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Delgadillo

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(54) **CYLINDER PAN CHILLER**

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(60) Provisional application No. 61/766,504, filed on Feb. 19, 2013.

(51) **Int. Cl.**

F25D 23/06	(2006.01)
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F25D 11/00	(2006.01)
F25D 31/00	(2006.01)
A47F 3/04	(2006.01)
A47F 10/06	(2006.01)

(52) **U.S. Cl.**

CPC ***F25D 23/061*** (2013.01); ***F25D 11/00*** (2013.01); ***F25D 31/00*** (2013.01); *A47F 3/0486* (2013.01); *A47F 10/06* (2013.01); *F25D 17/02* (2013.01)

(58) **Field of Classification Search**

CPC F25D 31/00; F25D 31/003; F25D 23/068; F25D 23/006; F25D 23/066; F25D 23/061; F25D 23/063; F25D 23/06; F25D 11/00; F25D 17/02; F25D 2400/10; Y10T 29/49879

USPC 62/99, 451, 185, 458; 99/517; 165/104.14; 220/592.05, 592.26, 23.88; 29/455.1

See application file for complete search history.

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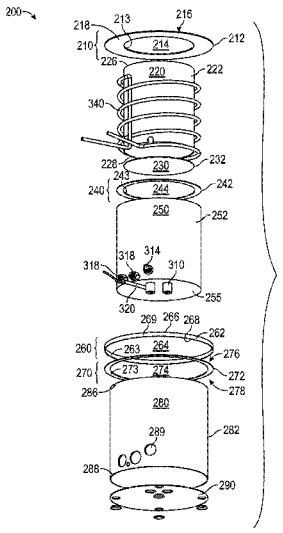
(57) **ABSTRACT**

A glycol pan chiller is configured in a unique cylinder form factor that achieves new efficiencies in power savings and cooling. A new cylindrical cooling assembly comprises three concentrically disposed cylinders attached together at their respective top ends to create an upper lip area **219** or shelf area that provides top end insulation and a useful shelf area. The concentrically disposed cylinders define an outward void for insulation, a middle void for refrigerant tubing and retained refrigerant or cooling fluid such as glycol and an inner void **224** for food storage and food cooling. Food cooled within the inner void is not dried out as heat transfer occurs without blowing air within the inner void.

