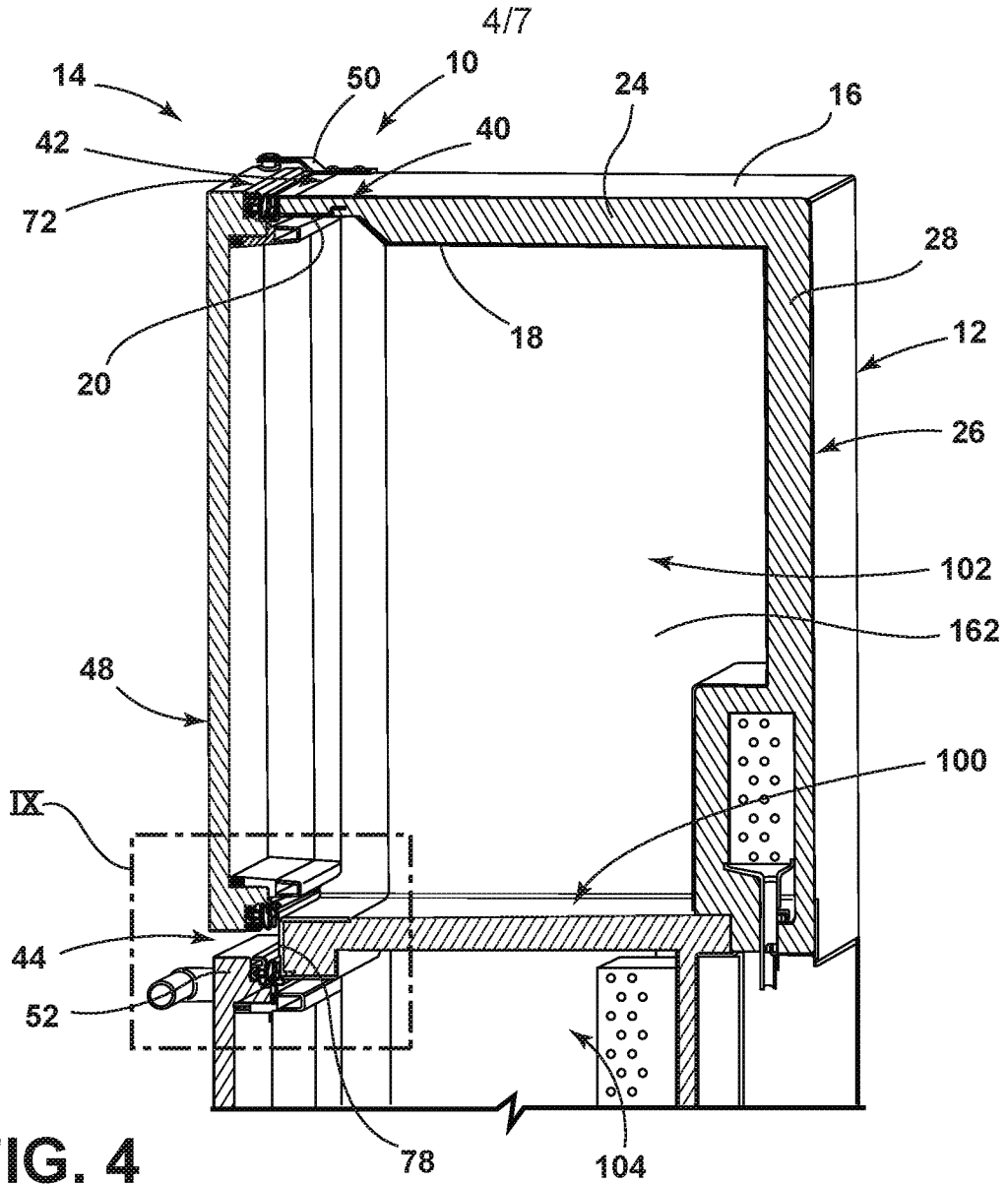


FIG. 4

