

Nov. 24, 1942.

L. A. PHILIPP

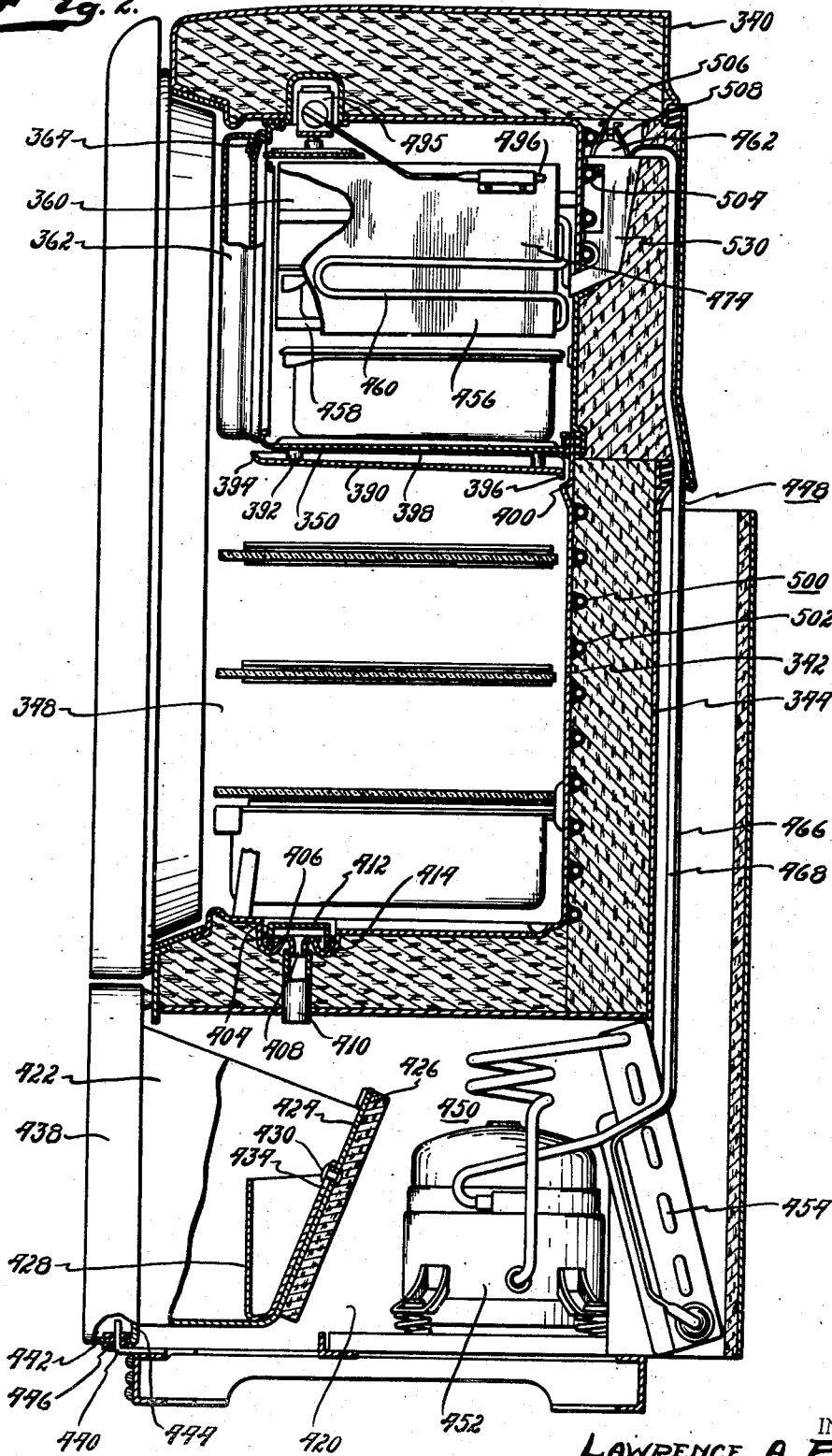
2,303,138

REFRIGERATING APPARATUS

Original Filed Aug. 23, 1940

3 Sheets-Sheet 2

Fig. 2.



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3 Sheets-Sheet 3

Fig. 3.