12 Claims, 4 Drawing Sheets



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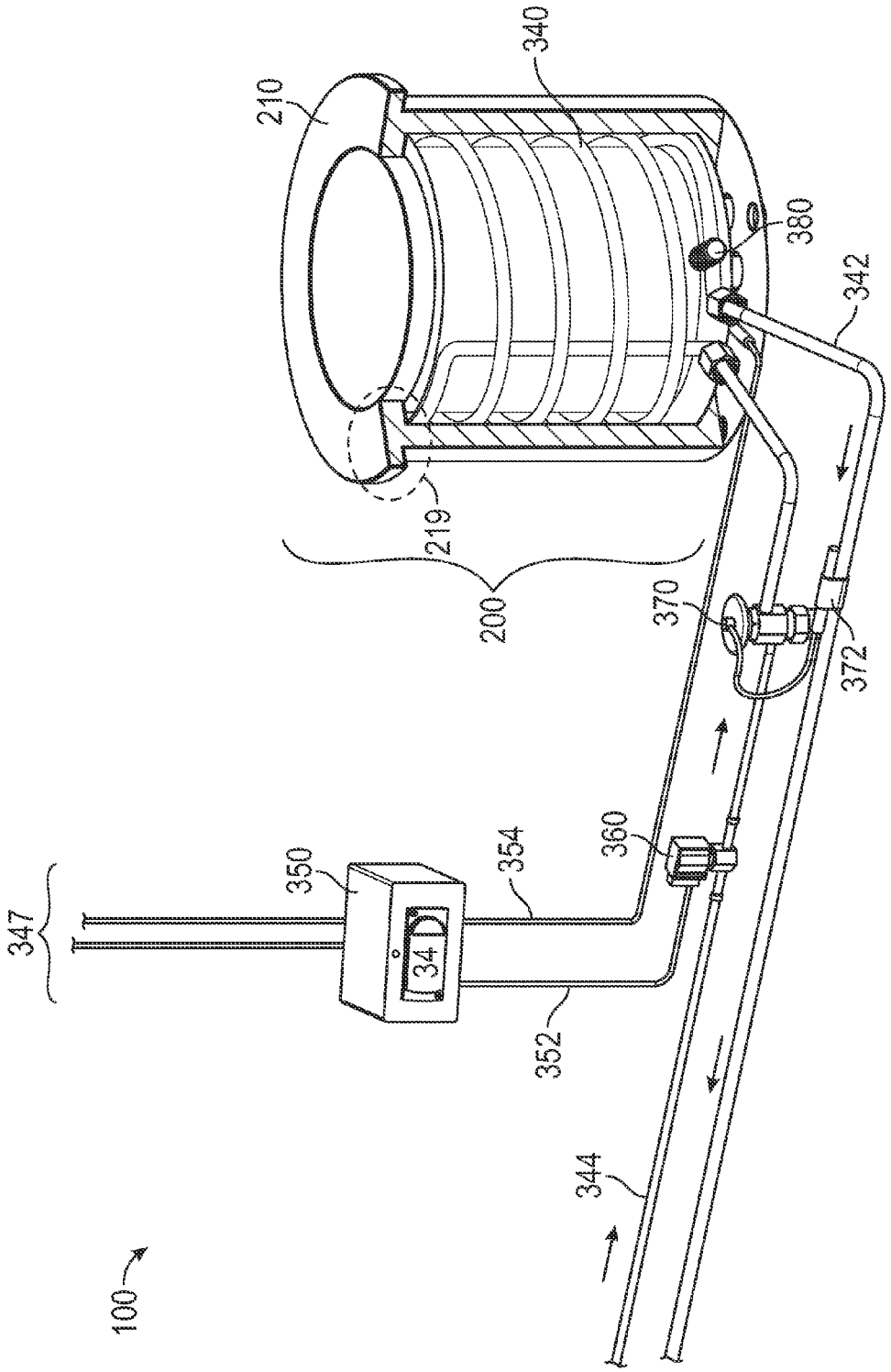
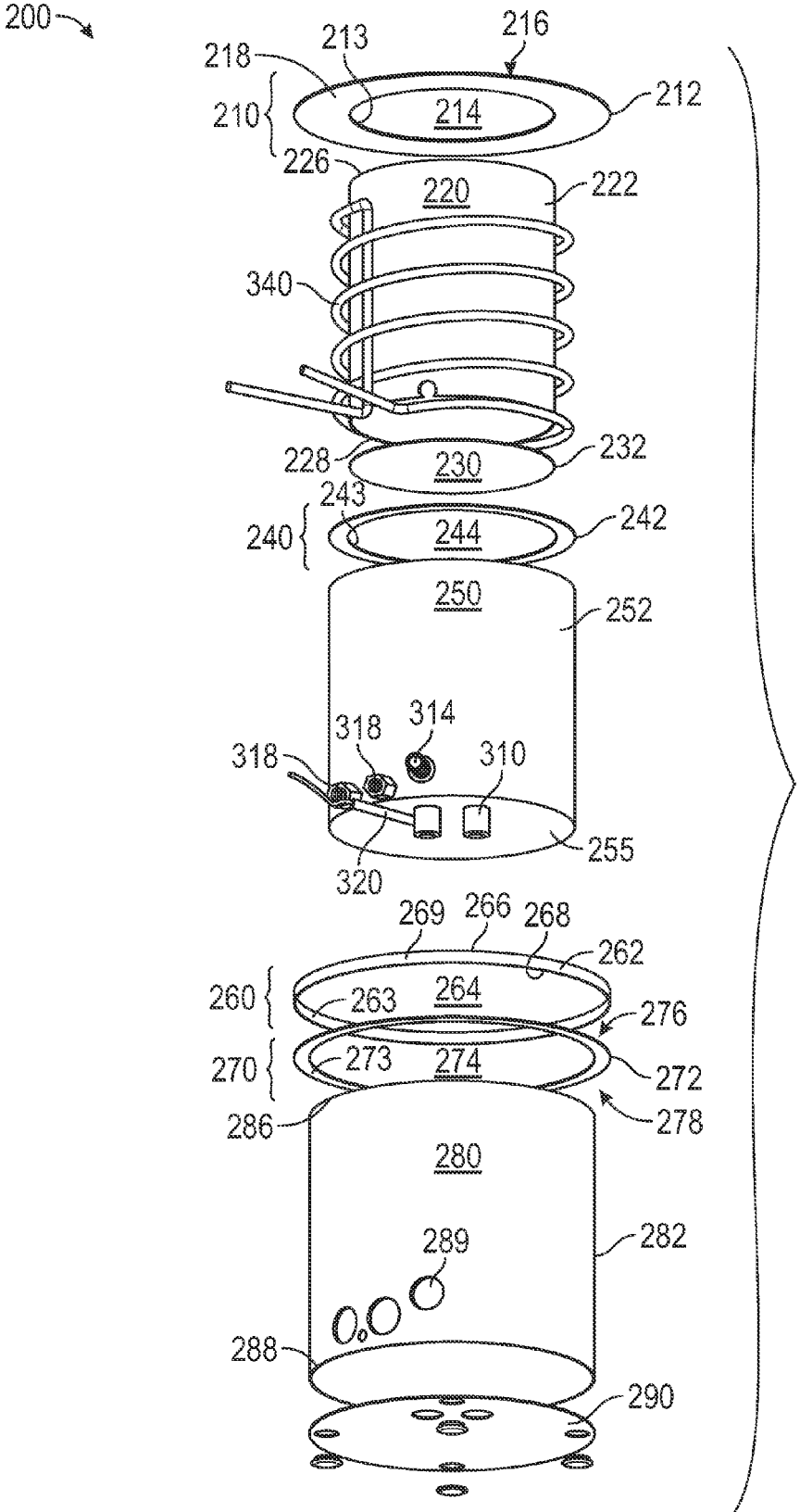


FIG. 1


200
216
213
218
210
214
212
226
220
222
340
228
230
232
243
240
244
242
250
252
318
314
318
310
320
255
269
266
268
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260
263
264
276
270
273
274
272
286
278
280
289
282
288
290

