June 4, 1968 R. L. BRAKE, JR., ETAL 3,387,114

WARMING OVEN

Filed June 9, 1965 4 Sheets-Sheet 1

FIG. 1

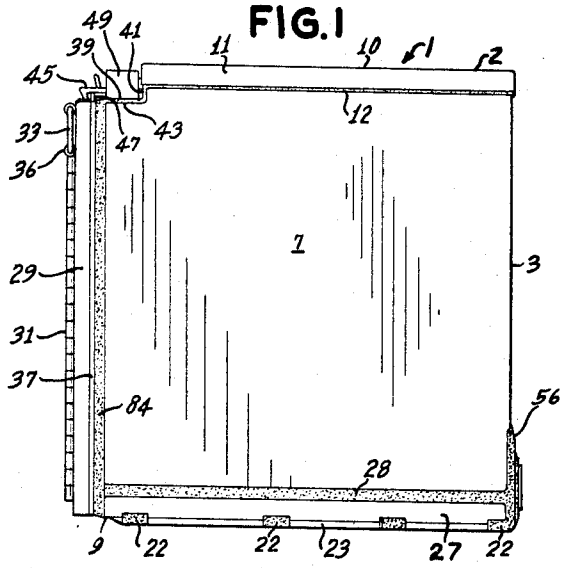


FIG. 2

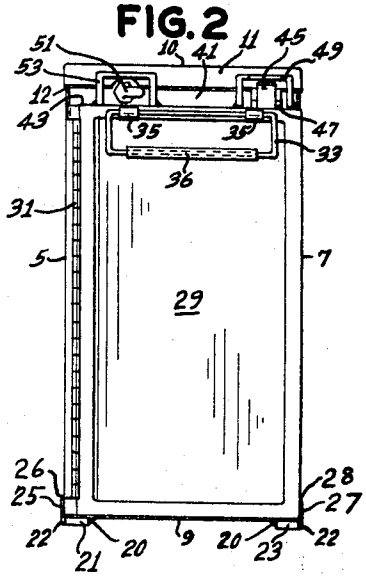


FIG. 3

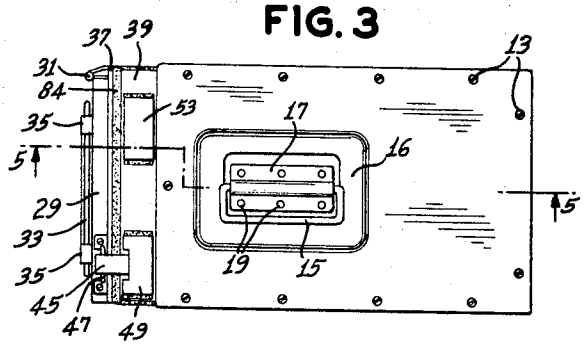


FIG. 4

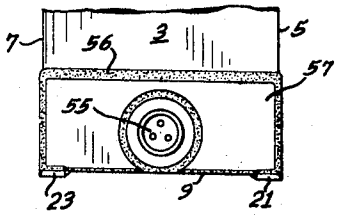
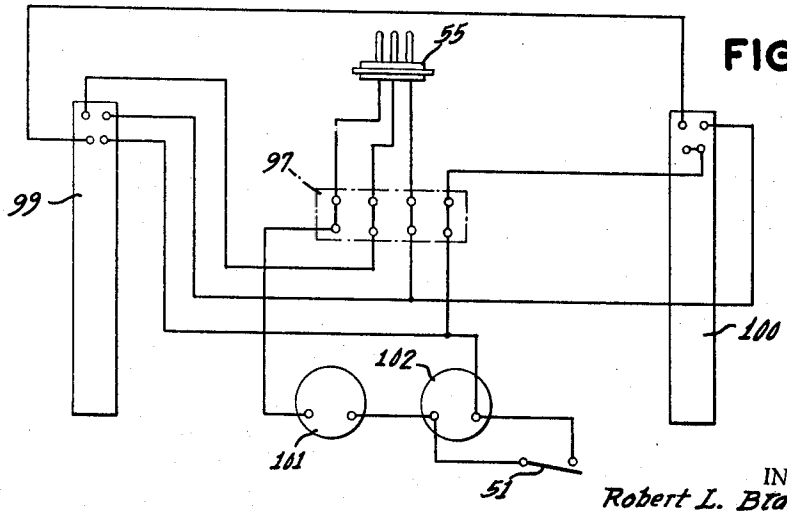


FIG. 13



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WARMING OVEN

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FIG. 5

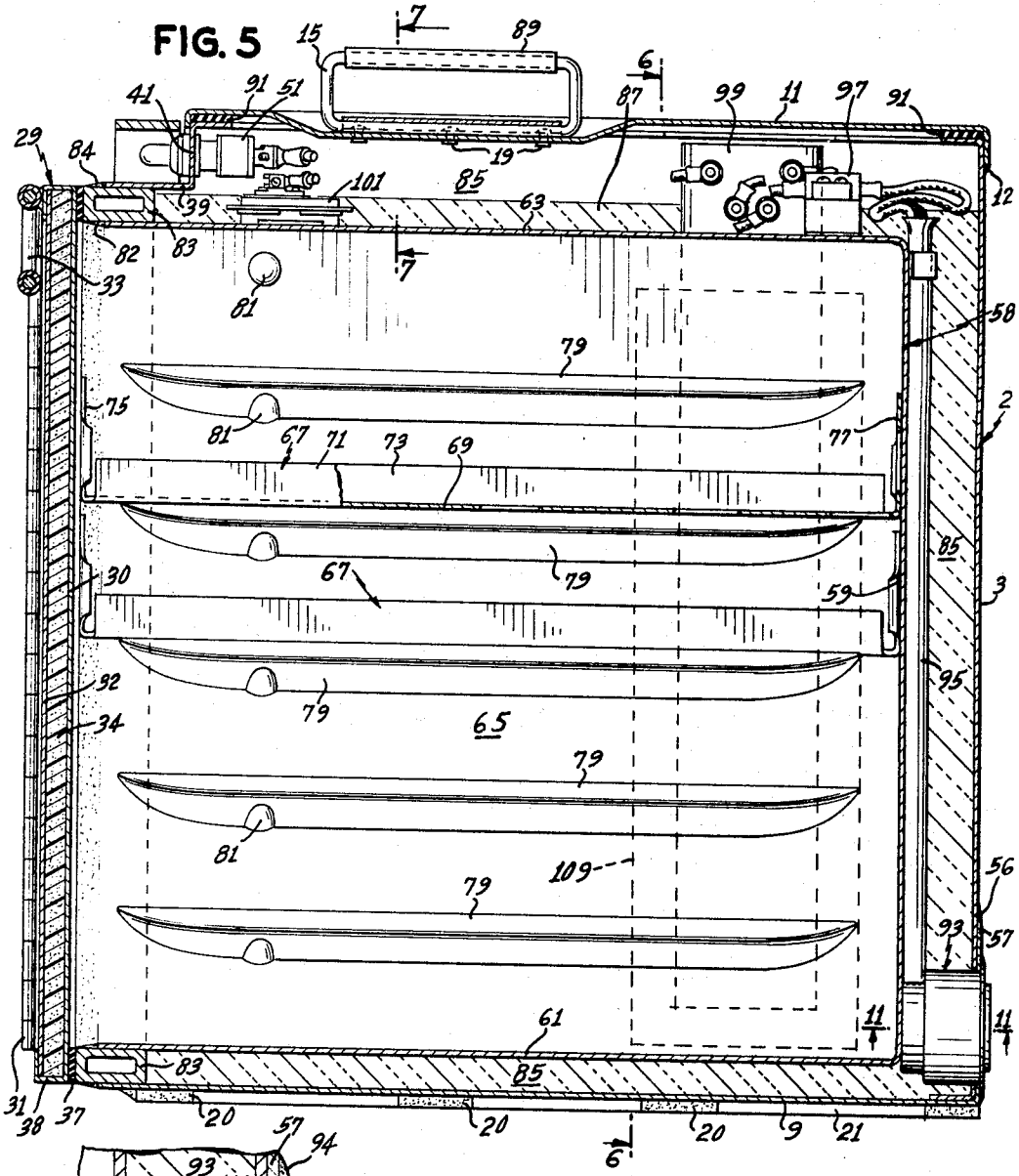


FIG. 11

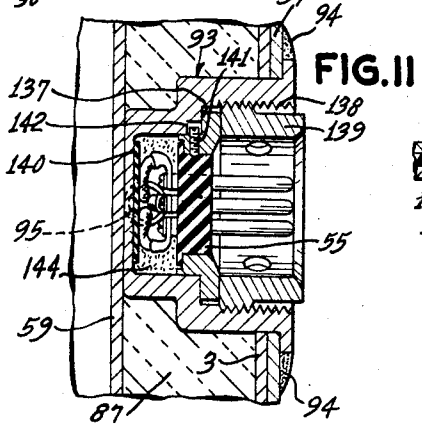
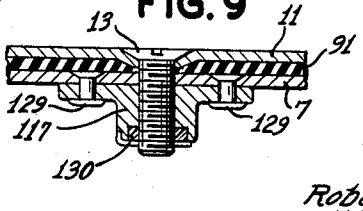