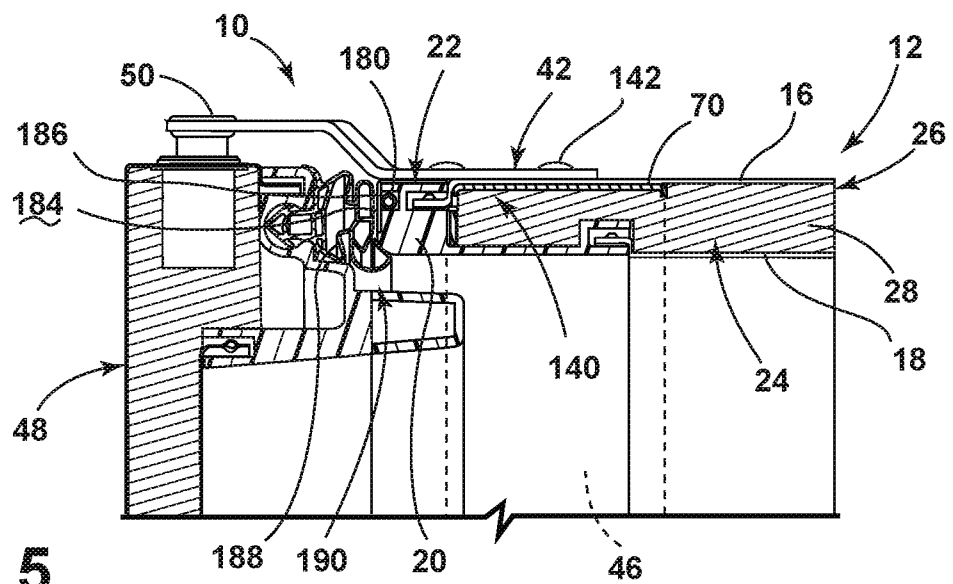
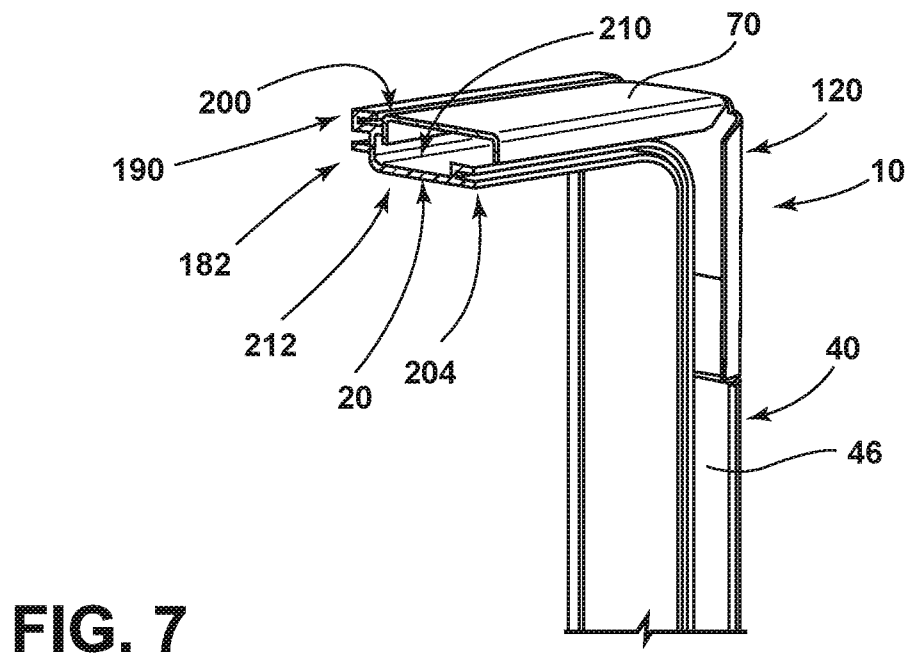