FIG. 2

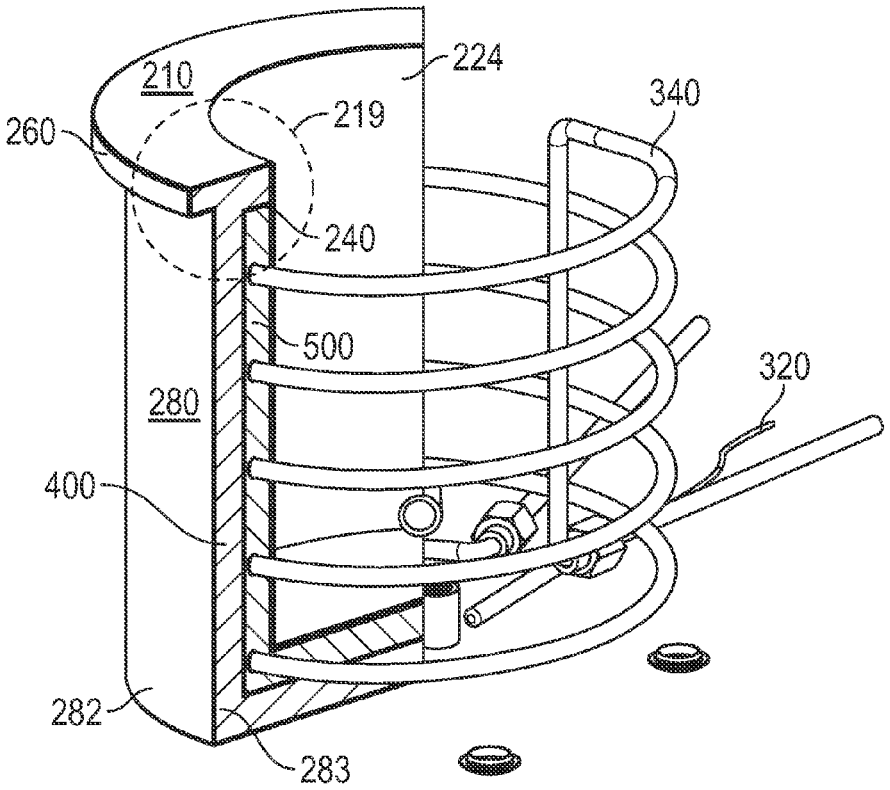
210
224
340
219
260
240
500
320
280
400
282
283