FIG. 9



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WARMING OVEN

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FIG. 6

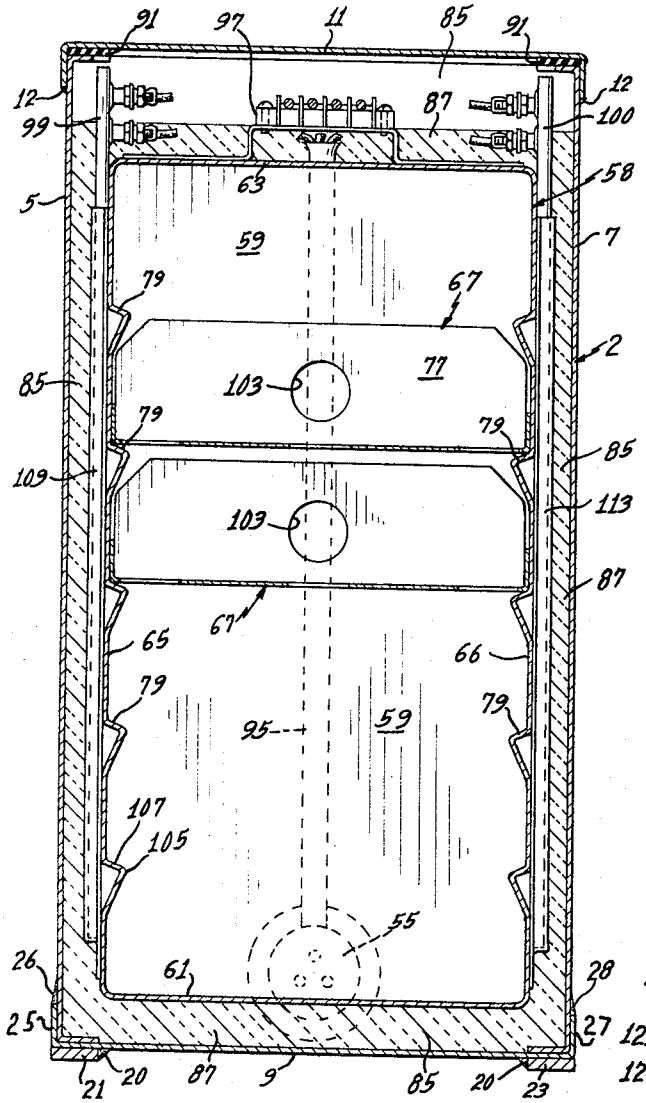


FIG. 12

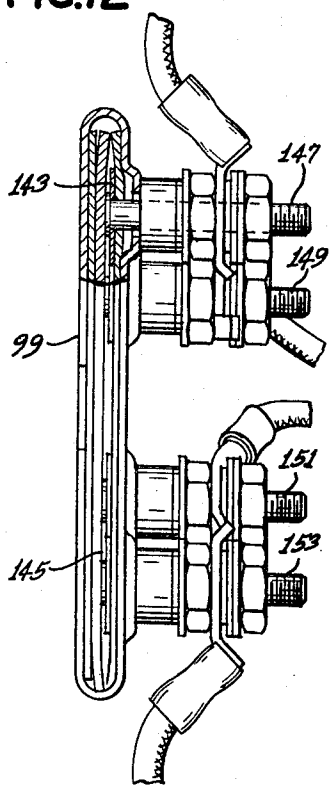


FIG. 10

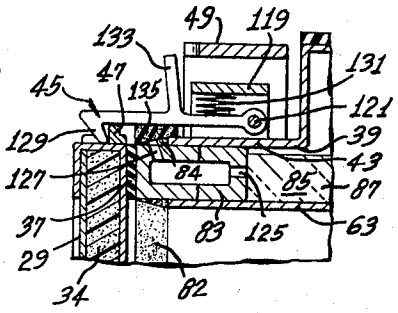
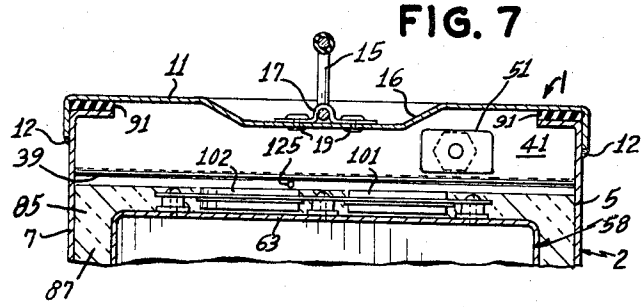


FIG. 7



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WARMING OVEN

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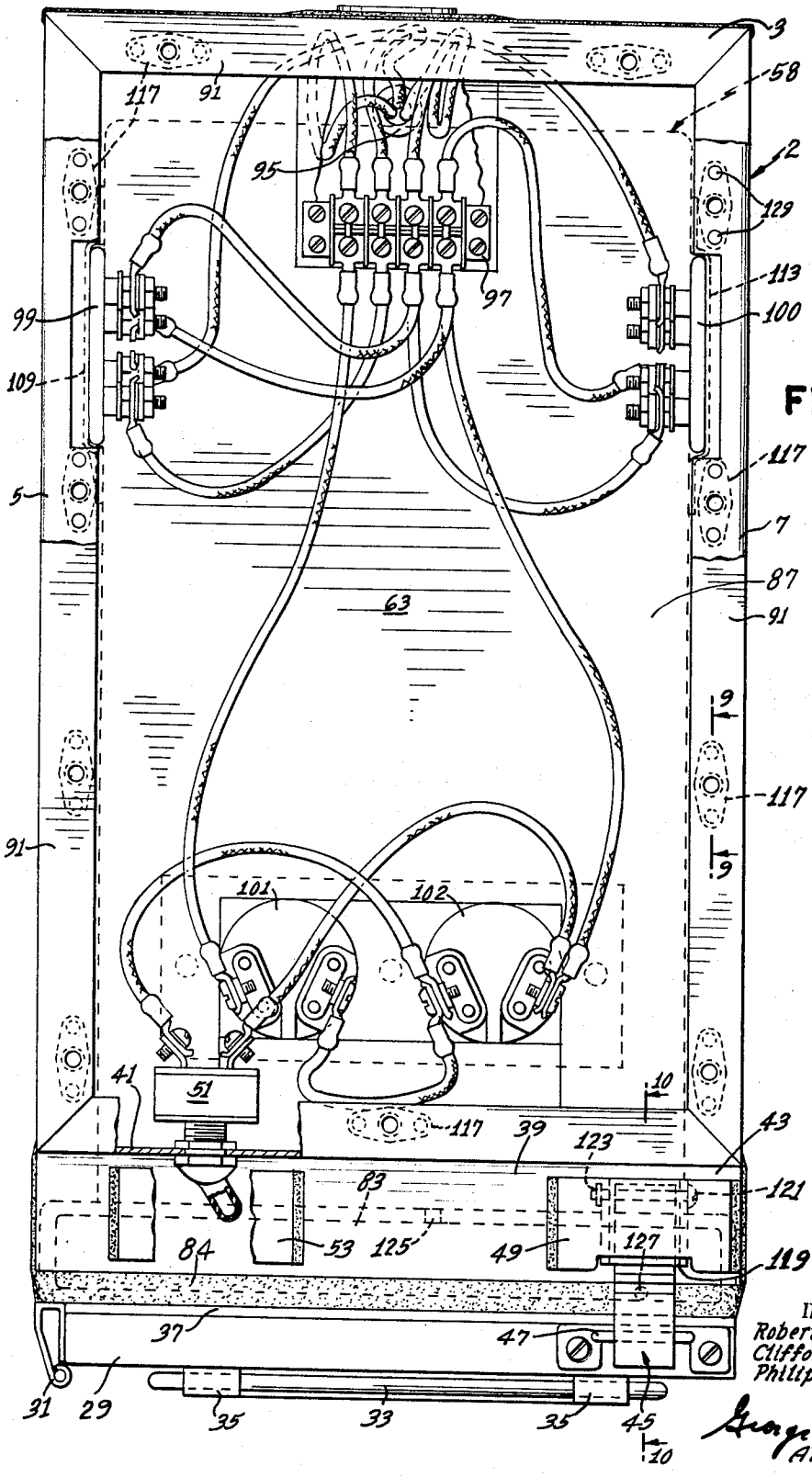


FIG. 8

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3,387,114

WARMING OVEN

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Filed June 9, 1965, Ser. No. 462,474
19 Claims. (Cl. 219—386)

ABSTRACT OF THE DISCLOSURE

A food warming oven particularly for aircraft comprising inner and outer sealed shells joined at the mouth of the oven to a hollow rigid collar member surrounding the mouth. An electric heating element is arranged in the sealed space between the shells, and this space communicates into the interior of the collar through a small vent. A second small vent communicates between the interior of the collar and the atmosphere. A latch element for the oven door includes a pad closing the vent to the atmosphere.

