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THERMAL IMPROVEMENTS IN VIS REFRIGERATORS

Abstract

A refrigeration appliance includes a cabinet having a trim breaker defining a mullion region and a refrigerant system. The cabinet defines a first compartment and a second compartment. The refrigerant system includes a refrigerant defining a flow path through a compressor, a heat loop coupled to the compressor, a condenser coupled to the heat loop, and an evaporator assembly coupled to the compressor and the condenser. The heat loop is routed around a perimeter of the cabinet and through the mullion region. The evaporator assembly includes at least one first evaporator disposed in the first compartment and a second evaporator disposed in the second compartment. The at least one first evaporator may include a first roll bond evaporator coupled to a second roll bond evaporator in series with the first, or a wire-on-tube evaporator.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to U.S. patent application Ser. No. 18/132,580, filed on Apr. 10, 2023, entitled “THERMAL IMPROVEMENTS IN VIS REFRIGERATORS,” the disclosure of which is hereby incorporated herein by reference in its entirety.

BACKGROUND OF THE DISCLOSURE

[0002] The present disclosure generally relates to thermal improvement for an appliance, and more specifically, to thermal improvements for a vacuum insulated refrigeration appliance.

SUMMARY OF THE DISCLOSURE

[0003] According to one aspect of the present disclosure, a vacuum insulated refrigerator includes a cabinet defining a refrigerator compartment and a freezer compartment where the cabinet at least partially defines a mechanical compartment. The cabinet includes a liner, a wrapper, and a trim breaker. The trim breaker is coupled to the liner and the wrapper. The trim breaker defines a refrigerator compartment perimeter, a freezer compartment perimeter, and a mullion region between the refrigerator compartment and the freezer compartment. The refrigerant system includes a compressor disposed in the mechanical compartment. A heat loop is coupled to the compressor where the heat loop includes a first send segment routed from the mechanical compartment and along a first portion of the freezer compartment perimeter, a second send segment routed through the mullion region, and a third send segment routed along a first portion of the refrigerator compartment perimeter adjacent the mullion region. A first return segment is routed along a second portion of the refrigerator compartment perimeter, a second return segment is routed through the mullion region, and a third return segment is routed along a second portion of the freezer compartment perimeter and to the mechanical compartment. A condenser is disposed in the mechanical compartment and is coupled to the heat loop, where a refrigerant is directed from the compressor, through the heat loop, and then to the condenser, and an evaporator assembly is coupled to the condenser and the compressor.

[0004] According to another aspect of the present disclosure, a vacuum insulated refrigerator includes a cabinet defining an upper compartment, a lower compartment, and a mullion region between the upper compartment and the lower compartment. The cabinet at least partially defines a machine compartment. A trim breaker is coupled to a periphery of the cabinet and the mullion region. A compressor is disposed in the machine compartment. A heat loop is fluidly coupled to the compressor where the heat loop is coupled to the trim breaker and is routed along the periphery of the cabinet and through the mullion region. A condenser is fluidly coupled to the heat loop. An evaporator assembly is fluidly coupled to the condenser and to the compressor. The evaporator assembly includes at least one first evaporator disposed in the upper compartment and a second evaporator disposed in the lower compartment. A refrigerant is configured to flow from the compressor to the heat loop, from the heat loop to the condenser, and from the condenser to the evaporator assembly.

[0005] According to yet another aspect of the present disclosure, a refrigeration appliance includes a cabinet including a wrapper and a liner where the wrapper at least partially defines a machine compartment. A trim breaker is coupled to an edge of the wrapper and an edge of the liner. The trim breaker defines a mullion region. A refrigerant system includes a compressor disposed in the machine compartment. A heat loop is coupled to the compressor. The heat loop is coupled to the trim breaker. The heat loop includes a send portion and a return portion routed through the mullion region, where the send portion and the return portion each cross a center line defined by the cabinet. A condenser is disposed in the machine compartment and is coupled to the heat loop. An evaporator assembly is coupled to the cabinet.

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

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] In the drawings:

[0008] FIG. **1** is a front perspective of a refrigeration appliance, according to the present disclosure;

[0009] FIG. **2** is a cross-sectional view of a refrigeration appliance with a vacuum insulated cabinet and vacuum insulated doors, according to the present disclosure;

[0010] FIG. **3** is an exploded side perspective view of a cabinet for a refrigeration appliance with a wrapper, a liner, and a trim breaker, according to the present disclosure;

[0011] FIG. **4** is a front elevational view of the trim breaker of FIG. **3**, according to the present disclosure;

[0012] FIG. **5** is a side perspective view of a refrigeration appliance with a machine compartment housing a portion of a refrigerant system, according to the present disclosure;

[0013] FIG. **6** is an enlarged side perspective view of the machine compartment of FIG. **5**, according to the present disclosure;

[0014] FIG. **7** is a flow diagram of a refrigerant system for a refrigeration appliance, according to the present disclosure;

[0015] FIG. **8** is a front elevational view of a first roll bond evaporator coupled to a second roll bond evaporator in a first compartment of an appliance, an evaporator in a second compartment, and a heat loop, according to the present disclosure;

[0016] FIG. **9** is a front elevational view of a wire-on-tube evaporator in a first compartment of an appliance, an evaporator in a second compartment, and a heat loop, according to the present disclosure;

[0017] FIG. **10** is a front elevational view of a heat loop routed along an appliance perimeter and through a mullion region, according to the present disclosure;

[0018] FIG. **11** is a partial enlarged front elevational view of the heat loop routed through the mullion region of FIG. **10**, taken at area XI;

[0019] FIG. **12** is a front elevational view of a heat loop routed along an appliance perimeter and through a mullion region, according to the present disclosure; and

[0020] FIG. **13** is a partial enlarged front elevational view of the heat loop routed through the mullion region of FIG. **12**, taken at area XIII.

[0021] The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles described herein.

DETAILED DESCRIPTION

[0022] The present illustrated embodiments reside primarily in combinations of method steps and apparatus components related to thermal improvements for a refrigeration appliance. Accordingly, the apparatus components and method steps have been represented, where appropriate, by conventional symbols in the drawings, showing only those specific details that are pertinent to understanding the embodiments of the present disclosure so as not to obscure the disclosure with details that will be readily apparent to those of ordinary skill in the art having the benefit of the description herein. Further, like numerals in the description and drawings represent like elements.

[0023] For purposes of description herein, the terms “upper,” “lower,” “right,” “left,” “rear,” “front,” “vertical,” “horizontal,” and derivatives thereof shall relate to the disclosure as oriented in FIG. **1**. Unless stated otherwise, the term “front” shall refer to the surface of the element closer to an intended viewer, and the term “rear” shall refer to the surface of the element further from the intended viewer. However, it is to be understood that the disclosure may assume various alternative orientations, 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.