FIG. 3

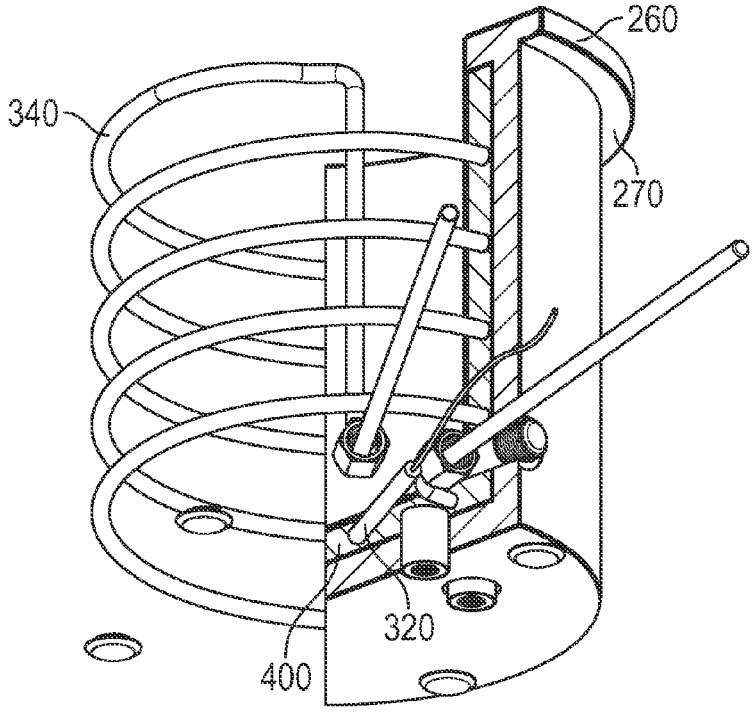
260
340
270
320
400

FIG. 4

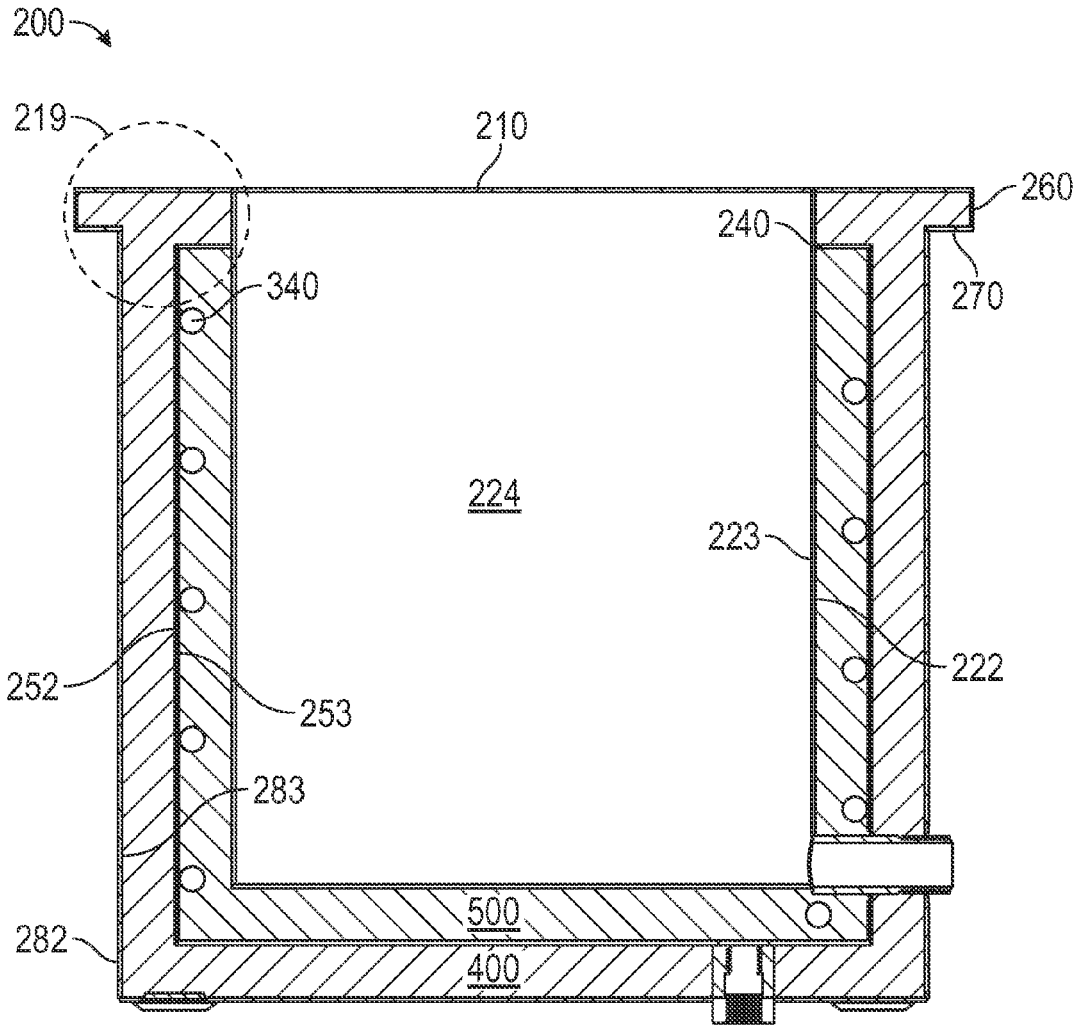

FIG. 5

CYLINDER PAN CHILLER

CROSS-REFERENCE TO RELATED APPLICATIONS

This is a utility application is a continuation in part or CIP of U.S. patent application Ser. No. 14/635,245 filed on or about Mar. 2, 2015 which is a CIP of Ser. No. 13/970,041 filed on or about Aug. 19, 2013 which is based upon and claims the benefit of U.S. provisional patent application Ser. No. 61/766,504, entitled "Glycol Pan Chiller Systems" filed on Feb. 12, 2013. These related applications are incorporated herein by reference and made a part of this application. If any conflict arises between the disclosure of the invention in this utility application and that in the related applications, the disclosure in this utility application shall govern. Moreover, the inventors incorporate herein by reference any and all patents, patent applications, and other documents hard copy or electronic, cited or referred to in this application.

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BACKGROUND OF THE INVENTION

(1) Field of the Invention

The invention generally relates to refrigeration systems. More particularly, the invention relates to means and methods of producing and using glycol pan chiller systems in cylindrical embodiments for specialized food preparation and food cooling.

(2) Description of the Related Art

The use of glycol in cooling systems is known in general, but the prior art fails to teach, suggest or motivate one skilled in the art to construct the disclosed embodiments using a cylindrical form factor and other disclosed features.

Several systems by KAIRAK are known in the art. For example U.S. Pat. No. 5,181,395 "Condenser Assembly", U.S. Pat. No. 5,927,092 "Food Pan Refrigeration Unit" and U.S. Pat. No. 5,355,687 "Pan Cooler and Method" disclose various refrigeration systems. While the known KAIRAK patents disclose various physical configurations of assembling cooling systems the KAIRAK patents fail to address the shortfalls in the art. The KAIRAK compressor and pump are almost always in operation. The KAIRAK system contemplates a traditional single food compartment system.

The known relevant published patent applications teach means and methods of protecting food held in a chiller and blowing cold air over food. Such published patent applications include 20090013707 Air blanketed food preparation table; 20060230948 Food Protector Apparatus that Attaches to a Drop-In Food pan and method and 20060201177 Air Blanketed Food Preparation Table. Thus, the trend in the art is to focus upon the protection of food in a chiller, blowing cold air directly upon food and to remain satisfied with the chilling methods of the prior art.