The oven includes a sealed electrical connection for the heating element, an insulated door closing against a gasket on the face of the collar, a recessed upper front edge portion in which a switch and the latch are disposed, guards for the switch and latch, and a sealed removable top panel portion of the outer sheel.

This invention relates to warming ovens and in particular to portable electric food warming ovens of the type used for storing and keeping warm food which is to be served on aircraft while in flight.

The invention is concerned with the provision of means whereby cooked food may be brought to and/or maintained at desirable serving temperatures in galleys of airplanes. Food warming ovens in their transit from and to the aircraft proper from the kitchens or points of food preparation located on the ground are generally treated in a rough manner, being banged together, bounced around on their carrying truck, exposed to all sorts of weather, and generally treated in a rough and tumbled manner. This type of treatment tends to loosen the means connecting and joining together the members comprising the outer box-like shell of the oven. If openings or holes in the outer shell of the oven result from such rough handling, the insulation and electrical means used to heat the oven which are contained between this outer box-like shell and the inner liner become susceptible to exposure to and accumulation of moisture. In time, the accumulation of moisture within the oven which is brought about by expansion and contraction of air between the walls while the oven is in the rain, or while it is being washed between periods of use, will prevent the insulation from serving its useful purpose and will deteriorate the heating means to the point where they will become inoperative. The insulation becomes waterlogged and inefficient, and it may even short-circuit the heating means.

It is, accordingly, an important object of this invention to provide a food warming oven resistant to damage from rough treatment and resistant to the entry of water into the insulation and heat element space.

If the space between the liner of the oven and the exterior box-like shell is water tight and airtight, the sides of the liner will bow inwardly and the sides of the outer box-like shell will bulge outwardly when the heating elements in the airtight space are connected or when the atmospheric pressure is reduced at elevated altitudes. Such bulging and bowing of the oven sides may cause undesirable jamming of the food trays contained within

the oven liner such that they cannot be removed, and further may cause jamming of one oven unit against its adjacent oven units in a tier or row of units such that the units cannot be removed from the row.

It is a general object of this invention to provide a new and improved food warming and holding oven, and particularly, to provide an improved oven of this type particularly adapted for use in aircraft.

Still another object of the invention is to provide a food warming oven for use in aircraft which is strong and rigid, yet of a simple and light weight construction.

Another general object of the instant invention is to provide a portable hot food or holding oven of which the insulation and heating element space will remain substantially free of moisture even after prolonged hard use and service.

A further object of the invention is to provide an improved hot food oven or holding oven which is of a watertight construction.

A specific object of this invention is to provide a warming oven for aircraft which may be cleaned by use of a mechanical washer without damage to the oven, and particularly without causing the insulation to become wet.

Another specific object of this invention is to provide a hot food oven or holding oven for use with aircraft wherein the space or chamber between the outer box-like shell and the inner oven liner is sealed as to moisture but which is provided with improved vent means permitting restricted movement of air between this space and the outside atmosphere whereby to prevent the inner and outer walls from bowing or bulging when in operation and service in an aircraft in flight.

A still further specific object of the invention is to provide a hot food oven or holding oven for use in aircraft which is readily and easily repaired, while still providing the watertight integrity of the oven after repair.

Yet another specific object of this invention is to provide a hot food oven for use in aircraft wherein the electrical heating means for the oven, that is to say, the electrical plug connector, the electrical heating elements and the electrical thermostats, are accessible and readily repaired or replaced, while maintaining the watertight integrity of the oven after such repair or replacement.

Another object of the subject invention is to provide a hot food holding oven having an improved door, door seat, door seal and door catch mechanisms covering the opening leading into the oven liner, such that even should the door become sprung it will still close this opening.

Still a further object of this invention is to provide a food warming or holding oven having no projecting parts and one in which the arrangement of the parts proves to be of greater convenience to the user thereof.

According to the present invention the foregoing and other objects and advantages are in general attained by providing within a hot food warming or holding oven of the type generally used by airlines aboard their aircraft an outer box-like shell for the oven which includes welded metal portions and which is moisture proof and, where necessary, air-tight. There is formed an air and moisture tight space or chamber between this outer shell and an oven's inner liner, which chamber contains insulation, thermostats and electrical elements for heating the food chamber of the oven. Also there is provided breathing means for this insulation and heating element chamber which allows communication between this space or chamber, between the outer shell and the inner liner, and the outside atmosphere such that air may pass into and out of this chamber, in a manner to minimize pressure differences between the chamber and the atmosphere and so arranged as normally to prevent entry of water and mois-

ture into the chamber. In a preferred embodiment of the invention the breathing means comprise, a sealed completely enclosed hollow collar of rectangular cross-section, which collar is a primary structural member of the oven, and which circumferentially and outwardly surrounds and is welded to the liner adjacent its open front side and inwardly surrounds and is welded to the outer shell adjacent its open front side. This sealed, hollow, rectangular collar member constitutes a part of the oven front against which the door seals and on which the door is hingedly mounted. The hollow collar member is provided with two small vent passageways or openings, one of which communicates between the interior of the collar and the chamber and the other of which communicates between the interior of the collar and the atmosphere. There is provided means yieldably positioned over and which normally covers the passageway opening externally of the oven to the atmopshere so as to prevent the passage of liquid thereinto but which permits the passage of air therethrough. The interior of the hollow collar serves as a collection chamber for any moisture that may inadvertently enter the pasageway opening externally of the oven to the atmosphere.

The novel features which are believed to be characteristic of this invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a right-side elevation view of the warming oven of this invention;

FIG. 2 is a front elevational view of the oven of FIG. 1;

FIG. 3 is a top plan view of the oven of FIG. 1;

FIG. 4 is a partial rear elevational view of the oven of FIG. 1;

FIG. 5 is an enlarged cross-sectional view along line **5—5** of FIG. 3 showing the details of the interior of the oven;

FIG. 6 is a cross-sectional view along line **6—6** of FIG. 5;

FIG. 7 is a cross-sectional view along line **7—7** of FIG. 5;

FIG. 8 is an enlarged top plan view, partially broken away, with the top cover of the oven removed;

FIG. 9 is a cross-sectional view along line **9—9** of FIG. 8;

FIG. 10 is a cross-sectional view along line **10—10** of FIG. 8;

FIG. 11 is a cross-sectional view along line **11—11** of FIG. 5;

FIG. 12 is a detailed plan view partly broken away, of one of the electric heating units of the oven; and

FIG. 13 is a schematic wiring diagram of the heating means of the warming oven of the invention.