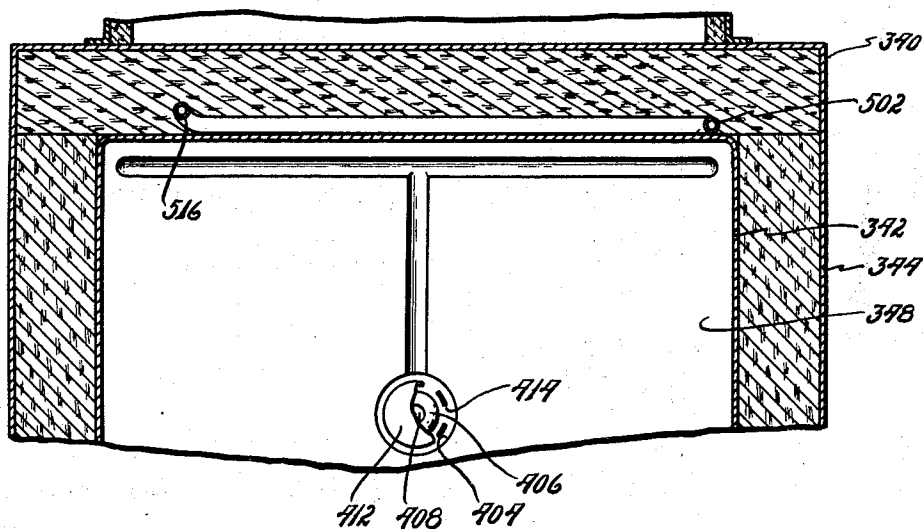
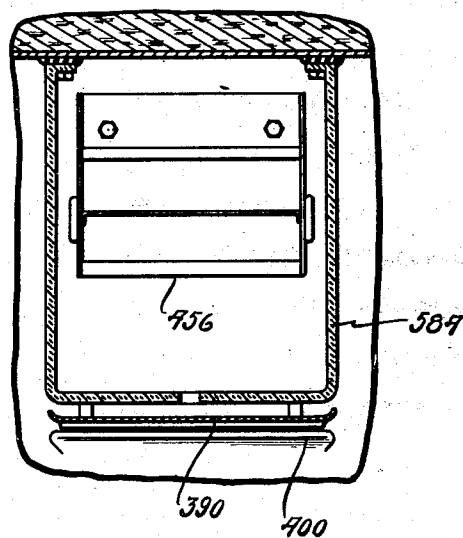


Fig. 4



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REFRIGERATING APPARATUS

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Original application August 23, 1940, Serial No.
353,924. Divided and this application July 21,
1941, Serial No. 403,354

9 Claims. (Cl. 62-103)

This invention relates to refrigerating apparatus, and more particularly to household refrigerators.

The present application is a division of my co-pending application Serial No. 353,924 filed August 23, 1940, for Refrigerating apparatus.

One of the object of my invention is to provide an improved arrangement for draining the drip water from refrigerant evaporators to the exterior of refrigerator cabinets.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a front view in elevation and partly broken away showing a refrigerator embodying features of my invention;

Fig. 2 is a view taken along the line 2-2 of Fig. 1;

Fig. 3 is a view taken along line 3-3 of Fig. 1; and

Fig. 4 is a view of a modified form of casing which is positioned within the food storage compartment for providing an ice freezing zone.

Referring to the drawings, the numeral 340 designates in general a cabinet having inner metallic liner 342 and an outer metallic casing 344. The inner metallic liner 342 forms walls of food storage compartment 348. Within the food storage compartment 348 is placed a sheet metal casing 350 which is secured to top wall of the liner 342 by bolts (not shown) and to the rear wall of the liner by bolts (not shown). Interposed between the casing 350 and the liner is provided gasket material 356 for sealing the terminating edges of the casing 350 to the top and rear walls of the liner 342 so that circulating air within the food storage compartment is sealed from the interior of the casing 350 and serves to form an ice freezing zone 360. The front of the zone 360 is closed by a hinged door 362 which is of double wall structure and carries a gasket 364 which engages with the front wall of the casing 350 to seal the open front of the casing so that circulating air within the food storage compartment cannot enter the ice freezing zone through the open front of the casing 350.

In Fig. 4 I have shown a modified form of casing 384, which is preferably constructed of plastic or glass, and offers some insulation to the flow of heat through the walls thereof.

Also, within the food storage compartment, I have provided a drip receiver 390 which is the

form of a shallow pan and is carried by the casing 350 by supports 392. The drip receiver has an upturned edge 394 at its forward end and a downturned edge 396 at the rear thereof. The drip receiver 390 is positioned so as to collect drip water from the casing 350 which may run down its exterior surfaces, and also for collecting drip water which may run through opening 398 formed in the bottom wall of the casing 350. The downturned edge 392 of the drip receiver extends over a protuberance 400 formed in the rear wall of the liner so that the drip water passing from the receiver 390 will contact the protuberance and then run down the rear wall of the liner to the bottom wall thereof. Within the bottom wall of the liner I have formed a recess 404 which has upturned bent portion 406 and an outlet 408 formed therein. Below the outlet 408 is a drain pipe 410. Above the upturned portion 406 is inverted cup 412 having slots 414 so that the drip water may run under the cup and thus form a trap thereunder so that air from outside the cabinet may not enter the interior of the refrigerator through the pipe 410 and outlet 408. Also, the cup 412 prevents possibility of food articles passing through the drain pipe 410.