There are many shortfalls in the prior art. For example, the chillers of the prior art typically use twenty year old technology and fail to artfully integrate the use of both glycol and Freon systems. Chillers in the prior art fail to efficiently

and economically cool chill pans and related assemblies. For example, chillers of the prior art often use non removable foam material to encase Freon lines wrapping a chiller. When a Freon line leaks, the unit is not economically repairable. The prior art is prone to condensation problems as well. The prior art is prone to blow cold air directly upon food, causing condensation problems and problems with drying out food. The prior art also fails to leverage chilled fluid, such as glycol to cool multiple compartments.

BRIEF SUMMARY OF THE INVENTION

The present invention overcomes shortfalls in the related art by presenting an unobvious and unique combination and configuration of liners, liner installation systems, use of Freon lines, use of glycol flowing in contact with Freon lines, with the glycol in a static state or moving state, with Freon lines chilling glycol within a new cylindrical cooling assembly. The disclosed cylindrical cooling assembly is uniquely configured to maximize cooling and to minimize energy consumption.

The disclosed cylindrical cooling assembly overcomes shortfalls in the art by use of an upper lip area or shelf area that provides a round smooth surface ideal for hanging items in the cooling compartment and provides an insulated upper section by the artful use of various components that may include three concentric cylinders, an upper horizontal outer ring, circular rings, outer bands and other components. The disclosed cylindrical cooling assembly overcomes shortfalls in the art by providing an assembly that is made of simple parts that are economical to fabricate and assemble. The disclosed cylindrical cooling assembly overcomes shortfalls in the art by providing a space efficient cooling chamber that is well suited for the cooling of pancake batter and other specialty items that are often set up in a commercial environment on a temporary or ad hoc basis. The disclosed cylindrical cooling assembly is very portable and easily adapts to any environment where refrigeration lines are found.

Disclosed embodiments overcome shortfalls in the art by use of a cylindrical chiller pan assembly comprising an inner circular cooling compartment, that is cooled within an inner liner area comprised of Freon lines surrounded by free flowing or static glycol. The Freon lines contain Freon or other fluid cooled by a single or relatively small number of refrigeration condensing and compressor units. The Freon lines wrap around an inner cylinder area and cool the surrounding glycol or other fluid. The contents of the inner circular void area, cooling chamber or food storage area are cooled indirectly by heat transfer into the Freon lines and surrounding glycol. The Freon lines remove heat from both the inner circular cooling compartment and the surrounding glycol.

The present invention overcomes shortfalls in the art by eschewing the practice of blowing chilled air over food held in a cooling area used for quick food access. This solution is known to dry out food. The prior art disclosures also teach methods of blowing cool air to the undersides of a pan chiller or pan containing food. The utility of blowing cool air to the undersides of a chiller is severely limited by the thermal properties of air. In acknowledgement of this shortfall, KAIRAK U.S. Pat. No. 5,927,092 uses cooling fins attached to a pan chiller in an effort to improve its air cooled system. In the automotive industry, air cooled engines were replaced long ago with liquid cooled engines. But, KAIRAK remains entrenched in the prior art and teaches away from the liquid cooled systems of the present invention.

Disclosed embodiments have provided unexpected and dramatically favorable results in cooling efficiency by ignoring the air fins and air cooling system of KAIRAK and by using a new cylindrical cooling assembly comprising a Freon line wrapped between concentrically disposed cylinders. A cylindrical inter void area is filled with glycol or other coolant fluid which is cooled by Freon or any other refrigerant.

Disclosed embodiments include the artful and unobvious combination of cylinders retained within other cylinders to efficiently chill pancake mix and other food products where maximizing cooling surface area is advantageous.

These and other objects and advantages will be made apparent when considering the following detailed specification when taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** depicts an overall system

FIG. **2** depicts an exploded view of a cylindrical cooling assembly

FIG. **3** depicts a perspective view of a cylindrical cooling assembly

FIG. **4** depicts a perspective view of a cylindrical cooling assembly

FIG. **5** depicts a sectional view of a cylindrical cooling assembly

REFERENCE NUMERALS IN THE DRAWINGS

100 a disclosed system in general
200 cylindrical cooling assembly in general
210 upper horizontal outer ring
212 outer circular circumference of upper horizontal outer ring **210**
213 inner circular circumference of upper horizontal outer ring **210**
214 inner circular void defined within upper horizontal outer ring **210**
216 top side of upper horizontal outer ring **210**
218 bottom side of upper horizontal outer ring **210**
219 upper lip area or shelf area
220 inner cylinder or pan chiller cylinder
222 outer wall of inner cylinder **220**
223 inner wall of inner cylinder **220**
224 inner void or cooling chamber defied within inner wall **223** of inner cylinder **220** **500**
226 top side or top edge of inner cylinder **220**
228 bottom side of inner cylinder **220**
230 circular bottom plate of inner cylinder **220**
232 outer circular circumference of circular bottom plate **230**
240 circular ring of middle tank or glycol tank cylinder **250**
242 outer circular circumference of circular ring **240** of glycol tank cylinder **250**
243 inner circular circumference of circular ring **240**
244 inner circular void defined within circular ring **240**
250 glycol tank cylinder or middle tank
252 outer wall of glycol tank cylinder **250**
253 inner wall of glycol tank cylinder **250**
255 bottom disc of glycol tank **250**
260 outer band of outer cylinder **280**
262 outer circular surface of outer band **260**
263 inner circular surface of outer band **260**
264 inner void defined within outer band **260**
266 top side of outer band **260**
268 bottom side of outer band **260**
269 circular vertical wall section
270 outer ring of outer cylinder **280**
272 outer surface of outer ring **270**
273 inner circular circumference of outer surface **272**
274 inner void defined within outer ring **270**
276 top side of outer ring **270**
278 bottom side of outer ring **270**
280 outer cylinder
282 outer wall of outer cylinder
283 inner wall of outer cylinder
286 top side of outer cylinder
288 bottom side of outer cylinder
289 utility voids defined within outer cylinder
290 bottom plate of outer cylinder **280**
310 threaded coupling
314 nipple
318 pipe adapter
320 sensor probe
340 Freon flow line or refrigerant tube wrapped between inner cylinder
220 and glycol tank **250**
342 Freon or refrigerant out flow line
344 Freon or refrigerant inflow line
347 electrical supply lines to thermostat **350**
350 thermostat
352 thermostatic control line for solenoid valve **360**
354 thermostatic line to receive temperature reading from sensor **320**
360 solenoid valve connected to Freon inflow line **344**
370 TXV valve in connection with Freon inflow line **344**
372 TXV sensor
380 drain
400 insulation
500 glycol or other fluid