Referring now to the drawings in detail, the warming oven of this invention designated by reference number **1** is generally depicted in FIG. 1 through FIG. 4. The oven has an outer rectangular box-like shell **2** which comprises a substantially vertically disposed upstanding back wall **3** which is connected along each of its vertical edges to vertically disposed upstanding side walls **5** and **7**. These walls are further joined along their lower edges to a substantially horizontally disposed tray-like bottom **9**. A top wall **10**, having a removable top cover portion **11**, completes the outside box-like shell **2** of the oven. This box-like outer shell defines a generally rectangular-shaped chamber therewithin having an open front side opposite upstanding back wall **3**. The outer housing is of a moisture and air-tight metal construction, and completely welded with the exception of the top cover **11**; which cover is removable to provide easy and ready access to the interior of the oven and the electrical heating means contained therein which are used to heat the oven. Top cover **11** is held in place by employing metal bolts **13**, which when tightened maintain top cover **11** in a moisture and air-sealed relationship with the rest of outer box-like shell **2**. To insure a moisture tight outer shell an epoxy bead or seal **12** is run completely around removable top cover **11**. A foldable recessed handle **15** is employed on top cover **11** to provide a convenient place to grasp the oven and allow for easier handling and moving of the oven from place to place. This handle **15** is mounted on top cover **11** by the use of a mounting bracket **17** and a suitable number of rivets **19**. The handle is easily rotatable within bracket **17** to permit it to fold downward into recess **16** in top cover **11** so as to be out of the way when not in use. Bottom wall **9** has reinforcing members **21** and **23** running along and welded to its outer edge portions to strengthen and further build up the oven. Welds **20** and **22** connect members **21** and **23** to bottom **9**. These members **21** and **23** act as skids and space the oven a short vertical distance off the horizontal platform or shelf on which the oven rests. The edge portions of bottom **9** are upturned and welded to side walls **5** and **7** at **26** and **28** respectively to form strengthening and reinforcing members **25** and **27** which lend rigidity and provide wear resistance to the oven. The oven is provided with a door **29** for ready and easy access into the oven liner or chamber wherein the food is stored and brought to and/or maintained at a desirable serving temperature. This door is provided with means in the form of a hinge **31** along one of its vertical edges to permit ready opening and closing of the same. To aid in removing the oven from its rack within the aircraft foldable handle **33** is connected along the top edge of door **29** by the use of connecting brackets **35** such that handle **33** can easily move and rotate within brackets **35** to permit complete grasping of the handle by hand. Handle **33** is provided with a handle grip **36** of diameter slightly greater than that of the handle and constructed of plastic or hard rubber to permit a secure hand grasp of the handle. A gasket **37** is mounted on and around the open front side of the oven to cooperate with door **29** so as to seal against air circulation the entrance to the storage space provided by the oven liner and to maintain the desired elevated temperature therein. The gasket remains effective even if the door hinge may have become sprung. The front portion **39** of the top wall of the outer shell **2** is recessed below the removable top cover **11**. This front recessed portion comprises a short vertical wall **41** substantially parallel to back side **3** and a short horizontal leg or wall **43** substantially parallel to the top cover **11**. Mounted on horizontal member **43** is a latch **45** which cooperates with a catch **47** secured to the top of door **29**, such that the door **29** is held in a sealed position against gasket **37** on the front side of the oven when latch **45** engages catch **47**. Positioned over latch **45** and connected to wall **43** is an inverted U-shaped channel member **49** which protects said latch and prevents the same from being inadvertently opened. Mounted through short vertical wall **41** is an electrical selective switch **51** for selectively controlling the temperature at which the interior of the oven is to be maintained. There is provided another inverted U-shaped channel member **53**, which member is positioned over switch **51** and connected to member **43** to protect said switch and prevent inadvertent switching or damage of the same. An electrical 3-prong plug connector **55** is mounted in and extends through back wall **3**, see FIG. 4. Plug **55** and cooperating parts are of a general screw-in and out construction such that it is capable of forming an air and moisture tight seal with the exterior shell of the oven. This plug provides a means of connecting the electrical heating means contained within the oven interior to a source of electric current aboard the aircraft or other device where the oven is to be employed. The back edge of bottom **9** is upturned and welded at **56** to back wall **3** along its lower portion between sides **5** and **7** forming member **57** which provides added strength and durability to back **3** in the area adjacent plug **55**.

FIG. 5 being an enlarged cross-section through the device shows the interior arrangement and details of the oven. As seen in this view the oven has an inner rectangular-shaped liner **58** having a substantially vertically disposed back wall **59**, a horizontally disposed bottom wall **61**, a horizontal top wall **63**, and two substantially vertically disposed up-standing side walls, one of which is **65**, the other **66**, not being seen in this view. These sides, bottom, back, and top walls are joined together to form a generally rectangular-shaped chamber therewithin having an open front side, and which together comprises the oven liner or chamber within which food is placed to be brought to and/or maintained in a servable state. Contained within this cooking chamber are a number of food trays or racks one of which is shown at **67**. The purpose of this tray **67** is to support and hold food while it is within the oven being cooked or maintained at a desired temperature. It is loose and unattached within the oven and may be removed therefrom if so desired. The food rests on food tray bottom **69** and is retained thereon by turned-up edges **71** and **73** and ends **75** and **77** which are similarly turned upward from bottom **69**. Disposed along vertical side wall **65** of inner liner are a number of horizontally disposed equally spaced food tray guides or rests **79** which extend from adjacent the open front side to slightly forward of back **59** of this inner liner. These guides **70** support and provide a rest for food trays **67** such that the food trays are maintained in spaced relationship one to another within the oven, thus providing for good heat circulation between and around the trays and protect the food resting thereon from being crushed. These guides may be attached to the sides or made integral therewith when the sides of the liner are formed. Similarly spaced, cooperating, horizontally disposed tray guides exist on the other vertically disposed up-standing side wall **66**; see FIG. 6. Food trays **67** slide freely into and out of the oven along guides **79**, although they are kept from inadvertent complete removal from the oven by food tray stops **81**. These stops **81** contact and coact with turned-up back end **77** of the food tray to prevent complete removal of the tray from the oven. To provide complete removal of the tray the front end **75** must be inclined upward a sufficient amount to release the contact between stop **81** and back end **77**, then the tray may be pulled forward and outward of the oven the remaining distance to provide complete removal of the same from the oven.

The inner rectangular shaped liner or cooking chamber **58** is welded at **82** along its open front side to a continuous, completely enclosed, sealed, hollow collar or compartment **83** of rectangular cross-section. Collar or compartment **83** completely and circumferentially surrounds the cooking chamber outwardly thereof so as to become a major structural member of the oven. Welded at **84** to the outer side of collar member **83** is box-like outer shell **2** such that the collar **83** extends inwardly of and completely around the open front side of this outer shell. There is thus formed a completely enclosed cavity, hollow space, or chamber **85** by and between inner cooking chamber or liner **58**, outer box-like shell **2** and collar member **83**. This chamber is sealed as to the passage of air and moisture into and out of the same. Insulation **87** is provided within chamber **85** to help maintain the heat generated, by the electrical heating means, within the oven liner **58** and to aid in maintaining the outside shell **2** of the oven in a relatively cool condition. Outer box-like shell **2** welded at **84** to collar member **83**, while more fully described hereinabove in connection with FIGS. 1 through 4, comprises back wall **3** having plate like strengthening member **57** attached thereto by weld **56**, side walls **5** and **7** (not seen in FIG. 5), bottom **9** with reinforcing member **21** connected to the edge thereof by weld **20**, top cover **11** with connected handle **15**, and recessed top front portion **39**. Handle **15** connected to top cover **11** by the use of rivets **19** extending therethrough is provided with a handle grip **89** constructed of hard rubber or plastic having a diameter slightly greater than of the handle such that said grip **89** provides an easier and surer hand grasp on the handle. Beneath top cover **11** is sealing gasket **91** which makes an air and moisture tight seal between top cover **11** and the remainder of outer shell **2** when metal bolts **13** (see FIG. 3) are securely tightened in place. To insure a moisture tight seal of top cover **11** with outer shell **2** an epoxy seal or bead is run entirely around the top cover where its edges meet the outer shell. The open front side of liner **58** is covered by door **29** which is mounted to collar member **83** along one of its vertical sides by the use of hinge **31**. The door **29** comprises a back wall **30** whose edges are flanged and upturned to form the top and sides of the door. Into this thus formed frame is placed front face **32** and rigid insulating foam plastic member **34**. Bottom **38** is then connected to back frame **30** to hold the front face **32** and plastic member **34** in place and complete the door **29**. This door which is provided with handle **33** is sealed to the oven opening by employing sealing gasket **37** secured to the front face of collar member **83**. Back wall **3** has mounted therewithin and therethrough a receptacle **93** for receiving and mounting therewithin electrical plug connector **55** (FIG. 4). Running vertically upward within chamber **85** from the inner end of receptacle **93** to adjacent the top wall **63** of liner **58** is a tubular conduit **95** for carrying electrical wiring from plug connector **55** to a terminal mounting board **97** which is connected to the top wall **63** of liner **58**. Electrical wiring in turn runs from its mounting board **97** to two electrical resistance heating elements one of which is shown at **99**, two thermostats one being **101**, and selective switch **51** mounted in and through short vertical wall **41** of downwardly recessed front portion **39** of the top of outer shell **2**; all of which will be described more fully hereinafter.