[0024] The terms “including,” “comprises,” “comprising,” or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. An element preceded by “comprises a . . . ” does not, without more constraints, preclude the existence of additional identical elements in the process, method, article, or apparatus that comprises the element.

[0025] Referring to FIGS. **1-13**, reference numeral **10** generally designates a vacuum insulated appliance including a cabinet **12** defining a refrigerator compartment **14** and a freezer compartment **16**. The cabinet **12** at least partially defines a mechanical compartment **18** and includes a liner **20**, a wrapper **22**, and a trim breaker **24** coupled to the liner **20** and the wrapper **22**. The trim breaker **24** defines a refrigerator compartment perimeter **26**, a freezer compartment perimeter **28**, and a mullion region **30** between the refrigerator compartment **14** and the freezer compartment **16**. A refrigerant system **40** includes a compressor **42** disposed in the mechanical compartment **18**, a heat loop **44** coupled to the compressor **42**, a condenser **46** disposed in the mechanical compartment **18** and coupled to the heat loop **44**, and an evaporator assembly **48** coupled to the condenser **46** and the compressor **42**, where a refrigerant **49** is directed from the compressor **42**, through the heat loop **44**, and then to the condenser **46**. The heat loop **44** includes a first send segment **50** routed from the mechanical compartment **18** and along a first portion **52** of the freezer compartment perimeter **28**, a second send segment **54** routed through the mullion region **30**, a third send segment **56** routed along a first portion **58** of the refrigerator compartment perimeter **26**, a first return segment **60** routed along a second portion **62** of the refrigerator compartment perimeter **26**, a second return segment **64** routed through the mullion region **30**, and a third return segment **66** routed along a second portion **68** of the freezer compartment perimeter **28** and to the mechanical compartment **18**.

[0026] Referring to FIGS. **1-3**, the vacuum insulated appliance **10** is illustrated as a refrigeration appliance, however, it is contemplated that the vacuum insulated appliance **10** disclosed herein may be for a variety of appliances, structures, or for insulation purposes other than with an appliance. The refrigeration appliance **10** is illustrated as a bottom mount refrigerator having a first insulated door **70***a* and a second insulated door **70***b*. The first insulated door **70***a* and the second insulated door **70***b*, which can generally be referred to as insulated doors **70**, can have substantially similar configurations, as discussed further herein. The cabinet **12** of the illustrated refrigeration appliance **10** includes an upper compartment configured as the refrigerator compartment **14** and a lower compartment configured as the freezer compartment **16**. In this way, the refrigerator and freezer compartments **14**, **16** defined by the cabinet **12** can be sealed with the insulated doors **70***a*, **70***b*, respectively. Moreover, in various configurations, the appliance **10** may include the cabinet **12** defining at least a first compartment and a second compartment sealed with insulated doors **70**. The appliance **10** may be, for example, a bottom mount French door refrigerator, a top mount refrigerator, a side-by-side refrigerator, a 4-door French door refrigerator, and/or a 5-door French door refrigerator. Further, the present disclosure is not limited to refrigerators. The appliance **10** may be, for example, freezers, coolers, vacuum insulated structures, and other similar appliances and fixtures within household and commercial settings.

[0027] The cabinet **12** of the appliance **10** is an insulated structure having an insulation cavity **80** defined between the liner **20** and the wrapper **22**. Similarly, the insulated doors **70** are an insulated structure having an insulation cavity **82** defined between a door wrapper **84** coupled to a door liner **86**. Each of the insulation cavities **80**, **82** of the cabinet **12** and insulated doors **70** typically includes one or more insulation materials **88** disposed therein. It is generally contemplated that the insulation materials **88** may be glass type materials, carbon-based powders, silicon oxide-based materials, silica-based materials, insulating gasses, and other standard insulation materials **88** known in the art. The insulation materials **88** substantially fill the insulation cavity **80**, forming a substantially continuous layer between the wrapper **22** and the liner **20**. Similarly, the insulation materials **88** substantially fill the insulation cavity **82**, forming a substantially continuous layer between the door wrapper **84** and the door liner **86**. The insulation cavities **80**, **82** are filled with the insulation materials **88** using a load port on the cabinet **12** and the insulated doors **70**, respectively. The cabinet **12** and the insulated doors **70** each define an evacuation port for applying a vacuum or negative pressure to the insulation cavities **80**, **82**.

[0028] Referring still to FIGS. **1-3**, an at least partial vacuum **90** is defined within the insulation cavities **80**, **82**. The at least partial vacuum **90** defines a pressure differential **92** between an exterior **94** of the cabinet **12** and the insulation cavity **80**. The pressure differential **92** serves to define the inward compressive force that is exerted on both the wrapper **22** and the liner **20** and tends to bias the wrapper **22** and the liner **20** toward the insulation cavity **80**. The pressure differential **92** and the inward compressive force are also exerted on both the door wrapper **84** and the door liner **86** of the insulated doors **70** and tend to bias the door wrapper **84** and the door liner **86** towards the insulation cavity **82** in a similar manner.

[0029] The wrapper **22**, the door wrapper **84**, the liner **20**, and the door liner **86** are made from a material at least partially resistant to bending, deformation, or otherwise being formed in response to an inward compressive force. These materials for the wrapper **22**, the door wrapper **84**, the liner **20**, and the door liner **86** include, but are not limited to, metals, polymers, metal alloys, combinations thereof, and/or other similar substantially rigid materials that can be used for vacuum insulated appliances and structures.

[0030] Referring still to FIG. **3**, as well as FIG. **4**, it is contemplated that the trim breaker **24** may be coupled to the outer edges **96** of the wrapper **22** and/or the liner **20**. The trim breaker **24** has a generally rectangular shape, however, it is contemplated that other geometric shapes known in the art may be used. In this way, the trim breaker **24** may not substantially interfere with access to the refrigerator and freezer compartments **14**, **16** defined by the cabinet **12**. At least one channel **98** may be defined around a perimeter of the trim breaker **24**. The channel **98** may be configured to receive the outer edges **96** of the wrapper **22** and/or the liner **20**. It is also contemplated that the trim breaker **24** may define more than one channel **98** to accommodate the wrapper **22** and the liner **20** in separate channels **98**. The channels **98** may be filled with an adhesive, such as, for example, an epoxy. The adhesive is configured to couple the wrapper **22** and/or the liner **20** with the trim breaker **24** and seal the insulation cavity **80**.