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

The following detailed description is directed to certain specific embodiments of the invention. However, the invention can be embodied in a multitude of different ways as defined and covered by the claims and their equivalents. In this description, reference is made to the drawings wherein like parts are designated with like numerals throughout.

Unless otherwise noted in this specification or in the claims, all of the terms used in the specification and the claims will have the meanings normally ascribed to these terms by workers in the art.

Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise," "comprising" and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in a sense of "including, but not limited to." Words using the singular or plural number also include the plural or singular number, respectively. Additionally, the words "herein," "above," "below," and words of similar import, when used in this application, shall refer to this application as a whole and not to any particular portions of this application.

The above detailed description of embodiments of the invention is not intended to be exhaustive or to limit the invention to the precise form disclosed above. While specific embodiments of, and examples for, the invention are described above for illustrative purposes, various equivalent modifications are possible within the scope of the invention, as those skilled in the relevant art will recognize. For example, while steps are presented in a given order, alter-

native embodiments may perform routines having steps in a different order. The teachings of the invention provided herein can be applied to other systems, not only the systems described herein. The various embodiments described herein can be combined to provide further embodiments. These and other changes can be made to the invention in light of the detailed description.

Any and all the above references and U.S. patents and applications are incorporated herein by reference. Aspects of the invention can be modified, if necessary, to employ the systems, functions and concepts of the various patents and applications described above to provide yet further embodiments of the invention.

These and other changes can be made to the invention in light of the above detailed description. In general, the terms used in the following claims, should not be construed to limit the invention to the specific embodiments disclosed in the specification, unless the above detailed description explicitly defines such terms. Accordingly, the actual scope of the invention encompasses the disclosed embodiments and all equivalent ways of practicing or implementing the invention under the claims.

Referring to FIG. **1**, a disclosed system **100** may comprise a cylindrical cooling assembly **200** attached to a Freon inflow line **344** and a Freon outflow line **343**. The Freon inflow line **344** may be attached to a solenoid valve **360** and the solenoid valve **360** may be attached to a thermostatic control line **352** which may be attached to a thermostat **350**. The thermostat **350** may be connected to power lines **347** and connected to a thermostatic line **354** to receive temperature information from a sensor **320** (shown in FIG. **2**). A TXV valve **370** may be connected to the Freon inflow line **344** while a TXV sensor **372** may be connected to the Freon outflow line **372**.

In general, the Freon may be cooled by any traditional means or by a Turbo Coil system. The cooled Freon enters the cylindrical cooling assembly **200** by use of the Freon inflow line **344**. The cooled Freon circulates in a spiral fashion within a Freon line **340** contained between an inner cylinder **220** or pan chiller cylinder and glycol tank cylinder **250** or middle tank, as shown in FIG. **2**.

Referring to FIG. **2**, a disclosed cylindrical cooling assembly **200** may comprise three cylinders in concentric formation that facilities the efficient cooling of items contained within an inner cylinder **220** or pan chiller cylinder. The inner cylinder **220** may comprise an outer wall **222** and an inner wall **223** (shown in FIG. **5**) with the outer wall supporting, in contact with or adjacent to a spiral Freon line **340**. The inner cylinder **220** may have a top edge **226** that comports to the inner circular circumference **213** of an upper horizontal outer ring **210**. The artful configuration of the inner cylinder **220** and upper horizontal outer ring **210** allows for an efficient and strong assembly of the cylindrical cooling assembly **200** as the upper horizontal outer ring **210** spans all three concentrically assembled cylinders to provide rigid support.

The upper horizontal outer ring **210** may comprise an outer circular circumference **212**, an inner circular circumference **213** with the inner circular circumference **213** defining an inner circular void **214** allowing for access to the inner cylinder **220**. The upper horizontal outer ring **210** may further include a top side **216** and a bottom side **218** with the bottom side connected to other components and the topside providing an upper shelve or upper lip area to house insulation at the upper portions of the assembly. The upper lip area or top side **216** provides a resting shelf for cooling inserts such as Bain Marie inserts. The inner cylinder **220** may include a bottom edge **228** that may be attached to circular bottom plate **230** to retain the cooled contents of the inner cylinder.