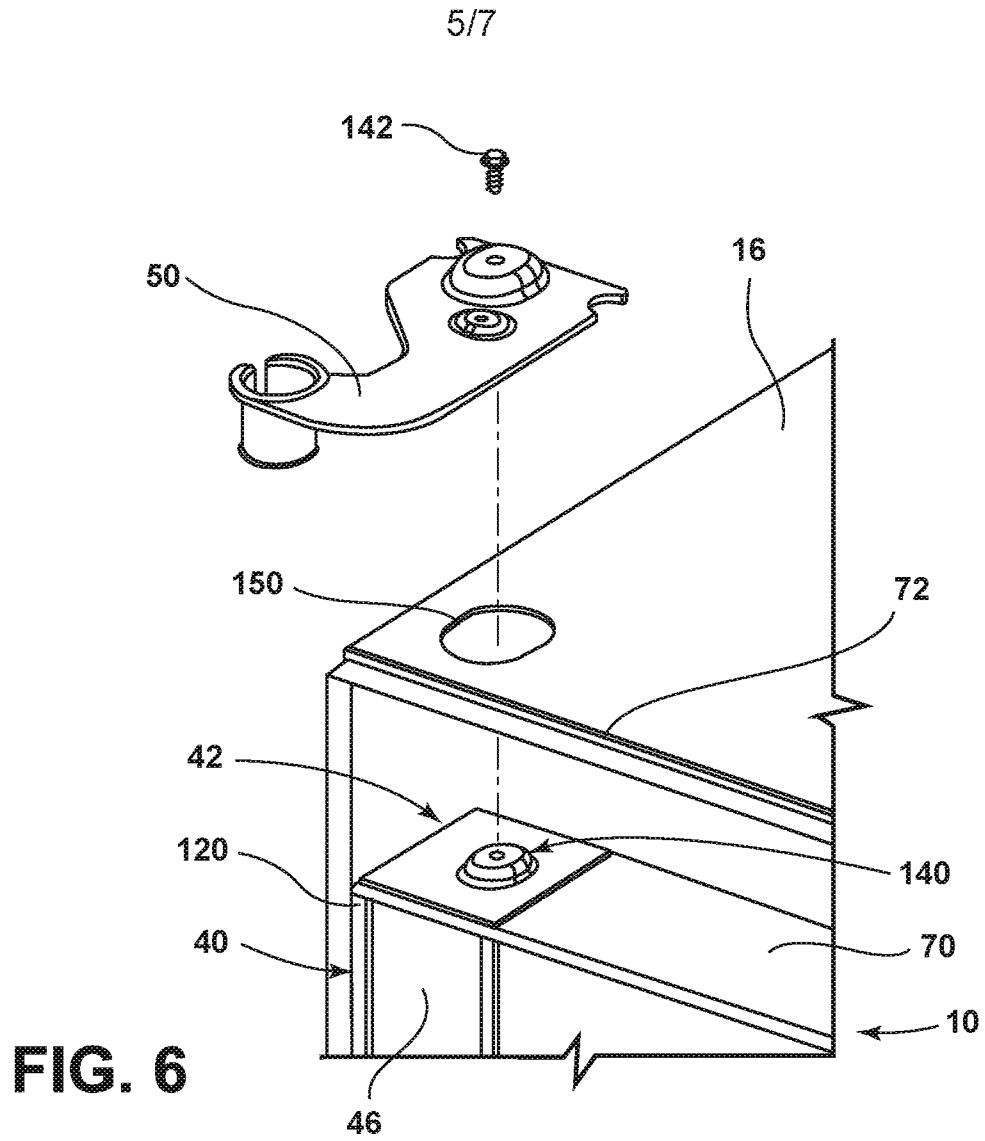