Below the food storage compartment there is provided a compartment 420. Within the machine compartment there is provided a vegetable bin 422 which has an inclined rear wall 424 to which is secured sound insulating material and heat insulating material 426. While such material as shown herein is shown as cork insulation, any suitable sound absorbing and heat insulating fibrous material, "Rock Wool," or the like, may be used. Upon the forward edge of the inclined wall 424, I have provided a removable drip pan 428 which is carried by rivets 430 and the pan is readily removable therefrom, by simply sliding upwardly on the inclined surface 424 until an enlarged slot 434 surrounds the head of the rivet 430 and then the removable receptacle 428 may be moved forward slightly to clear the head of the rivet and then lifted upwardly to be removed from the vegetable bin. The drip receptacle 428 is positioned below the drain pipe 410 to receive the drip water from the pipe 410. The vegetable bin is carried by a tiltable door 438 which closes the front end of the machine compartment. The door 438 rests upon an L-shaped member 440 and the door includes an outer wall 442 and an inner wall 444. These walls have on their lower edges flanges which extend toward each other and which carry rubber gasket material 446. The rubber gasket ma-

terial engages the L-shaped support and allows the upper part of the door to be tilted outwardly to gain access to the vegetable bin to place vegetables therein or to remove the drip receptacle as desired. Since the rear wall 424 of the vegetable bin is insulated, the heat of condensation does not tend to evaporate water collected in the receptacle 428 and it is found necessary to periodically empty such receptacle.

Within the cabinet I have provided a refrigerating system, designated in general by the numeral 448. The system includes a condensing element 450 which includes a motor compressor unit 452 and condenser 454. The system also includes a refrigerant evaporating element 456 which includes refrigerated shelves 458 and pipe loops 460. At the outlet of the element 456 is a refrigerant accumulator 462. Liquid refrigerant is delivered from the condensing element to the evaporating element through a small diameter or capillary tube 466, and vaporized refrigerant is returned from the accumulator 462 through vapor return conduit 468. The gaseous refrigerant returned through the conduit 468 to the compressor unit is compressed by it and delivered to the condenser element to be liquified and from which it is delivered to the evaporating element under the control of the small diameter tube 466. Preferably, the small diameter tube 466 and vapor return conduit 468 are securely united together in heat exchange relationship. The refrigerant entering the evaporating element first passes through one leg of the return bends 460 whence it flows through the lower refrigerated shelf to the second leg of the return bends 460 whence it passes through the upper refrigerated shelf and a small quantity of liquid is allowed to enter the lower portion of the accumulator 462. The vapor return conduit is preferably connected to the upper end of the accumulator so that only gaseous refrigerant may be returned to the compressor unit. The refrigerant evaporating element 456 is utilized primarily for the freezing of substances and is spaced somewhat from the walls of the casing 350 so that it cools the walls of the casing 350 slightly so that whatever cooling effect it may have for the cooling of circulating air within the food storage compartment 348 takes place without the formation of frost or ice on the exterior surfaces of the casing 350. A switch 495 which includes thermal bulb 496 (see Fig. 2) secured to member 474 is used for controlling the operation of the motor compressor unit in response to changes in temperature of member 474 as is well understood in the art.

Also, for cooling the food storage compartment, I have provided a secondary refrigerating system, designated in general by the numeral 500 and includes an evaporating portion 502 secured to the rear wall of the liner only. The system also includes a condensing portion 504 which is secured to the rear wall of the liner at the upper portion thereof and has secured thereto a semi-circular shell 506 which receives half of the accumulator 462. Another semi-circular shell 508 is clamped to the condensing portion 504 by bolts (not shown) and clamps the accumulator firmly in engagement with the shell 506. Since the shell 506 is secured to the condensing section 504 and system 500, preferably by welding, the accumulator may be in good thermal contact with the condensing portion 504 and an accumulator is utilized for condensing evaporated refrigerant in the secondary system. Evaporated refrigerant