A circular ring **240** of the middle tank or glycol tank **250** may provide an upper barrier to the Freon line and glycol void area defined between the inner cylinder **220** and the glycol tank **250**. The circular ring **240** provides an advantage of defining an upper portion of the glycol void area such that the upper lip area **219** (shown on FIG. **3**) may be thickly insulated. The circular ring **240** may comprise an outer circular circumference **242** and an inner circular circumference **243** that defines an inner circular void **244**. The inner circular void **224** may comport to the outer wall of the inner cylinder while the outer circular circumference may comport to the inner wall of the middle tank or glycol tank cylinder.

A middle tank or glycol tank cylinder **250** may comprise an outer wall **252** and an inner wall **253** (shown in FIG. **5**). The glycol tank cylinder **250** may be of lesser height as compared to the inner cylinder so as to accommodate the lip area. The glycol tank **250** may define voids for or comprise a nipple **314**, one or more pipe adapters **318** that may be used with Freon lines, one or more threaded couplings **310** and a sensor probe **320**. The sensor probe **320** placement overcomes shortfalls in the related art by attachment to the middle tank where Freon temperature is relatively stable and not immediately affected by the contents of the inner cylinder. The glycol tank may include a bottom disc **255** to retain insulation or to support the threaded couplings.

The use and configuration of the outer band **260** and outer ring **270** of the outer cylinder **280** overcome shortfalls in the art by supporting the upper lip area, the separation of the three concentric cylinders and by providing means of containing insulation within the upper lip and between the glycol cylinder and the outer cylinder.

The outer band **260** of the outer cylinder **280** may comprise an outer circular surface **262**, an inner circular surface **263** defining an inner void, a top side **266** and a bottom side **268** as well as a circular vertical wall section **269**. The top side **266** may fit to or comport with the circular ring **240** of the glycol tank while the bottom side of the outer band may fit to or comport with the outer ring **270** of the outer cylinder **280**.

The outer cylinder **280** may comprise an outer surface **282** or outer wall, an inner surface or inner wall **283**, a top side **286** or top edge, a bottom side **288** and define various utility voids **280**. A bottom plate **290** may define various voids and comport with the bottom side or bottom edge **288** of the outer cylinder **280**.

FIG. **3** depicts perspective and sectional view of a cylindrical cooling assembly comprising an upper lip area **219** or shelf area which may comprise an area of insulation **400** retained within an upper horizontal outer ring **210**, an outer wall of the inner cylinder, the upper surface of the circular ring **240** of the middle cylinder, the inner wall or side of the outer cylinder, the upper side of the outer ring **290** of the outer cylinder and the inner side of the outer band **260** of the outer cylinder. The upper lip area overcomes shortfalls in the art by accommodating an insulated and flat lip area shown outwardly upon the top surface of the upper horizontal outer ring **210** and by providing top end insulation to the void area containing the glycol **500** and Freon lines **340**.

The use of contained glycol **500** in contact with Freon lines with the glycol backed with insulation **400** and with the glycol in direct contact with the inner cylinder overcomes shortfalls in the art as food contained within the inner cylinder is in relatively close contact with the glycol for

quick heat removal. The outer insulation **400** protects the glycol from heat transfer caused by ambient air.

FIG. **4** depicts various components include a sensor probe **320** inserted into insulation **400** found at the bottom portions of the assembly. This configuration overcomes shortfalls in the art as the sensor probe in not exposed to transitory changes in unit temperature.

FIG. **5** a sectional view of a cylindrical cooling assembly **200** comprising three concentrically assembled cylinder walls with each cylinder wall having inside and outside surfaces with the top ends of the three cylinders artfully terminating in an upper lip area **219** or shelf area. An outer cylinder is shown to have an outer surface **282** and inner surface **283**. A middle cylinder or glycol cylinder is shown to have an outer surface **252** and an inner surface **253**. An inner cylinder is shown to have an inner surface **223** and an outer surface **222**. The inner surface **223** of the inner cylinder may define an inner void **224** or food storage area.

Disclosed embodiments include the following items.

Item 1. A cylindrical cooling assembly **200** for cooling food within a cooling chamber **224**, the assembly comprising:

a) an upper horizontal ring **210** having an inner circular circumference **213**, an outer circular circumference **212**, at top side **216** and a bottom side **218**, attached to an outer band **260** of an outer cylinder **280**;

b) the outer band comprising an outer circular surface **262**, an inner circular surface **263**, a top side **266**, a bottom side **268** and a circular vertical wall section **269**, the outer band attached to an outer ring **270** of the outer cylinder;

c) the outer ring of the outer cylinder comprising an outer surface **272**, an inner surface **273**, at top side **276** and a bottom side **278**;

d) the outer cylinder attached to the outer ring of the outer cylinder, the outer cylinder comprising an outer wall **282**, an inner wall **283**, a top side **286** and a bottom side **288**, the outer cylinder attached to a bottom plate **290**;

e) a middle tank **250** disposed within the outer cylinder, the middle tank attached to a circular ring **240** of the middle tank and the circular ring attached to an inner cylinder **220** disposed within the middle tank;

f) the inner cylinder comprising a top side **226**, a bottom side **228**, an outer wall **222** and an inner wall **223** defining the cooling chamber.