[0031] The trim breaker **24** includes cross member **100** to define apertures **102***a*, **102***b* corresponding to the refrigerator and freezer compartments **14**, **16** of the appliance **10**. The channels **98** defined by the trim breaker **24** may extend around the perimeter of the trim breaker **24** as well as along the cross member **100**. The cross member **100** defines the mullion region **30** between the refrigerator and freezer compartments **14**, **16**. In the illustrated example, the trim breaker **24** defines the refrigerator compartment perimeter **26** around the upper aperture **102***a* and defines the freezer compartment perimeter **28** around the lower aperture **102***b*.

[0032] Referring to FIGS. **5** and **6**, passthroughs **110***a*, **110***b* are defined by the wrapper **22** and the liner **20** to provide a passage for electrical, fluid, and other appliance connections between the refrigerator and freezer compartments **14**, **16** and outside the cabinet **12**. The wrapper **22** has top surface **112**, a bottom surface **114**, a rear surface **116**, a pair of side surfaces **118**, and a curved surface **120**. The bottom surface **114** of the wrapper **22** may be coupled to a base **122**. The curved surface **120** of the wrapper **22** and the base **122** at least partially define the mechanical compartment **18**. The liner **20** can generally have a similar shape as the wrapper **22** to be fit within the wrapper **22** and form the cabinet **12**.

[0033] Various appliance components **124** can be positioned on the base **122** within the mechanical compartment **18** below the rear surface **116** and proximate to the curved surface **120** of the wrapper **22**. The appliance components **124** positioned within the mechanical compartment **18** include components of the refrigerant system **40**, including the compressor **42**, portions of the heat loop **44**, the condenser **46**, and/or portions of the evaporator assembly **48**. The appliance components **124** may also include a controller, electronics, or other components for operation of the appliance **10**.

[0034] As illustrated in FIG. **7**, a flow diagram depicts a flow path **126** for a thermal exchange media, referred to herein as the refrigerant **49**, through the refrigerant system **40**. The refrigerant **49** is generally capable of undergoing repeated phase changes between a liquid and a gas. The refrigerant system **40** generally performs a refrigeration cycle that cools the refrigerator and freezer compartments **14**, **16** by using the refrigerant **49** as the thermal exchange media between the compartments **14**, **16** and an external environment. The flow path **126** of the refrigerant **49** generally starts by flowing from the compressor **42**, through the heat loop **44**, through the condenser **46**, through the evaporator assembly **48**, and then returns to the compressor **42**.

[0035] The refrigerant **49** enters the compressor **42** as a low-pressure gas. The refrigerant **49** may also be introduced to the compressor **42** and refrigerant system **40** using a refrigerant inlet **130**. The compressor **42** is configured to compress the refrigerant **49** into a higher-pressure gas. During the compression, the refrigerant **49** temperature increases. The compressor **42** is also configured to circulate the refrigerant **49** through the refrigerant system **40**. The refrigerant **49** exits the compressor **42** and enters the heat loop **44** as the higher-pressure gas. The heat loop **44** is coupled to the compressor **42** and is generally routed out of the mechanical compartment **18**, along the refrigerator and freezer compartment perimeters **26**, **28** and through the mullion region **30**, and returns to the mechanical compartment **18**. The heat loop **44** is coupled to the trim breaker **24** and assists with temperature regulation about the compartments **14**, **16**. Specific configurations of the heat loop **44** are discussed further herein. The refrigerant **49** remains as the higher-pressure gas while flowing through the heat loop but may have a reduced temperature because of heat exchange with the trim breaker **24** and other components proximate the trim breaker **24**.

[0036] The heat loop **44** extends into the machine compartment **18**, and the refrigerant **49** exits the heat loop **44** and the enters the condenser **46** as a higher-pressure gas. The condenser **46** is coupled to the heat loop **44** and is configured as a heat exchanger. The condenser **46** may exchange heat with ambient air in the mechanical compartment **18**. The condenser **46** condenses the refrigerant **49** to a liquid, releasing heat. The condenser **46** may be coupled to a drier **132**. The drier **132** is configured to trap moisture, dirt, or other contaminants that may be present in the refrigerant system **40**. The refrigerant **49** exits the drier **132** and is directed to the evaporator assembly **48**. It is also contemplated that the refrigerant system **40** may not include the drier **132**. In such configurations, the condenser **46** is coupled to the evaporator assembly **48**.

[0037] The refrigerant **49** exits the condenser **46** or the drier **132** and enters the evaporator assembly **48**. The evaporator assembly **48**, discussed further herein, is configured to cool the refrigerator compartment **14** and/or the freezer compartment **16**. As the refrigerant flows through the evaporator assembly **48**, the refrigerant **49** experiences a pressure drop and becomes a low-pressure liquid configured to absorb heat, thereby cooling the compartments **14**, **16**. The refrigerant **49** exits the evaporator assembly **48**, enters a check valve **134** as the low-pressure gas, and returns to the condenser **46**, starting the refrigerant system **40**. The check valve **134** may be coupled to the evaporator assembly **48** and the compressor **42**. The check valve **134** regulates the direction of flow of the refrigerant **49** and prevents the refrigerant **49** from back-feeding from the compressor **42** to the evaporator assembly **48**. It is contemplated that the refrigerant system **40** may not include the check valve **134**. In such configurations, the evaporator assembly **48** is directly coupled to the compressor **42**.

[0038] Still referring to FIG. **7**, a three-way valve **136** may be disposed between the condenser **46** or the drier **132** and the evaporator assembly **48**. The three-way valve **136** is coupled to the condenser **46** or the drier **132** and splits the flow of the refrigerant **49** between a refrigerator evaporator assembly **138** and a freezer evaporator assembly **140**. The evaporator assembly **48** may include the refrigerator evaporator assembly **138**, the freezer evaporator assembly **140**, or both. The three-way valve **136** may be omitted when the evaporator assembly **48** includes one of the refrigerator evaporator assembly **138** or the freezer evaporator assembly **140**. The evaporator assembly **48**, as illustrated, includes both the refrigerator evaporator assembly **138**, disposed in the refrigerator compartment **14**, and the freezer evaporator assembly **140**, disposed in the freezer compartment **16**, which are routed in parallel along the flow path **126**.

[0039] The refrigerator and freezer evaporator assemblies **138**, **140** are both coupled to the three-way valve **136** via capillary tubes **142***a*, **142***b* and/or an expansion valve. The capillary tubes **142***a*, **142***b* regulate the flow of the refrigerant **49** through the refrigerator and freezer evaporator assemblies **138**, **140**. The refrigerant **49** experiences a pressure loss through the capillary tubes **142***a*, **142***b* and becomes the low-pressure liquid. As the refrigerant **49** flows through the refrigerator and freezer evaporator assemblies **138**, **140**, the refrigerant **49** phase changes into the low-pressure gas, removing heat from the refrigerator compartment **14** and freezer compartment **16**, respectively.