Food tray or rack **67** is provided with a finger or thumb hole **103** (see FIG. 6) centered in up-turned end **77** of the tray to aid in sliding the tray into and out of the oven on tray guides **79**. A similar thumb or finger hole is provided in the other up-turned end **75**, as the tray is reversible end for end and either end may be the first into the oven. The tray guides **79** as shown in this embodiment have been made integral with and are a part of the oven liner **58**. These guides **79** have a protruding lip or rib **105** which forms a ledge **107** with the rest of the guide on which the food tray **67** rests and may slide freely inward and outward of the cooking chamber **58**.

Positioning of electrical resistance heating elements **99** and **100** is more readily discernible in FIG. 6. Elongated heating element **99** is mounted vertically in chamber **85** between oven liner **58** and outer shell **2** and adjacent the rear wall **59** of liner **58**. This element **99** is slidably connected to the outside of side wall **65** by the use of mounting bracket **109** such that it may be readily removed from and replaced within chamber **85** by removing releasable top cover **11**, should repair or replacement of the element be necessary. Heating element **100** is similarly mounted using attaching bracket **113** on the outside of side wall **66** of liner **58**. Electrical terminal mounting board **97** is connected to the top wall **63** and adjacent the back wall **59** of oven liner **58** to provide a convenient place and means for electrically connecting together the heating means contained within the oven interior. Gasket **91** is shown in sealed arrangement with removable top cover **11** and the flanged-over upper edges of sides **5** and **7** of outer housing **2**. The vacant portions of chamber **85** are filled with insulating material **87** as previously explained.

FIG. 7 depicts the upper portion of the oven **1** looking in the direction of the front thereof showing the details within chamber **85** between liner **58** and outer shell **2** at this point. Here "hi" and "low" thermostats **101** and **102** are mounted on the outer side of top wall **63** of oven liner **58** near its open front side to provide for maintaining the temperature of heating elements **99** and **100**

at the desired one of the two available temperatures. Electrical switch **51** for selecting the desired thermostat to be used, that being either **101** and **102**, is mounted in and through short vertical wall **41** of the downwardly recessed portion **39** (see FIGS. 1 and 5) of the top of outer housing **2**. Again gasket **91** is shown in sealed arrangement with removable top cover **11** and the inwardly flanged-oven upper edges of side walls **5** and **7** of outer housing **2**. Handle **15** readily rotates within its connecting bracket **17** such that it folds downwardly into recess **16** in top cover **11** to permit the same to lie flat within said recess **16** and not protrude beyond the upper flat surface of top cover **11**.

FIG. 8, being an enlarged plan view partially broken away of the oven with top cover **11** removed, shows the details of the electrical heating means contained within chamber **85** between outer shell **2** and oven liner **58**. Riveted to the underside of flanged-over top edge portion of sides **5** and **7**, back **3**, and vertical wall **41**, and intermittently spaced thereabout are threaded bolt receptacles **117**. These provide a place for securing metal bolts **13** which hold and seal removable top cover **11** in place against sealing gasket **91**. Door **29** is mounted along its left vertical edge by the use of hinge **31** to the front face of collar member **83** so as to cover the open front side of liner **58**. For purposes of convenience a handle **33** is provided on the front of the door adjacent the top edge portion thereof, and is attached thereto in a substantially horizontal manner by connecting brackets **35**. This door is sealed to the oven front by employing gasket **37** secured to the front of collar member **83**, catch **47** mounted on the top of the door and cooperating latch **45** pivotally mounted at its rearward end on the top of short horizontal member **43** of front recessed portion **39** of the top of outer shell **2**. Connected to short horizontal leg member **43** of the front recessed portion **39** of the top of shell **2** is a small inverted U-shaped channel member **119** through which latch **45** is pivotally mounted at its rearward end. To accomplish the mounting of latch **45** a pair of aligned holes are drilled, one to a side, in the lower rear portion of each side of the inverted U-shaped channel member **119** such that latch **45** may be pivotally mounted thereto by the use of bolt **121** and cooperating nut **123**. Larger inverted U-shaped channel member **49** is positioned and connected over smaller member **119** to protect the latch mechanism and aid in preventing the inadvertent opening of door **29**. A small breathing hole, vent opening or passageway **125** is provided in collar member **83** and centered in its upper rear portion to permit communication between the chamber **85**, between liner **58** and shell **2**, and the interior of hollow collar member **83**. A second small breathing hole, vent opening or passageway **127** is provided in collar member **83** in its upper top portion and short horizontal leg **43** of shell **2** directly beneath latch **45** to permit communication between the interior of hollow collar member **83** and the exterior of the oven. The purpose of these small holes will be more fully described in connection with FIG. 10. In FIG. 8 the mounting of electrical switch **51**, for selectively engaging either electrical thermostats **101** and **102**, through and within short vertical wall **41** is more clearly discernible. To aid in protecting this switch from damage and to prevent the inadvertent switching of the same, inverted U-shaped channel member **53** is positioned over the same and connected to horizontal member **43**. Electrical wiring connects switch **51** to thermostats **101** and **102** mounted to the top wall **63** of liner **58** adjacent its front portion, and then in turn connects heating elements **99** and **100** which are mounted vertically, one to a side, near the rear of liner **58** via terminal mounting board **97** centered in the rear portion of and connected to top wall **63** of liner **58**. These electrical wires run from board **97** down through tubular conduit **95** to electrically connect said board with the 3-pronged plug connector **55** mounted in back wall **3** of shell **2**, which plug connector is engaged with a source of electric current aboard the airplane when the device of this invention is in operation.

FIG. 9 shows the details of attachment of removable top cover **11** to the rest of outer housing **2**; it being a cross-section through one representative point of attachment. Mounted to flanged-over upper edge portion of side **7** is threaded bolt receptacle or connector **117**. The connection is made by spot welds or rivets **129** such that receptacle **117** is flushly sealed with the underside of bent or flanged-over top portion of side **7** to provide a place for securing metal bolt **13**. When bolt **13** is tightened down within receptacle **117** it pulls top cover **11** downward into sealed engagement with gasket **91** and the remainder of the shell **2**, a portion of which is represented in this FIG. 9 by side **7**, such that a moisture and air tight container for the contents of the oven is formed. Receptacle **117** is provided with an elastic stop nut **130** mounted in its lowermost portion. The stop nut **130** being a nylon ring made to grip bolt **13** and prevent the same from turning and becoming loose with receptacle **117**. Metal bolt **13** is provided with a flat head and is countersunk within top cover **11** so that the bolt head is flush with the surface of top cover **11** making a smooth nice appearing top to the oven.

In FIG. 10 the door **29** is shown in sealed position with gasket **37** covering the open front side of the oven liner. The door is retained in this position by catch **47** mounted on the top of the door and cooperating latch **45**, which is pivotally connected at its aft end by the use of bolt **121** to small inverted U-shaped channel member **119** which in turn is mounted on short horizontal member **43** of recessed front portion **39**. Latch **45** is provided with a hook-like finger **129** on its outer end for hooking engagement with catch **47** to securely hold the door against sealing gasket **37**; also there is a biasing means in the form of a coiled spring **131**, having one end attached to the top of latch **45** and the other end attached to the underside of member **119**, for urging latch **45** into cooperative engagement with catch **47**. The latch is additionally provided with a thumb or finger rest or push bar **133** such that if force is exerted against rest **133** latch **45** rotates about pivot point **121** and disengages catch **47** so that door **29** may be opened. At this point in the oven hollow rectangular collar member **83** is welded to the top wall **63** of the liner and to short horizontal member **43** of recessed front portion **39** of the top wall of the shell. Between the two housings is chamber **85** filled with insulation material **87**. As previously described collar member **83** has two small holes, vent openings or passageways **125** and **127** contained therewithin; passageway **125** in and through the upper rear portion of hollow collar member **83** permitting communication between chamber **85** and the hollow of member **83**, and passageway **127** in and through the upper top portion of hollow collar member **83** and short horizontal member **43** and located directly beneath latch **45** permitting communication between the hollow of member **83** and the exterior of the oven. The passageways are so constructed as to permit air to pass freely into and out of chamber **85** between the liner and the shell but to prevent water and moisture from entering said chamber **85**. A small piece of sponge rubber **135** is secured by glue to the underside of latch **45** directly over small breathing hole **127** to seal the same and prevent the entrance of moisture of any sort. When the oven is in use in an aircraft while in flight the air contained within chamber **85** will expand due to the oven heat and the reduced pressure within the aircraft. This expanded air will escape the chamber **85** by flowing through passageway **125** into the hollow of collar member **83** and then from said hollow to the exterior of the oven through passageway **127** compressing or slightly lifting sponge rubber pad **135** in its path to the atmosphere surrounding the oven, such that the inner housing **58** does not bulge or bow inward causing difficulty in removing food trays **67**, nor does outer housing bulge or bow outward causing difficulty in removing the oven from a row or tier of ovens if so de-