FIG. 5



6/7

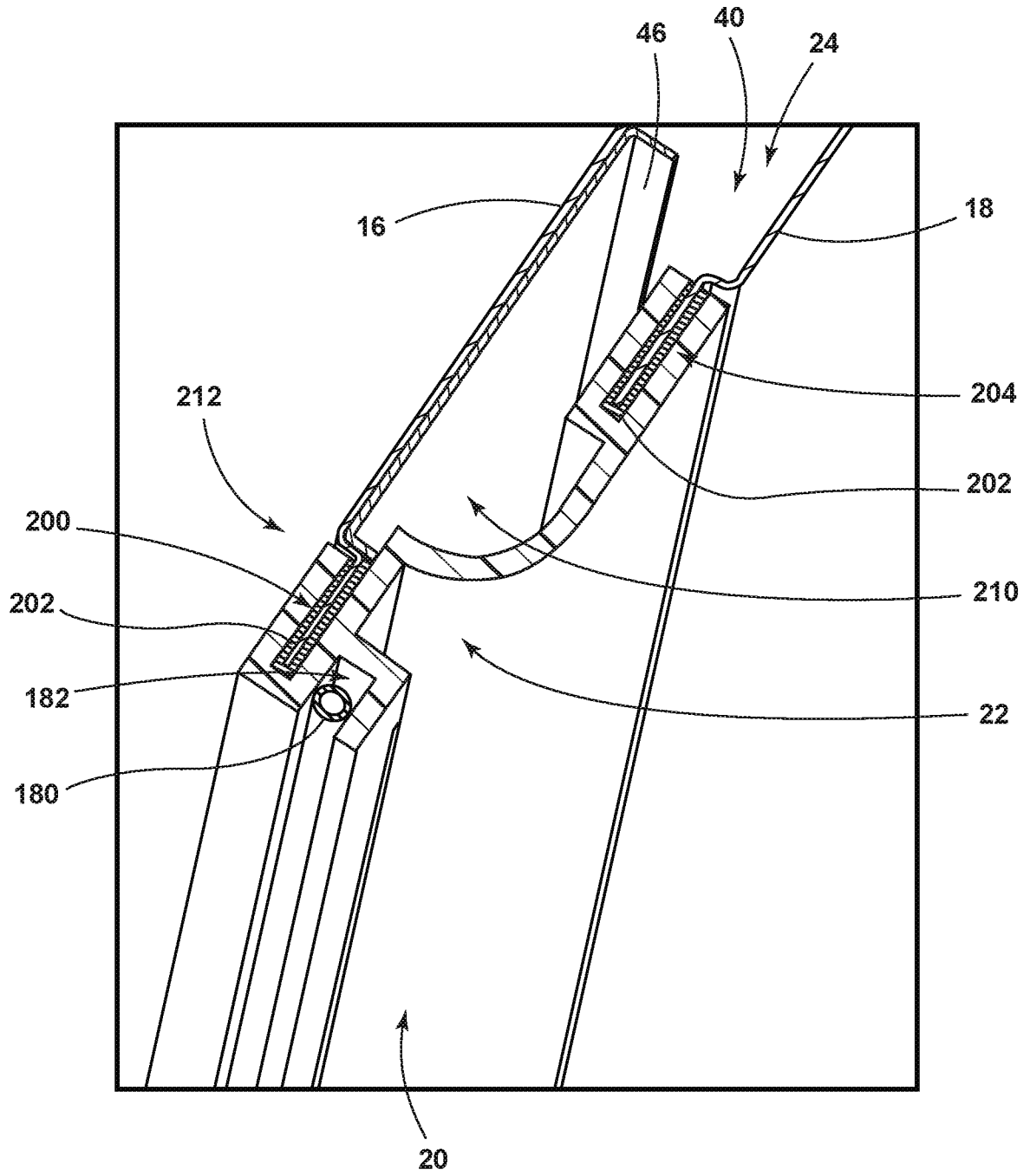


FIG. 8

717

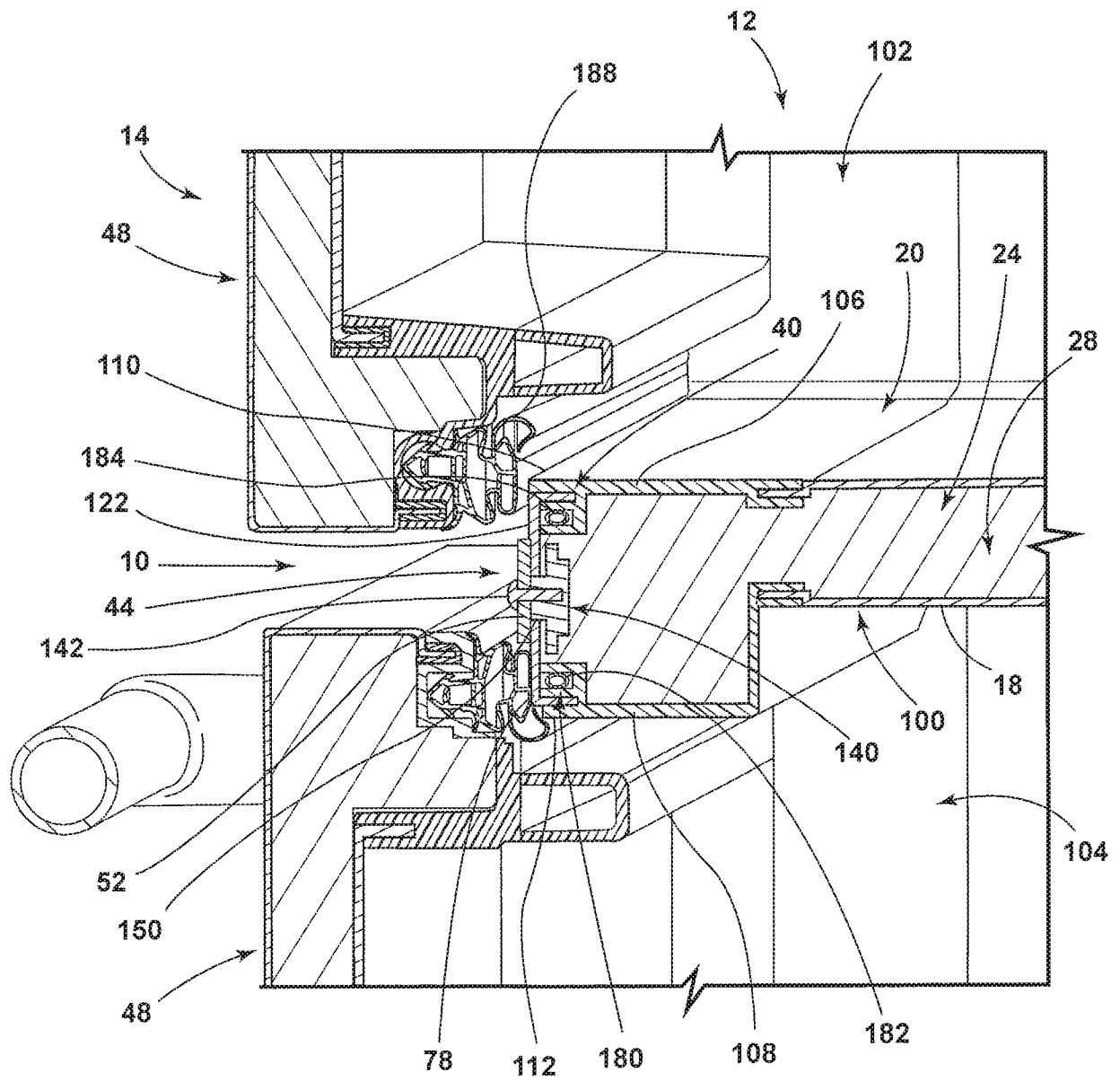


FIG. 9

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.: 5-12
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 2016/030547

A. CLASSIFICATION OF SUBJECT MATTER				
<i>F25D 11/00 (2006.01)</i> <i>F25D 23/06 (2006.01)</i>				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols)				
F25D 11/00-11/02, 21/00, 23/00-23/08, 17/00-17/08, F16L 59/00, 59/065				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)				
Espacenet, USPTO DB, RUPAT OLD, RUPAT, RUABU1, PAJ, PatSearch (RUPTO internal)				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	US 2014/0346942 A1 (LG ELECTRONICS INC.) 27.11.2014	1-4		
A	WO 2012/044001 A2 (LG ELECTRONICS INC. et al.) 05.04.2012	1-4		
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.				
* Special categories of cited documents: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier document but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%; vertical-align: top;"> <p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&” document member of the same patent family</p> </td> </tr> </table>			<p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier document but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&” document member of the same patent family</p>
<p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier document but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&” document member of the same patent family</p>			
Date of the actual completion of the international search		Date of mailing of the international search report		
09 August 2016 (09.08.2016)		24 November 2016 (24.11.2016)		
Name and mailing address of the ISA/RU: Federal Institute of Industrial Property, Berezhkovskaya nab., 30-1, Moscow, G-59, GSP-3, Russia, 125993 Facsimile No: (8-495) 531-63-18, (8-499) 243-33-37		Authorized officer T. Darina Telephone No. (495)531-64-81		