[0040] The refrigerant **49** exits the refrigerator and freezer evaporator assemblies **138**, **140** and enters the check valve **134**. The refrigerator and freezer evaporator assemblies **138**, **140** are both coupled to the check valve **134** using suction lines **146***a*, **146***b*. The refrigerant system **40** may include other components and is not limited to the components discussed herein.

[0041] The heat loop **44** is disposed directly between the compressor **42** and the condenser **46**. In this way, the refrigerant **49** is directed from the compressor **42** to the heat loop **44** and then from the heat loop **44** to the condenser **46**. The heat loop **44** being coupled between the compressor **42** and the condenser **46** allows for increased performance of the heat loop **44**. The heat loop **44** reduces or prevents condensation on the periphery of the cabinet **12** at the trim breaker **24** and the wrapper **22**. The heat loop **44** being coupled between the compressor **42** and condenser **46** increases the temperature of the refrigerant **49** running through the heat loop **44**, resulting in the decrease in condensation.

[0042] Referring again to FIG. **5**, as well as FIGS. **8** and **9**, the refrigerator evaporator assembly **138** is coupled to at least one interior surface **170** of the liner **20** within the refrigerator compartment **14**, and the freezer evaporator assembly **140** is coupled to at least one interior surface **172** of the liner **20** within the freezer compartment **16**. The capillary tube **142***a* and suction line **146***a* for the refrigerator evaporator assembly **138** are routed through the upper passthrough **110***a*. The capillary tube **142***b* and suction line **146***b* for the freezer evaporator assembly **140** are routed through the lower passthrough **110***b*. The capillary tube **142***b* is coupled to an inlet **174** of the freezer evaporator assembly **140** and the suction line **146***b* is coupled to an outlet **176** of the freezer evaporator assembly **140**.

[0043] In the illustrated configuration, the freezer evaporator assembly is configured as a fin-on-tube evaporator **178**. The fin-on-tube evaporator **178** has a refrigerant tube **180** and a plurality of fins **182** coupled to the refrigerant tube **180**. Air flows through the fin-on-tube evaporator **178** and transfers heat through both the refrigerant tube **180** and the plurality of fins **182**. While the fin-on-tube evaporator **178** is depicted, other evaporator assemblies or configurations may be used for the freezer evaporator assembly **140**.

[0044] Referring still to FIG. **8**, the refrigerator evaporator assembly **138** may include a first roll bond evaporator **200** coupled to a second roll bond evaporator **202**. The first and second roll bond evaporators **200**, **202** are coupled together in series along the flow path **126**. The capillary tube **142***a* is coupled to an inlet **204** of the first roll bond evaporator **200**. A refrigerant line **206** is coupled to an outlet **208** of the first roll bond evaporator **200** and to an inlet **210** of the second bond evaporator **202**. The suction line **146***a* is coupled to an outlet **212** of the second roll bond evaporator **202**. The first roll bond evaporator **200** has a first panel **214** and a second panel **216** coupled together to define a refrigerant channel **218** between the inlet **204** and the outlet **208**. Similarly, the second roll bond evaporator **202** has a first panel **220** and a second panel **222** coupled together to define a refrigerant channel **224** between the inlet **210** and the outlet **212**. Air in the refrigerator compartment **14** flows along the first and second roll bond evaporators **200**, **202** and is cooled by transferring heat to the refrigerant **49**.

[0045] Referring to FIG. **9**, the refrigerator evaporator assembly **138** may include a wire-on-tube evaporator **230**. The capillary tube **142***a* is coupled to an inlet **232** of the wire-on-tube evaporator **230**. The suction line **146***a* is coupled to an outlet **234** of the wire-on-tube evaporator **230**. The wire-on-tube evaporator **230** has a refrigerant tube **236** and a plurality of wires **238** coupled to the refrigerant tube **236**. The plurality of wires **238** may be run perpendicular to the refrigerant tube **236**. Air in the refrigerator compartment **14** flows over the wire-on-tube evaporator **230** and is cooled by the plurality of wires **238** and transfers heat to the refrigerant **49**. The plurality of wires **238** transfer the heat from the air to the refrigerant tube **236**.

[0046] The evaporator assembly **48** including either the first and second roll bond evaporators **200**, **202** or the wire-on-tube evaporator **230** helps improve the balancing of the refrigerant system **40** between the refrigerator and freezer evaporator assemblies **138**, **140**. The inclusion of either the first and second roll bond evaporators **200**, **202** or the wire-on-tube evaporator **230** also reduces or prevent a buildup of condensation on the suction lines **146***a*, **146***b*. The first and second roll bond evaporators **200**, **202** and/or the wire-on-tube evaporator **230** allows for a more complete evaporation of the refrigerant **49** and helps prevent liquid refrigerant from entering the suction line **146***a* and the compressor **42**. The more complete evaporation of the refrigerant **49** may also allow for the removal of an accumulator from the refrigerant system **40**. The removal of the accumulator may help decreases the complexity of the system, the time of manufacturing, and ease maintenance of the system. Moreover, the roll bond evaporators **200**, **202** and/or the wire-on-tube evaporator **230** may be advantageous for increasing surface area of the refrigerator evaporator assembly **138** to maximize efficiency in the heat exchange process.

[0047] Referring to FIGS. **10-13**, the configuration of the heat loop **44** may also assist in improving thermal regulation of the appliance **10**. The heat loop **44** is generally routed around a perimeter of the cabinet **12** and through the mullion region **30**. The heat loop **44** is routed from the mechanical compartment **18**, along the refrigerator and freezer compartment perimeters **26**, **28**, through the mullion region **30**, and returns to the mechanical compartment **18** to couple to the condenser **46**. The heat loop **44** is coupled to the trim breaker **24** along the compartment perimeters **26**, **28** and in the mullion region **30**. The heat loop **44** includes the first send segment **50** routed from the mechanical compartment **18** along the first portion **52** of the freezer compartment perimeter **28**, the second send segment **54** routed through the mullion region **30**, and the third send segment **56** routed along the first portion **58** of the refrigerator compartment perimeter **26**. The heat loop **44** also includes the first return segment **60** routed along the second portion **62** of the refrigerator compartment perimeter **26**, the second return segment **64** routed through the mullion region **30**, and the third return segment **66** routed along the second portion **68** of the freezer compartment perimeter **28** to the mechanical compartment **18**.

[0048] The first send segment **50** may be routed from the mechanical compartment **18** and couple to the trim breaker **24** proximate a center line **250** of the cabinet **12**. Additionally, the third return segment **66** may decouple from the trim breaker **24** proximate the center line **250** of the cabinet **12** and be routed to the mechanical compartment **18**. The first portion **52** of the freezer compartment perimeter **28** may start at the center line **250** on a first, lower edge **252** of the freezer compartment perimeter **28**, extending along the first edge **252**, along a second, side edge **254** of the freezer compartment perimeter **28**, and stopping proximate the mullion region **30**. The second portion **68** of the freezer compartment **16** may start at the center line **250** on the first edge **252**, extending along the first edge **252**, extending along a third, side edge **256** of the freezer compartment **16**, and stopping proximate the mullion region **30**.