sired. The reverse cycle takes effect when the oven cools and the aircraft lands, that is air is sucked or drawn into chamber **85**; first entering the hollow of collar **83** by being drawn through sponge rubber **135** and passageway **127** and then entering chamber **85** through passageway **125**. Should the oven be standing in rain, or otherwise exposed to moisture in one form or another, during this period of drawing air, moisture would enter chamber **85** were it not for the design and location of collar member **83**, passageways **125** and **127**, sponge rubber **135**, and latch **45**; but because of the design of the oven, and in particular these last enumerated parts and members thereof, moisture will not penetrate into chamber **85**. Should rain, or moisture in some other form, somehow seep beneath latch **45**, penetrate through sponge rubber **135**, and enter the hollow of collar member **83**, it will fall to the bottom thereof, where it can do no harm, and will not enter chamber **85** through passageway **125**. Thus air may pass relatively freely into and out of chamber **85**, but moisture is prevented from entering this chamber and damaging the insulation and electrical heating means contained therewithin.

It will be recognized that the existence of a pressure above atmospheric pressure within chamber **85** would have the undesirable tendency to bow the walls of the outer shell outwardly and the walls of the inner shell inwardly, which may jam the oven in its rack and jam the food trays in the oven, whereas the existence of a pressure below atmospheric pressure within chamber **85** would merely have the tendency to bow the walls of the outer shell inwardly and the walls of the inner shell outwardly. While only small excess pressure in the chamber is tolerable, pressures even substantially less than atmospheric have no serious consequences so long as they are not sufficiently less than atmospheric to compress the insulation material below its elastic limit. Thus sponge rubber pad **135** preferably acts as a leaky check valve which permits air relatively quickly to escape to prevent pressure build-up in the chamber but which permits air to enter through vent **127** relatively slowly. Even if the pad when in place entirely prevented air from entering through vent **127**, the latch is, of course, periodically opened and the pad is raised at the same time permitting air to enter through the vent.

Because of the sealed construction of the oven, it may be washed by submersion with the door open and with the pad **135** in place to prevent any appreciable entry of water through the vent. The latch should not be raised when water is around the latch and pad, during washing or in the rain, for example, and there would normally be no occasion to raise the latch at such times.

Three-prong electrical plug connector **55** is mounted in and through the lower central portion of back wall **3** and strengthening member **57** of the outer shell; depicted in FIG. 11. The attachment which is of a moisture and air-tight nature is provided by receptacle **93** which is welded at **94** to plate member **57** and extends through back wall **3** and chamber **85** to back wall **59** of the liner. This receptacle **93** has a seat **137** on its inner side for receiving plug connector **55** and inner thread **138** for sealing the connector **55** in place by the use of threaded retaining ring **139**. A small pin **141** which seats in groove or slot **142** is employed in the side of connector **55** to prevent the same from turning within receptacle **93** as retainer **139** is tightened to seal said connector within the receptacle and to align or index the prongs of the connector in position to meet corresponding, and coacting contacts contained within the aircraft. Electrical wires lead from the inner ends of the 3-prongs of connector **55** up through tubular conduit **95** to the terminal mounting board **97** mounted on the top wall **63** of oven liner **58**. A small disk of mica **140** is provided for electrical insulation purposes in the back of receptacle **93** to insure that the wires connected to the prongs of connector **55** do not short-out on this metal back should their insulation become thin or worn. To insure a moisture tight seal of the outer-shell, the area in the back of receptacle **93**, adjacent to mica disk **140**, is potted with a suitable epoxy resin **144** just prior to sealing connector **55** in place within the receptacle **93** by the use of retainer **139**.

Electrical resistance heating element **99** mounted on the left rear side of liner **58** is shown in an expanded top view in FIG. 12. As seen here element **99** has two heating units or individual heating elements **143** and **145** to provide for differing amounts of heat within the oven as so desired. Connected to unit **143** are two connecting means **147** and **149** in the form of bolts, washers and nuts to provide for connection of the heating unit by electrical wires to the other members of the oven heating means. Similar electrical connecting means **151** and **153** are attached to heating unit **145** for the same purpose. While only heating element **99** is shown in FIG. 12, heating element **100** mounted on the right rear portion of oven liner **58** is constructed similarly.

The schematic wiring diagram for the electric heating means of the oven, seen in FIG. 13, shows the electrical connection of the plug connector **55** with the terminal mounting board **97**. Leading from board **97** electrical means connect thermostats **101** and **102**, electrical selective switch **51**, and electrical resistance heating elements **99** and **100** to complete the electrical circuit.

Applicants have thus disclosed a new and improved portable food warming oven for use with aircraft which is both strong and rigid and yet simple of construction and light in weight. The oven can withstand rough treatment and handling yet because of the water tight construction the inside of this oven remains substantially free of moisture even after prolonged use and service, thus preventing moisture deterioration of the insulation and heating means contained therein. Due to the breathable yet water tight design of the portable oven the sides thereof will not bulge and bow inward or outward when the oven is in use in aircraft in flight. Should any of the electrical means used to heat the oven interior ever need repair or replacement, the same can be easily and readily accomplished while still maintaining the water tight integrity of the oven after such repair or replacement. The warming oven of this invention has no projecting parts and the arrangement of its parts is such that they are of great convenience to the user thereof.

While the food warming or holding oven of this invention has been described mainly in connection with aircraft, it is not limited to such use, although it is particularly suitable for use where substantial changes in atmospheric pressure may occur. The oven described herein could also be used in buses, trucks, small boats, and other places, where it is desired to maintain and transport hot food at desirable temperatures, such that it will be ready for serving at any instant, or to heat prior to serving food originally loaded into the oven while cold. Also the portable oven of this invention could be employed when it is desired to serve hot foods at points remote from or at a distance removed from a kitchen or other point of food preparation.

While only a certain preferred embodiment of this invention has been shown and described by way of illustration, many modifications will occur to those skilled in the art and it is, therefore, desired that it be understood that it is intended in the appended claims to cover all such modifications as fall within the true spirit and scope of this invention.

What is claimed as new and what is desired to secure by Letters Patent of the United States is:

1. In a food warming oven, a liner and an outer housing sealed together and defining a sealed insulating chamber therebetween, means for heating the oven comprising an electric heating element disposed in said chamber and an electrical conductor connected to said element sealed through said outer housing, a closed hollow compartment having a first wall portion exposed to the interior of said

chamber and a second wall portion exposed to the outside atmosphere, said first wall portion being provided with a small vent opening therethrough communicating between said chamber and said compartment and said second wall portion being provided with a small vent opening therethrough communicating between said compartment and the outside atmosphere, said compartment being adapted and arranged to trap moisture entering thereinto through said vent in said second wall as said sealed chamber breathes through said vents.

2. The food warming oven as defined in claim 1 wherein said compartment is located between said liner and said outer housing, and attached to said outer housing.

3. A portable holding oven comprising a generally rectangular shaped outer shell having a pair of spaced vertical up-standing side walls, a horizontal bottom wall connected between said side walls, a vertical upstanding back wall connected between said side walls and connected to said bottom wall, a horizontal top wall connected between said side walls and connected to said back wall, and an open front side, a generally rectangular shaped inner liner having a pair of vertical side walls respectively parallel to and inwardly spaced from said side walls of said outer shell, a horizontal bottom wall connected between said inner side walls parallel to and inwardly spaced from said outer bottom wall, a vertical back wall connected between said inner side walls and connected to said inner bottom wall and parallel to and inwardly spaced from said outer back wall, a horizontal top wall connected between said inner side walls and connected to said inner back wall and parallel to and inwardly spaced from said outer top wall, and an open front side, connecting means adjacent said open front side of said inner liner to sealingly connect said inner liner to said outer shell adjacent said open front side of said outer shell to provide a sealed chamber between said inner liner and outer shell, a wall in said chamber dividing said chamber into an insulating portion and a relatively much smaller, liquid-tight container portion, insulating material within said insulating portion of said sealed chamber, said container portion comprising an upper and a lower portion and being provided with a first small vent opening to the atmosphere exteriorly of the oven and a second small vent opening from its said upper portion into said insulating portion, said insulating portion and said container portion being sealed air and moisture tight except for said small vent openings, whereby said chamber breathes through said vent openings to the atmosphere and moisture entering through said first vent opening collects in said lower portion of said container portion and is prevented from reaching said insulating material, whereby said first portion of said chamber breathes through said passageways and through said container and moisture entering through said second passageway collects in said lower portion and does not enter said second portion of said chamber.