Item 2. The cylindrical cooling assembly of 1 wherein a refrigerant tube
240 is disposed between the middle tank and the inner cylinder.

Item 3. The cylindrical cooling assembly of 2 further comprising an upper lip area **219**, the upper lip area comprising the upper horizontal outer ring, the topside of the inner cylinder and the circular ring of the middle tank.

Item 4. The cylindrical cooling assembly of 2 further including a circular bottom plate **230** attached to the bottom side of the inner cylinder.

Item 5. The cylindrical cooling assembly of 4 further including insulation disposed between the inner wall of the outer cylinder and the outer wall of the middle tank.

Item 6. They cylindrical cooling assembly of 5 further including a plurality of utility voids **289** defined within the outer cylinder.

Item 7. The cylindrical cooling assembly of 6 further including a temperature sensor **320** disposed at the bottom side of the middle tank.

Item 8. The cylindrical cooling assembly of 7 further including a first pipe adapter **318** and a second pipe adapter disposed upon the outer surface of the middle tank.

Item 9. The cylindrical cooling assembly of 8 wherein the refrigerant tube comprises a first end attached to the first pipe adapter and the refrigerant tube comprises a second end attached to the second pipe adapter.

Item 10. The cylindrical cooling assembly of 9 with a refrigerant inflow line attached to the first pipe adapter and with a refrigerant outflow line attached to the second pipe adapter.

Item 11. The cylindrical cooling assembly of 10 with a TXV valve connected to the refrigerant inflow line with the TXV valve comprising a TXV sensor **272** attached to the refrigerant outflow line.

Item 12. The cylindrical cooling assembly of 11 further comprising a solenoid valve connected to the refrigerant inflow line.

Item 13. The cylindrical cooling assembly of 12 further comprising a thermostat **350** comprising a thermostatic control line **352** attached to the solenoid valve and the thermostat further comprising a thermostatic line attached to the sensor.

Item 14. The cylindrical cooling assembly of 13 wherein the refrigerant inflow line and refrigerant out flow line are connected to a refrigerant cooling system.

Item 15. The cylindrical cooling assembly of 14 wherein the sensor is disposed with the insulation.

What is claimed is:

1. A cylindrical cooling assembly for cooling food within a cooling chamber, the assembly comprising:

a) an outer cylinder attached to an outer ring of the outer cylinder, the outer cylinder comprising an outer wall and an inner wall attached to a bottom plate;

b) a middle tank comprising of an outer wall and an inner wall disposed within the outer cylinder, the middle tank attached to a circular ring of the middle tank, the circular ring attached to an inner cylinder disposed within the middle tank;

c) the inner cylinder comprising an outer wall, an inner wall and an inside area of the inner all defining the cooling chamber with a circular bottom plate attached to a bottom side of the inner cylinder;

d) insulation disposed between the inner wall of the outer cylinder and the outer wall of the middle tank;

e) the inner wall of the middle tank and the outer wall of the inner cylinder defining a glycol void area in which a spiral refrigerant tube is disposed within the glycol void area;

f) glycol disposed within the glycol void area, the glycol in contact with the spiral refrigerant tube carrying a refrigerant;

g) an upper lip area, the upper lip area comprising an upper horizontal outer ring, the upper horizontal outer ring attached to an outer band of the outer cylinder, a topside of the inner cylinder and the circular ring of the middle tank.

2. The cylindrical cooling assembly of claim **1**, the outer band further comprising of an outer circular surface, an inner circular surface, and a circular vertical wall section the outer band attached to the outer ring of the outer cylinder.

3. They cylindrical cooling assembly of claim **1** further including a plurality of utility voids defined within the outer cylinder.

4. The cylindrical cooling assembly of claim **1** further including a temperature sensor disposed at the bottom side of the middle tank.

5. The cylindrical cooling assembly of claim **1** further including a first pipe adapter and a second pipe adapter disposed upon the outer wall of the middle tank.

6. The cylindrical cooling assembly of claim 1 wherein the spiral refrigerant tube comprises a first end attached to the first pipe adapter and the spiral refrigerant tube comprises a second end attached to the second pipe adapter.

7. The cylindrical cooling assembly of claim 6 with a refrigerant inflow line attached to the first pipe adapter and with a refrigerant outflow line attached to the second pipe adapter.

8. The cylindrical cooling assembly of claim 7 with a TXV valve connected to the refrigerant inflow line with the TXV valve comprising a TXV sensor attached to the refrigerant outflow line.

9. The cylindrical cooling assembly of claim 8 further comprising a solenoid valve connected to the refrigerant inflow line.

10. The cylindrical cooling assembly of claim 9 further comprising a thermostat comprising a thermostatic control line attached to the solenoid valve and the thermostat further comprising a thermostatic line attached to the temperature sensor which is disposed with the insulation.

11. The cylindrical cooling assembly of claim 10 wherein the refrigerant inflow line and refrigerant out flow line are connected to a refrigerant cooling system.

12. The cylindrical cooling assembly of claim 11 wherein the sensor is disposed within the insulation.

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