[0049] The first portion **58** of the refrigerator compartment perimeter **26** may start proximate the mullion region **30** extending along a first, side edge **258** of the refrigerator compartment perimeter **26**, extending along a second, upper edge **260** of the refrigerator compartment **14**, and stopping at the center line **250** on the second edge **260**. The second portion **62** of the refrigerator compartment **14** transitions from the first portion **58** proximate the center line **250**, extending along the second edge **260** of the refrigerator compartment **14**, extending along a third, side edge **262** of the refrigerator compartment **14**, and stopping at the mullion region **30**.

[0050] Referring still to FIGS. **10** and **11**, the heat loop **44** may be routed through the mullion region **30** in different configurations to limit temperature variation within the mullion region **30** and a prevent condensation buildup on in the mullion region **30**. A first configuration of the heat loop **44** routed through the mullion region **30** is illustrated. The second send segment **54**, which is also referred to herein as the send portion **54**, may have a generally “Z” shape or a serpentine shape, extending toward the refrigerator compartment **14**, through the mullion region **30**, and again towards the refrigerator compartment **14**.

[0051] The second send segment **54** routed through the mullion region **30** includes a first mullion segment **270** which is routed along a first mullion portion **272** of the freezer compartment perimeter **28**. The first mullion portion **272** extends between the side edge **254** and where the send segment **54** extends towards the refrigerator compartment **14**. A second mullion segment **274** extends from a first lateral side **276**, also referred to as a first end **276**, of the mullion region **30** to a second lateral side **278**, also referred to as a second end **278**, of the mullion region **30**. The two sides or ends **276**, **278** are on opposing sides of the center line **250**. The second mullion segment **274** extends proximate a midline **280** between the freezer compartment **16** and the refrigerator compartment **14**. A third mullion segment **282** is routed along a first mullion portion **284** of the refrigerator compartment perimeter **26**. The third mullion segment **282** is generally parallel to the first mullion segment **270** and the second mullion segment **274**. The third mullion segment **282** is generally longer than the first mullion segment **270**.

[0052] The second return segment **64**, also referred to as the return portion **64**, of the heat loop **44** may have a generally “Z” shape or a serpentine shape, extending toward the freezer compartment **16**, through the mullion region **30**, and again towards the freezer compartment **16**. The second return segment **64** includes a first mullion segment **286** routed along a second mullion portion **288** of the refrigerator compartment perimeter **26**. A second mullion segment **290** extends from the second lateral side **278** of the mullion region **30** to the first lateral side **276** of the mullion region **30** proximate the midline **280**. A third mullion segment **292** is routed along a second mullion portion **294** of the freezer compartment perimeter **28**. The third mullion segment **292** is generally parallel to the first mullion segment **286** and the second mullion segment **290**. The third mullion segment **292** is generally longer than the first mullion segment **286**.

[0053] The send portion **54** routed proximate the midline **280** may extend proximate and parallel to the return portion **64** routed proximate to the midline **280**. Accordingly, the second mullion segment **274** of the second send segment **54** may extend proximate and parallel to the second mullion segment **290** of the second return segment **64**. The second mullion segment **274** of the second send segment **54** and the second mullion segment **290** of the second return segment **64** may extend equidistance from the midline **280** and/or equidistance from the freezer compartment perimeter **28** and the refrigerator compartment perimeter **26**, respectively. The send portion **54** and the return portion **64** may generally be rotationally symmetrical around a center point **296** defined by the intersection of the center line **250** and the midline **280**. The send portion **54** and/or the return portion **64** may cross the center line **250**.

[0054] Stated a different way, the heat loop **44** routed through the mullion region **30** includes the send portion **54** and the return portion **64**. The send portion **54** of the heat loop **44** is routed proximate to the first mullion portion **272** of the freezer compartment perimeter **28**, proximate to the midline **280** between the freezer compartment **16** and the refrigerator compartment **14** and from the first end **276** of the mullion region **30** to the second end **278** of the mullion region **30**, and proximate to the first mullion portion **284** of the refrigerator compartment perimeter **26**. The return portion **64** of the heat loop **44** is routed proximate to the second mullion portion **288** of the refrigerator compartment perimeter **26**, proximate to the midline **280** and from the second end **278** to the first end **276**, and proximate to the second mullion portion **294** of the freezer compartment perimeter **28**.

[0055] Referring still to FIGS. **10** and **11**, the first mullion segment **270** of the second send segment **54** is routed in a first direction **320**, as illustrated by arrow **320**. The second mullion segment **274** is routed in the first direction **320** and is coupled to the first mullion segment **270** with a connector segment **322**, which is routed from the first direction **320** to a second direction **324**, as illustrated by arrow **324**, and again in the first direction **320**. The second direction **324** may be perpendicular to the first direction **320**. The third mullion segment **282** is routed in a third direction **326**, as illustrated by arrow **326**, and is coupled to the second mullion segment **274** with a connecter segment **328**, which is routed from the first direction **320** to the third direction **326**. The first direction **320** and the third direction **326** may be opposing, horizontal directions. The second direction **322** may be perpendicular to the first and/or third directions **320**, **326**.

[0056] The first mullion segment **286** of the second return segment **64** is routed in the third direction **326**. The second mullion segment **290** is routed in the third direction **326** and is coupled to the second mullion segment **290** with a connector segment **330**, which is routed from the third direction **326** to a fourth direction **332**, illustrated by arrow **332**, and to the first direction **320**. The fourth direction **332** may be perpendicular to the third direction **326**. The second direction **324** and the fourth direction **332** may be opposing directions. The third mullion segment **292** is routed in the first direction **320** and is coupled to the second mullion segment **290** with a connector segment **334**, which is routed from the third direction **326** to the first direction **320**.

[0057] Referring again to FIGS. **12** and **13**, a second configuration of the heat loop **44** routed through the mullion region is illustrated. The second send segment **54**, also referred to as the send portion **54**, routed through the mullion region **30** includes a first mullion segment **340** routed along a first mullion portion **342** of the freezer compartment perimeter **28**, a second mullion segment **344** extending at an obtuse angle A**1** from a lower or freezer side **346** of the mullion region **30** to an upper or refrigerator side **348** of the mullion region **30**, and a third mullion segment **350** routed along a first mullion portion **352** of the refrigerator compartment perimeter **26**.