4. A portable holding oven comprising a generally rectangular shaped outer shell having a pair of spaced vertical up-standing side walls, a horizontal bottom wall connected between said side walls, a vertical up-standing back wall connected between said side walls and connected to said bottom wall, a horizontal top wall connected between said side walls and connected to said back wall, and an open front side, a generally rectangular shaped inner liner having a pair of vertical side walls respectively parallel to and inwardly spaced from said side walls of said outer shell, a horizontal bottom wall connected between said inner side walls and parallel to and inwardly spaced from said outer bottom wall, a vertical back wall connected between said inner side walls and connected to said inner bottom wall and parallel to and inwardly spaced from said outer back wall, a horizontal top wall connected between said inner side walls and connected to said inner back wall and parallel to and inwardly spaced from said outer top wall, and an open front side, connecting means adjacent said open front side of said inner liner to sealingly connect said inner liner to said outer shell adjacent said open front side of said outer shell to provide a sealed air and moisture tight chamber between said inner liner and outer shell, insulating material and heating means in said chamber, an enclosed box-like member contained within said sealed chamber between said inner liner and outer shell, said box-like member having a lower portion and an upper portion spaced above said lower portion, said box-like member being provided with a passageway in its said upper portion only communicating with the interior of said chamber and being provided with a vent opening to the outside atmosphere, whereby moisture entering through said vent opening collects in the lower portion of said box-like container out of contact with said insulation material.

5. A portable warming oven comprising a generally rectangular shaped outer shell having a pair of spaced vertical up-standing side walls, a horizontal bottom wall connected between said side walls, a vertical up-standing back wall connected between said side walls and connected to said bottom wall, a horizontal top wall connected between said side walls and connected to said back wall, and an open front side, a generally rectangular shaped inner liner having a pair of vertical side walls respectively parallel to and inwardly spaced from said side walls of said outer shell, a horizontal bottom wall connected between said inner side walls parallel to and inwardly spaced from said outer bottom wall, a vertical back wall connected between said inner side walls and connected to said inner bottom wall and parallel to and inwardly spaced from said outer back wall, a horizontal top wall connected between said inner side walls and connected to said inner back wall and parallel to and inwardly spaced from said outer top wall, and an open front side, connecting means adjacent said open front side of said inner liner to sealingly connect said inner liner to said outer shell adjacent said open front side of said outer shell to provide a sealed air and moisture tight chamber between said inner liner and outer shell, heating means in said chamber, an enclosed hollow collar member within said sealed chamber between said inner liner and said outer shell circumferentially surrounding said inner liner adjacent its said open front side to collect moisture which inadvertently enters said chamber, a first passageway providing communication between said sealed chamber and the hollow of said collar member, and a second passageway providing communication between the hollow of said collar member and the exterior of the oven.

6. A portable holding oven comprising a generally rectangular shaped outer shell having a pair of spaced vertical up-standing side walls, a horizontal bottom wall connected between said side walls, a vertical up-standing back wall connected between said side walls and connected to said bottom wall, a horizontal top wall connected between said side walls and connected to said back wall, and an open front side, a generally rectangular shaped inner liner having a pair of vertical side walls respectively parallel to and inwardly spaced from said side walls of said outer shell, a horizontal bottom wall connected between said inner side walls parallel to and inwardly spaced from said outer bottom wall, a vertical back wall connected between said inner side walls and connected to said inner bottom wall and parallel to and inwardly spaced from said outer back wall, a horizontal top wall connected between said inner side walls and connected to said inner back wall and parallel to and inwardly spaced from said outer top wall, and an open front side, a completely enclosed, hollow box-like collar member having a rectangular cross-section circumferentially surrounding, extending outwardly thereof and connected to said inner liner adjacent its open front side and surrounding inwardly thereof and connected to said outer shell adjacent its open front side such that a sealed air and moisture tight chamber is formed between said inner liner and said outer shell, heating means in said chamber, a first passageway located in the top rear por-

tion of said collar member providing communication between said sealed chamber between said inner liner and said outer shell and the hollow of said collar member, a second passageway located in the top front portion of said collar member and said outer shell providing communication between the hollow of said collar member and the exterior of the oven, protective means selectively positionable over the end of said second passageway externally of the oven for preventing the passage of liquid and permitting the passage of air therethrough, said collar member being adapted to retain and contain any liquid inadvertently passing thereinto through said second passageway.

7. A portable warming oven for use with aircraft comprising a generally rectangular shaped outer shell having a pair of spaced vertical up-standing side walls, a horizontal bottom wall connected between said side walls, a vertical up-standing back wall connected between said side walls and connected to said bottom wall, a horizontal top wall connected between said side walls and connected to said back wall, and an open front side, a generally rectangular shaped inner liner having a pair of vertical side walls respectively parallel to and inwardly spaced from said side walls of said outer shell, a horizontal bottom wall connected between said inner side walls and parallel to and inwardly spaced from said outer bottom wall, a vertical back wall connected between said inner side walls and connected to said inner bottom wall and parallel to and inwardly spaced from said outer back wall, a horizontal top wall connected between said inner side walls and connected to said inner back wall and parallel to and inwardly spaced from said outer top wall, and an open front side, a completely enclosed, hollow collar member having a rectangular cross-section surrounding said inner liner outwardly thereof and connected thereto adjacent its open front side and surrounding said outer shell inwardly thereof and connected thereto adjacent its open front side such that a sealed air and moisture tight chamber is formed between said inner liner and said outer shell, heating means in said chamber, a door hinged along one of its vertical sides and mounted to the front face of said collar member to provide a cover for said open front side of said inner liner, gasket means secured to the front face of said collar member for sealing said door with the front face of said collar member, latch means mounted on said top wall of said outer housing to hold and maintain said door in sealed arrangement with said gasket means, a first passageway located in the top rear portion of said collar member proving communication between said sealed chamber between said inner liner and said outer shell and the hollow of said collar member, a second passageway located in the top front portion of said collar member and said outer shell providing communication between the hollow of said collar member and the exterior of the oven, the outer end of said second passageway externally of the oven located directly beneath said latch means, an air pervious, liquid impervious member secured to the underside of said latch means directly over the outer end of said second passageway covering and protecting said outer end to prevent the passage of liquid and permit the passage of air therethrough, said collar member being adapted to retain and contain any liquid inadvertently passing thereinto through said second passageway.

8. A portable holding oven comprising a generally rectangular shaped outer shell having a pair of spaced vertical up-standing side walls, a horizontal bottom wall connected between said side walls, a vertical up-standing back wall connected between said side walls and connected to said bottom wall, a horizontal top wall connected between said side walls and connected to said back wall, said top wall having a rear portion selectively removable therefrom, gasket means for sealing said removable rear portion of said top wall to said outer shell, said top wall being recessed downwardly adjacent the forward end thereof and being constituted by a short vertically extending wall portion substantially parallel to said back wall of said outer shell and a short horizontally extending wall portion substantially parallel to and offset inwardly from said removable rear portion of said top wall, and an open front side, a generally rectangular shaped inner liner having a pair of vertical side walls respectively parallel to and inwardly spaced from said side walls of said outer shell, a horizontal bottom wall connected between said inner side walls and parallel to and inwardly spaced from said outer bottom wall, a vertical back wall connected between said inner side walls and connected to said inner bottom wall and parallel to and inwardly spaced from said outer back wall, a horizontal top wall connected between said inner side walls and connected to said inner back wall and parallel to and inwardly spaced from said outer top wall, and an open front side, connecting means adjacent said open front side of said inner liner to sealingly connect said inner liner to said outer shell adjacent said open front side of said outer shell to provide a closed chamber between said inner liner and said outer shell, insulating material in said chamber, a door mounted on said outer shell to seal said open front side of said inner liner, a latch mechanism pivotally mounted at one end thereof on said short horizontally extending wall portion of said downwardly recessed front portion of said top wall of said outer shell to maintain said door in sealed arrangement with said open front side of said inner liner, and an inverted U-shaped channel member positioned over and extending downwardly around said latch mechanism and connected to said short horizontally extending wall portion of said downwardly recessed front portion of said top wall of said outer shell to protect said latch and prevent the inadvertent opening of the same.