which is condensed by the refrigerating effect of the accumulator flows downwardly through vertical leg 516 to the lowermost part of the evaporator 502 whence it flows upwardly in the evaporator and after it is vaporized it passes upwardly through a vertical leg (not shown) to the upper portion of the condenser 504. The accumulator and secondary refrigerating system is placed within the insulation between the rear wall of the liner and the rear wall of the outer casing. Immediately below the accumulator I have provided a trough 530 which extends through an opening (not shown) in the rear wall of the liner. This permits ventilation between the insulation and the ice freezing evaporating element so that if there is any moisture in the air within the insulation it will be frozen out upon the accumulator or passed with the air to the ice making element and frozen on surfaces of the ice making element. When it is desired to defrost the refrigerant evaporating element 456, frost also melts from the accumulator if any is accumulated thereon. This drip water would then flow through the trough 530 down to the bottom wall of the casing 350 and through the opening 398 in the bottom wall of the casing to the drip receiver 390 whence it passes to the protuberance 400 formed in the rear wall of the liner and down to the bottom wall of the liner and through the drain 410. The secondary refrigerant evaporator 502 is secured to the rear wall of the liner, preferably by a coating of "Hydrolene," however, any other bituminous cement may be used for that purpose. Preferably, the heat exchange relation between the accumulator and the secondary condenser is such and the coating of "Hydrolene" between the evaporator 502 and the rear wall of the liner is such, that the secondary refrigerant evaporator functions to cool the food storage compartment through the rear wall of the liner without the collection of frost upon the rear wall of the liner. If during operation of the secondary refrigerating system moisture collects on the rear wall of the liner 342 it will be conducted down the rear wall to the bottom wall of the liner and pass through the drain pipe 410 into the drip receptacle 428.

Although only a preferred form of the invention has been illustrated, and that form described in detail, it will be apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims:

I claim:

1. Refrigerating apparatus comprising a cabinet having a food storage compartment, a casing in said compartment, a refrigerant evaporating element in said casing, said casing having an opening in a wall thereof to permit drip water from said element to flow through, and a drip receiver carried by said casing and being arranged for conducting said drip water to a wall of said compartment, said drip receiver and said wall being so arranged with respect to each other that the drip water is discharged upon said wall.

2. Refrigerating apparatus comprising a cabinet having a food storage compartment, a casing in said compartment, a refrigerant evaporating element in said casing, said casing having an opening in a wall thereof to permit drip water from said element to flow through, and a drip receiver carried by said casing and being arranged for conducting said drip water to a

protuberance formed in a wall of said compartment.

3. Refrigerating apparatus comprising a cabinet having a food storage compartment, a casing in said compartment, a refrigerant evaporating element in said casing, said casing having an opening in a wall thereof to permit drip water from said element to flow through, and a drip receiver carried by said casing and being arranged for discharging said drip water upon a vertical wall of said compartment and a drain in the bottom wall of said compartment.

4. Refrigerating apparatus comprising a cabinet having inner and outer walls, said inner wall defining a food storage compartment, insulation between said walls, a refrigerant evaporating element within said food storage compartment and a refrigerant evaporating element between said walls, the inner wall having an opening adjacent said element between said walls and a trough below the element between the walls for conducting drip water therefrom into said food storage compartment for discharge upon said inner wall.

5. Refrigerating apparatus comprising a cabinet having a liner, a refrigerant evaporator on one side of the liner, a refrigerant evaporator on the other side of the liner, said liner having an opening, a drip pan below one of said evaporators and a trough below the other evaporator for conducting drip water through said opening and into said pan.

6. Refrigerating apparatus comprising a cabinet having a wall with a protuberance formed thereon, heat absorbing means secured to said wall, a refrigerant evaporator above said protu-

berance, means for conducting drip water from said evaporator to said protuberance, and a drain pipe below said wall.

7. Refrigerating apparatus comprising a cabinet having a liner arranged to form walls of a food storage compartment, a refrigerant evaporating element positioned in said compartment, means supported by said liner and positioned horizontally below said element and having provisions for collecting drip water from said element and conducting it to said liner, and means carried by the liner for supporting said means, said first means and said liner being so arranged with respect to each other that said drip water is discharged from said means on to said liner.

8. Refrigerating apparatus comprising a cabinet having a liner arranged to form walls of a food storage compartment, said liner having a protuberance, a refrigerant evaporator above said protuberance, a device positioned below said evaporator for collecting the drip water therefrom and having provisions for conducting it to said protuberance, and means carried by said liner and supporting said device in said position.

9. Refrigerating apparatus comprising a cabinet having a liner arranged to form walls of a food storage compartment, said liner being provided with a protruding member, a refrigerant evaporator above said protruding member and means positioned below said evaporator for collecting the drip water therefrom and for conducting it to said protruding member, said protruding member being arranged to receive and to direct the flow of drip water over the inner surface of said liner.

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