[0058] The second return segment **64**, also referred to as the return portion **64**, of the heat loop **44** includes a first mullion segment **354** routed along a second mullion portion **356** of the refrigerator compartment perimeter **26**, a second mullion segment **358** extending at an obtuse angle A**2** from the refrigerator side **348** of the mullion region **30** to the freezer side **346** of the mullion region **30**, and a third mullion segment **360** routed along a second mullion portion **362** of the freezer compartment perimeter **28**. The second mullion segment **344** of the second send segment **54** may extend proximate and parallel to the second mullion segment **358** of the second return segment **64**. The send portion **54** and the return portion **64** may generally be rotationally symmetrical around the center point **296**. The send portion **54** and/or the return portion **64** may cross the center line **250**.

[0059] Stated a different way, the heat loop **44** routed through the mullion region **30** includes the send portion **54** and the return portion **64**. The send portion **54** is routed proximate to the first mullion portion **342** of the freezer compartment **16**, from the lower side **346** of the mullion region **30** to the upper side **348** of the mullion region **30** at the obtuse angle A**1** relative to the lower side

346 of the mullion region **30**, and proximate to the first mullion portion **352** of the refrigerator compartment **14**. The return portion **64** is routed proximate to the second mullion portion **356** of the refrigerator compartment **14**, from the upper side **348** to the lower side **346** at the obtuse angle A**2** relative to the upper side **348** of the mullion region **30**, and proximate to the second mullion portion **362** of the freezer compartment **16**. The obtuse angle A**1** and obtuse angle A**2** may be the same angle.

[0060] The obtuse angle A**1** is defined as the angle between the first mullion segment **340** of the second send segment **54** and the second mullion segment **344** of the second send segment **54**. The obtuse angle A**2** is defined as the angle between the first mullion segment **354** of the second return segment **64** and the second mullion segment **358** of the second return segment **64**. The obtuse angles A**1** may be defined as the angle between the midline **280** and the second mullion segment **344** of the second send segment **54**. The obtuse angles A**2** may be defined as the angle between the midline **280** and the second mullion segment **358** of the second return segment **64**. The obtuse angles A**1** and A**2** are equal when the second mullion segment **344** of the second send segment **54** extends parallel to the second mullion segment **358** of the second return segment **64**.

[0061] Referring still to FIGS. **12** and **13**, the first mullion segment **340** of the second send segment **54** is routed in a first direction **390**, as illustrated by arrow **390**. The second mullion segment **344** is routed in a second direction **392**, as illustrated by arrow **392**, and is coupled to the first mullion segment **340** with a connector segment **394**, which is routed in the first direction **390** to the second direction **392**. The second direction **392** is at the obtuse angle A**1** in the first direction **390**. The third mullion segment **350** is routed in a third direction **396**, as illustrated by arrow **396** and is coupled to the second mullion segment **344** by a connector segment **398**, which is routed in the second direction **392** to the third direction **396**. The first direction **390** and the third direction **396** may be opposing directions.

[0062] The first mullion segment **354** of the second return segment **64** is routed in the third direction **396**. The second mullion segment **358** is routed in a fourth direction **400**, as illustrated by arrow **400**, and is coupled to the first mullion segment **354** by a connector segment **402**, which is routed in the third direction **396** to the fourth direction **400**. The fourth direction **400** is at the obtuse angle A**2** to the third direction **396**. The fourth direction **400** and the second direction **392** may be opposing directions. The third mullion segment **360** is routed in the first direction **390** and is coupled to the second mullion segment **358** by a connector segment **404** routed in the fourth direction **400** to the first direction **390**.

[0063] The first and second configurations of the heat loop **44** routing in the mullion region **30** reduces or prevents condensation buildup on the periphery of the cabinet **12** at the trim breaker **24** and the wrapper **22**. Both configurations can reduce or minimize temperature variation or low temperature areas in the mullion region **30**.

[0064] With reference to FIGS. **1-13**, the refrigerant system **40** configuration, the heat loop **44** configurations, and the evaporator assembly **48** configurations may be used independently or in any combinations with each other. For example, the refrigerant system **40** with the heat loop **44** disposed between the compressor **42** and the condenser **46** may be used with the first configuration of the heat loop **44**. The heat loop **44** configurations may also be used independently of the refrigerant system **40** discussed and used with a refrigerant system having the heat loop **44** disposed between a condenser and an evaporator assembly. The evaporator assemblies **48** may be used with the refrigerant system **40** and/or the heat loop **44** configurations or may be used independently of the other systems.

[0065] Use of the present device may provide a variety of advantages. For example, the refrigerant system **40** may have an improved system balance between the refrigerator evaporator assembly **138** and the freezer evaporator assembly **140** when the refrigerator evaporator assembly **138** is either the first roll bond evaporator **200** coupled to the second roll bond evaporator **202** or the wire-on-tube evaporator **230**. Both configurations of the refrigerator evaporator assembly **138** increase heat transfer between the refrigerator compartment **14** and the refrigerant system **40**. The configurations of the refrigerator evaporator assembly **138** increase a cooling load to reduce or prevent liquid refrigerant from entering the compressor **42**, which reduces external condensation on the suction lines **146***a*, **146***b*. Additionally, disposing the heat loop **44** between the compressor **42** and the condenser **46** may better regulate temperature along the trim breaker **24** and through the mullion region **30**, which can reduce or prevent external condensation. Moreover, the configuration of the heat loop **44** between the compressor **42** and the condenser **46** may also optimize the layout of the refrigerant system **40** and/or the appliance **10**. Further, the configurations of the heat loop **44** in the mullion region **30** may help create a consistent or more consistent temperature across the mullion region **30** and reduce or eliminate low temperature spots. The more consistent temperature in the mullion region **30** helps reduce external condensation in the mullion region **30**. Also, each of the refrigerant system **40** configuration, the heat loop **44** configurations, and the evaporator assembly **48** configurations may be utilized independently or in combination to increase energy efficiency of the vacuum insulated appliance **10** and reduce refrigerant cycle time within the refrigerant system **40**. Additional benefits or advantages may be realized and/or achieved.

[0066] The device disclosed herein is further summarized in the following paragraphs and is further characterized by combinations of any and all of the various aspects described herein.