9. The portable holding oven of claim 8 further comprising electrical heating means contained within said sealed chamber between said inner liner and said outer shell for heating the interior of said oven, a switch mounted on and extending through said short vertically extending wall portion of said downwardly recessed front portion of said top wall of said outer shell to regulate the temperature maintained by said heating means within said sealed chamber, and an inverted U-shaped channel member positioned over and extending downwardly around said switch and connected to said short horizontally extending wall portion of said downwardly recessed front portion of said top wall of said outer shell to protect said switch from damage thereto and prevent the inadvertent switching of the same.

10. A portable warming oven for use with aircraft comprising a generally rectangular shaped outer shell having a pair of spaced vertical up-standing side walls, a horizontal bottom wall connected between said side walls, a vertical up-standing back wall connected between said side walls and connected to said bottom wall, a horizontal top wall connected between said side walls and connected to said back wall, said top wall having a rear and front portion, said rear portion of said top wall selectively removable from said top wall, gasket means for sealing said removable rear portion of said top wall to said outer shell, said front portion of said top wall recessed downwardly and being constituted by a vertically extending wall portion substantially parallel to said back wall of said outer shell and a horizontally extending wall portion substantially parallel to and offset inwardly from said removable rear portion of said top wall, and an open front side, a generally rectangular shaped inner liner having a pair of vertical side walls respectively parallel to and inwardly spaced from said side walls of said outer shell, a horizontal bottom wall connected between said inner side walls parallel to and inwardly spaced from said outer bottom wall, a vertical back wall connected between said inner side walls and connected to said inner bottom wall and parallel to and inwardly spaced from said outer back wall,

a horizontal top wall connected between said inner side walls and connected to said inner back wall and parallel to and inwardly spaced from said outer top wall, and an open front side, a completely enclosed hollow collar member having a rectangular cross-section surrounding said inner liner outwardly thereof and connected thereto adjacent its open front side and surrounding said outer shell inwardly thereof and connected thereto adjacent its open front side such that a sealed air and moisture tight chamber is formed between said inner liner and said outer shell, a door hinged along one of its vertical sides and mounted to the front face of said collar member to provide a cover for said open front side of said inner liner, gasket means secured to the front face of said collar member for sealing said door with the front face of said collar member, a latch pivotally mounted at one of its ends on said horizontally extending wall portion of said downwardly recessed front portion of said top wall of said outer shell to hold and maintain said door in sealed arrangement with said gasket means, an inverted U-shaped channel member positioned over and extending downwardly around said latch and connected to said horizontally extending wall portion of said downwardly recessed front portion of said top wall to protect said latch and prevent the inadvertent opening of the same, electrical heating means contained within said sealed chamber between said inner liner and said outer shell for heating the interior of said oven, a switch mounted on and extending through said vertically extending wall portion of said downwardly recessed front portion of said top wall, to regulate the temperature maintained by said heating means within said sealed chamber, an inverted U-shaped channel member positioned over and extending downwardly around said switch and connected to said horizontally extending wall portion of said downwardly recessed front portion of said top wall to protect said switch and prevent the inadvertent switching of the same, a first passageway located in the top rear portion of said collar member providing communication between said sealed chamber between said inner liner and said outer shell and the hollow of said collar member, a second passageway located in the top front portion of said collar member and said horizontally extending wall portion of said downwardly recessed front portion of said top wall of said outer shell providing communication between the hollow of said collar member and the exterior of the oven, the outer end of said second passageway opening externally of the oven and located directly beneath said latch mounted on said horizontally extending wall portion of said downwardly recessed front portion of said top wall, an air-pervious, liquid-impervious member secured to the underside of said latch directly over the outer end of said second passageway covering and protecting said outer end to prevent the passage of liquid and permit the passage of air therethrough, said collar member being adapted to retain and contain any liquid inadvertently passing thereinto through said second passageway opening externally of the oven.

11. In combination, in a warming oven having an upper exposed panel, a closed chamber underlying said panel, a hingedly attached door including a catch, and heating means in said chamber, a small breathing vent opening through said panel communicating between said chamber and the external atmosphere, a latch comprising an elongated blade portion pivotally mounted at its rearward end, said panel for rotation about an axis, the forward end of said blade portion terminating in a hooked finger for cooperative engagement with said catch, a substantially laterally extending member connected to said blade portion near its midpoint for operation of said latch such that when a pushing force is exerted on said member said blade will rotate upwardly about its rearward end to disengage said finger from said catch, a gasket pad under said blade retained thereby against said panel in covering relation to said breathing vent when said blade finger is engaged with said catch and disengaged therefrom when said blade is so rotated upwardly, and a spring for urging said latch into cooperative engagement with the catch.

12. A food holding oven comprising an outer box-like shell having a breathing vent opening located in the top front portion thereof, an inner food chamber disposed within and sealed to said outer shell, said outer shell and said inner food chamber defining a sealed insulating chamber therebetween, a door closing the opening into said food chamber, a catch mounted substantially horizontally on the top of said door, said catch having a substantially vertically extending lip, a latch for cooperative engagement with said catch to securely hold said door in a closed position, said latch having an elongated substantially horizontally disposed blade portion pivotally mounted at its rearward end to the top of said outer shell for rotation about a horizontal axis, said blade portion positioned over said vent opening, the forward end of said horizontally disposed blade portion terminating in a downwardly hooked finger for cooperative engagement with said vertically extending lip on said catch, a substantially vertically extending member connected to said blade portion near its midpoint for operation of said latch such that when a pushing force is exerted against said vertically extending member said latch will rotate about its rearward end and disengage said catch, a spring for urging said latch into cooperative engagement with said catch, and an air-pervious, liquid-impervious member secured to the underside of said blade portion directly over said vent opening and covering and protecting the same to prevent the passage of liquid thereinto yet permit the passage of air therethrough.

13. In combination, in a food warming oven, an outer shell, an inner shell disposed within said outer shell, said inner shell having a forward edge defining the opening into the interior thereof, a rigid hollow collar outwardly surrounding said forward edge and welded thereto completely therearound, said outer shell having a forward edge extending outwardly around said collar and welded thereto completely therearound, said shells comprising walls, the walls of said inner shell being spaced inwardly of the walls of the outer shell, whereby a heat insulating space is defined outwardly by said outer shell, inwardly by said inner shell and forwardly by said collar member.

14. The combination according to claim **13** wherein said collar member is provided with a small vent opening communicating between the hollow interior of said collar member and said insulating space and a second small vent opening communicating between said hollow interior and the outside atmosphere.

15. The combination according to claim **14** wherein said collar member has an exposed exterior surface portion around said second small vent opening, a resilient pad, and means retaining said pad in yieldable contact with said surface portion, said pad being operative to minimize entrance of moisture through said second small vent opening into the interior of said collar while permitting escape of air from the interior of said collar into the external atomsphere.

16. In a food warming oven, a hermetically sealed insulating chamber having air therein, an electric heating element in said chamber, an exterior wall having an inner surface exposed to the air in said chamber and an exterior surface exposed to the outside atmosphere, a small vent opening through said exterior wall, and a check valve member normally closing said vent opening against inward passage of moisture and operative to permit the escape of air from said chamber to the atmosphere.

17. The combination according to claim **16** wherein a hollow compartment is disposed inwardly of said wall with said small vent communicating thereinto, said compartment having an opening into said chamber, said compartment being adapted and arranged to trap therein any such moisture as may enter from the outside atmosphere through said small vent.

18. In a portable holding oven, a hermetically sealed insulating chamber having air and insulating material therein, an exterior wall having an inner surface exposed to the air in said chamber and an exterior surface exposed to the outside atmosphere, a small vent opening through said exterior wall, a resilient rubber or rubber-like closure member exteriorly of said wall, and means mounted exteriorly on said oven urging said member toward said surface in position to close said vent thereby to retard the entrance of moisture through said vent into said chamber, said closure member and said urging means comprising a pressure relief valve to vent air from said chamber when the pressure therein becomes greater than the outside atmospheric pressure.

19. The combination according to claim 18 wherein a hollow compartment is disposed inwardly of said wall with said small vent communicating thereinto, said compartment having an opening into said chamber, said compartment being adapted and arranged to trap therein any

such moisture as may enter from the outside atmosphere through said small vent.

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