[0067] According to an aspect of the present disclosure, a vacuum insulated refrigerator includes a cabinet defining a refrigerator compartment and a freezer compartment where the cabinet at least partially defines a mechanical compartment. The cabinet includes a liner, a wrapper, and a trim breaker. The trim breaker is coupled to the liner and the wrapper. The trim breaker defines a refrigerator compartment perimeter, a freezer compartment perimeter, and a mullion region between the refrigerator compartment and the freezer compartment. The refrigerant system includes a compressor disposed in the mechanical compartment. A heat loop is coupled to the compressor where the heat loop includes a first send segment routed from the mechanical compartment and along a first portion of the freezer compartment perimeter, a second send segment routed through the mullion region, and a third send segment routed along a first portion of the refrigerator compartment perimeter adjacent the mullion region. A first return segment is routed along a second portion of the refrigerator compartment perimeter, a second return segment is routed through the mullion region, and a third return segment is routed along a second portion of the freezer compartment perimeter and to the mechanical compartment. A condenser is disposed in the mechanical compartment and is coupled to the heat loop, where a refrigerant is directed from the compressor, through the heat loop, and then to the condenser, and an evaporator assembly is coupled to the condenser and the compressor.

[0068] According to another aspect, a second send segment of a heat loop includes a first mullion segment routed along a first mullion portion of a freezer compartment perimeter. A second mullion segment extends from a first lateral side of a mullion region to a second lateral side of the mullion proximate a midline between a freezer compartment and a refrigerator compartment. A third mullion segment is routed along a first mullion portion of a refrigerator compartment perimeter. A second return segment of the heat loop includes a first mullion segment routed along a second mullion portion of the refrigerator compartment perimeter. A second mullion segment extends from the second lateral side of the mullion region to the first lateral side of the mullion region proximate the midline. A third mullion segment is routed along a second mullion portion of the freezer compartment perimeter. The second mullion segment of the second send segment extends proximate and parallel to the second mullion segment of the second return segment.

[0069] According to yet another aspect, a second send segment of the heat loop includes a first mullion segment routed along a first mullion portion of a freezer compartment perimeter. A second mullion segment extends at an obtuse angle from a freezer side of a mullion region to a refrigerator side of the mullion region. A third mullion segment is routed along a first mullion portion of the refrigerator compartment perimeter. A second return portion of the heat loop includes a first

mullion segment routed along a second mullion portion of a refrigerator compartment perimeter. A second mullion segment extends at an obtuse angle from the refrigerator side of the mullion region to the freezer side of the mullion region. A third mullion segment is routed along a second mullion portion of the freezer compartment perimeter. The second mullion segment of the second send segment extends proximate and parallel to the second mullion segment of the second return segment.
[0070] According to another aspect, a refrigerant system includes a drier coupled to a condenser and an evaporator assembly.
[0071] According to yet another aspect, an evaporator assembly includes a refrigerator evaporator assembly disposed in a refrigerator compartment and a freezer evaporator assembly disposed in a freezer compartment where the refrigerator evaporator assembly and the freezer assembly are arranged in parallel along a refrigerant flow path.
[0072] According to another aspect, a refrigerator evaporation assembly includes a first roll bond evaporator coupled to a second roll bond evaporator. The first roll bond evaporator and the second roll bond evaporator are arranged in series along a refrigerant flow path.
[0073] According to yet another aspect, a refrigerator evaporation assembly includes a wire-on-tube evaporator, and a freezer evaporator assembly includes a fin-on-tube evaporator.
[0074] According to another aspect of the present disclosure, a vacuum insulated refrigerator includes a cabinet defining an upper compartment, a lower compartment, and a mullion region between the upper compartment and the lower compartment. The cabinet at least partially defines a machine compartment. A trim breaker is coupled to a periphery of the cabinet and the mullion region. A compressor is disposed in the machine compartment. A heat loop is fluidly coupled to the compressor where the heat loop is coupled to the trim breaker and is routed along the periphery of the cabinet and through the mullion region. A condenser is fluidly coupled to the heat loop. An evaporator assembly is fluidly coupled to the condenser and to the compressor. The evaporator assembly includes at least one first evaporator disposed in the upper compartment and a second evaporator disposed in the lower compartment. A refrigerant is configured to flow from the compressor to the heat loop, from the heat loop to the condenser, and from the condenser to the evaporator assembly.
[0075] According to another aspect, at least one first evaporator includes a first roll bond evaporator coupled to a second roll bond evaporator.
[0076] According to yet another aspect, an upper compartment is a refrigerator compartment, where at least one first evaporator is a wire-on-tube evaporator.
[0077] According to another aspect, a heat loop is routed through a mullion region which includes a send portion and a return portion. The send portion is routed proximate to a first mullion portion of a lower compartment, proximate to a midline between an upper compartment and the lower compartment and from a first end of the mullion region to a second end of the mullion region, and proximate to a first mullion portion of the upper compartment. The return portion is routed proximate to a second mullion portion of the upper compartment, proximate to the midline and from the second end to the first end, and proximate to a second mullion portion of the lower compartment. The send portion routed proximate the midline extends proximate and parallel to the return portion routed proximate to the midline.
[0078] According to yet another aspect, a heat loop is routed through a mullion region including a send portion and a return portion. The send portion is routed proximate to a first mullion portion of a lower compartment, from a lower side of the mullion region to an upper side of the mullion region at a first obtuse angle relative to the lower side of the mullion region, and proximate to a first mullion portion of an upper compartment. The return portion is routed proximate to a second mullion portion of the upper compartment, from the upper side to the lower side at a second obtuse angle relative to the upper side of the mullion region and proximate to a second mullion portion of the lower compartment. The send portion extending at the first obtuse angle extends proximate to

the return portion extending at the second obtuse angle.
[0079] According to another aspect, a first obtuse angle is equal to a second obtuse angle.
[0080] According to another aspect of the present disclosure, a refrigeration appliance includes a cabinet including a wrapper and a liner where the wrapper at least partially defines a machine compartment. A trim breaker is coupled to an edge of the wrapper and an edge of the liner. The trim breaker defines a mullion region. A refrigerant system includes a compressor disposed in the machine compartment. A heat loop is coupled to the compressor. The heat loop is coupled to the trim breaker. The heat loop includes a send portion and a return portion routed through the mullion region, where the send portion and the return portion each cross a center line defined by the cabinet. A condenser is disposed in the machine compartment and is coupled to the heat loop. An evaporator assembly is coupled to the cabinet.
[0081] According to another aspect, a liner defines a refrigeration compartment and a freezer compartment. An evaporator assembly includes a wire-on-tube evaporator coupled to the liner and in the refrigeration compartment.
[0082] According to yet another aspect, a liner defines a refrigeration compartment and a freezer compartment. An evaporator assembly includes a first roll bond evaporator coupled to a second roll bond evaporator. The first roll bond evaporator and the second roll bond evaporator are arranged in series along a flow path of a refrigerant and are coupled to the liner in the refrigeration compartment.
[0083] According to another aspect, a heat loop is disposed between a compressor and a condenser. A refrigerant system is configured to direct a refrigerant along a flow path from the compressor to the heat loop, from the heat loop to the condenser, and through an evaporator assembly to the compressor.
[0084] According to yet another aspect, a cabinet defines a first compartment, a second compartment, and a mullion region between the first compartment and the second compartment. A heat loop is routed along a perimeter of the first compartment, a perimeter of the second compartment, through the mullion region between the first compartment and the second compartment.
[0085] According to another aspect, a send portion is routed proximate to a first mullion portion of a first compartment, proximate to a midline between a second compartment and the first compartment and from a first end of a mullion region to a second end of the mullion region, and proximate to a first mullion portion of the second compartment. A return portion is routed proximate to a second mullion portion of the second compartment, proximate to the midline and from the second end to the first end, and proximate to a second mullion portion of the first compartment. The send portion is routed proximate the midline extends proximate and parallel to the return portion routed proximate to the midline.
[0086] According to yet another aspect, a send portion is routed proximate to a first mullion portion of a first compartment, from a lower side of the mullion region to an upper side of a mullion region at a first obtuse angle relative to the lower side of the mullion region, and proximate to a first mullion portion of a second compartment. A return portion is routed proximate to a second mullion portion of the second compartment, from the upper side to the lower side at a second obtuse angle relative to the upper side of the mullion region and proximate to a second mullion portion of the first compartment. The send portion extending at the first obtuse angle extends parallel and proximate to the return portion extending at the second obtuse angle.
[0087] It will be understood by one having ordinary skill in the art that construction of the described disclosure and other components is not limited to any specific material. Other exemplary embodiments of the disclosure disclosed herein may be formed from a wide variety of materials, unless described otherwise herein.
[0088] 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.

[0089] It is also important to note that the construction and arrangement of the elements of the disclosure 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.

[0090] 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 disclosure. The exemplary structures and processes disclosed herein are for illustrative purposes and are not to be construed as limiting.

Claims

1. A refrigerant system for a vacuum insulated appliance, comprising: a trim breaker including a first compartment perimeter, a second compartment perimeter, and a mullion region between the first compartment perimeter and the second compartment perimeter; a compressor; a condenser; a heat loop extending from the compressor and along the trim breaker to the condenser, wherein the heat loop extends: along the first compartment perimeter; through the mullion region toward the second compartment perimeter and crossing a center line and a midline of the trim breaker, the midline being between the first and second compartment perimeter and normal to the center line; along the second compartment perimeter; and through the mullion region toward the first compartment perimeter and crossing the center line and the midline of the trim breaker; an evaporator assembly; and a refrigerant configured to be directed from the compressor, through the heat loop to the condenser, and through the evaporator assembly.

2. The refrigerant system of claim 1, further comprising: a 3-way valve disposed between the condenser and the evaporator assembly, wherein the evaporator assembly includes a first evaporator and a second evaporator, and wherein the refrigerant is directed to the first and second evaporators by the 3-way valve.

3. The refrigerant system of claim 2, wherein the first evaporator is a fin-on-tube evaporator, and wherein the second evaporator includes at least one roll bond evaporator.

4. The refrigerant system of claim 3, wherein the at least one roll bond evaporator includes first and second roll bond evaporators arranged in series along a flow path of the refrigerant.

5. The refrigerant system of claim 1, wherein the heat loop extends parallel to the midline in the

mullion region.
6. The refrigerant system of claim 1, wherein in the mullion region the heat loop includes a send segment and a return segment, wherein the send segment extends toward the second compartment perimeter parallel with the center line and crossing the midline and then parallel to the midline, and wherein the return segment extends toward the first compartment perimeter parallel with the center line and crossing the midline and the parallel with the midlines.
7. The refrigerant system of claim 1, wherein in the mullion region the heat loop includes a send segment and a return segment, wherein the send segment extends along the first compartment perimeter and then at an obtuse angle to cross the center line and the midline toward the second compartment perimeter, and wherein the return segment extends along the second compartment perimeter and then at an obtuse angle to cross the center line and the midline toward the first compartment perimeter.
8. The refrigerant system of claim 1, wherein in the mullion region the heat loop includes a send segment and a return segment, and wherein at least a portion of the return segment and a portion of the send segment extend parallel with one another.
9. An appliance comprising: a cabinet; a trim breaker coupled to the cabinet and defining a first compartment perimeter, a second compartment perimeter, and a mullion region between the first and second compartment perimeters; a machine compartment at least partially defined by the cabinet; a compressor disposed within the machine compartment; a condenser disposed within the machine compartment; a heat loop extending from the compressor, along the trim breaker, and to the condenser, wherein the heat loop has a send segment and a return segment extending across the mullion region, and wherein each of the send segment and the return segment cross an appliance center line.
10. The appliance of claim 9, wherein the cabinet includes an outer wrapper and an inner liner, and wherein the outer wrapper and the inner liner define a vacuum insulated cavity therebetween.
11. The appliance of claim 10, wherein the machine compartment is at least partially defined by an outer surface of the outer wrapper of the cabinet.
12. The appliance of claim 9, wherein each of the send segment and the return segment include a first portion that extends parallel to a midline between the first and second compartment perimeters and a second portion that crosses the midline.
13. The appliance of claim 12, wherein the second portion of each of the send segment and the return segment is disposed proximate to the appliance center line.
14. The appliance of claim 12, wherein the second portion of the send segment is disposed proximate to a first side edge of the trim breaker, and wherein the second portion of the return segment is disposed proximate a second opposing side edge of the trim breaker.
15. The appliance of claim 9, further comprising: a first evaporator assembly; and a second evaporator assembly arranged in parallel along a flow path for a refrigerant.
16. The appliance of claim 15, wherein the second evaporator assembly includes first and second evaporators arranged in series along the flow path.
17. A refrigerant system for a vacuum insulated appliance, comprising: a compressor; a condenser; a heat loop extending from the compressor and to the condenser, wherein the heat loop is configured to extend along perimeters of first and second compartments of said vacuum insulated appliance between the compressor and the condenser; an evaporator assembly including: a first evaporator assembly; a second evaporator assembly arranged in parallel with the first evaporator assembly along a flow path, the second evaporator assembly including a first evaporator and a second evaporator arranged in series along the flow path; and a refrigerant configured to be directed along the flow path from the compressor, through the heat loop, to the condenser, and through the evaporator assembly.
18. The refrigerant system of claim 17, wherein the heat loop is configured to cross a center line of said vacuum insulated appliance between the perimeter of the first compartment and the perimeter

of the second compartment.

19. The refrigerant system of claim 18, wherein the heat loop includes a send segment and a return segment between the perimeter of the first compartment and the perimeter of the second compartment, and wherein each of the send segment and the return segment is configured to cross the center line.

20. The refrigerant system of claim 17, wherein the first evaporator assembly is a fin-on-tube evaporator, and wherein the first and second evaporators are first and second roll bond evaporators.