June 21, 1949. J. A. BRINKOETER 2,473,781

MEANS TO ELIMINATE DRIPPAGE OF CONDENSATION IN OPEN-VIEW FROZEN FOOD CASES

Filed Oct. 28, 1947 3 Sheets-Sheet 1

Fig. 1.

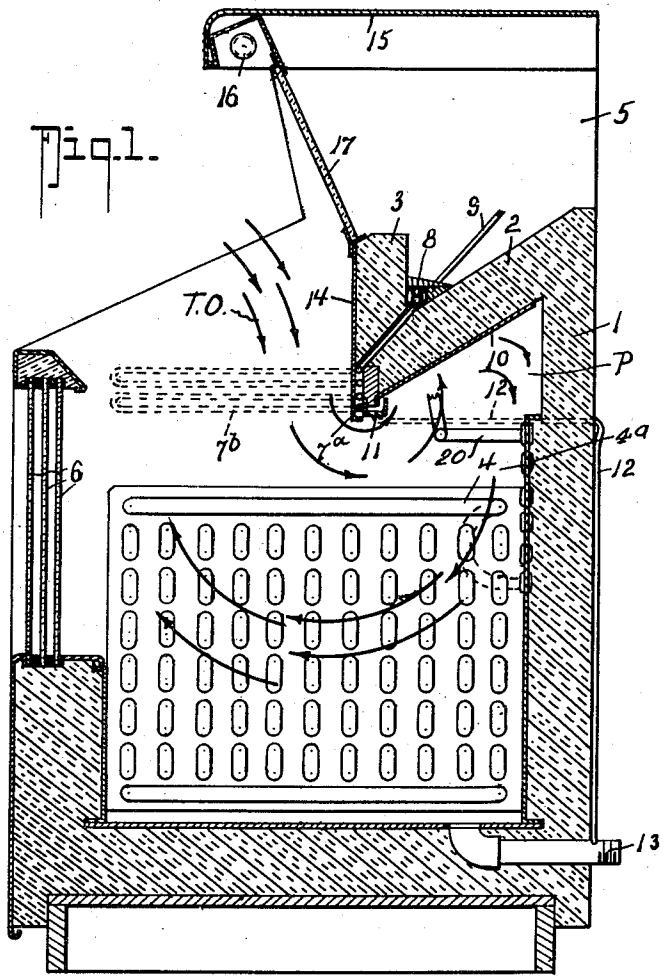
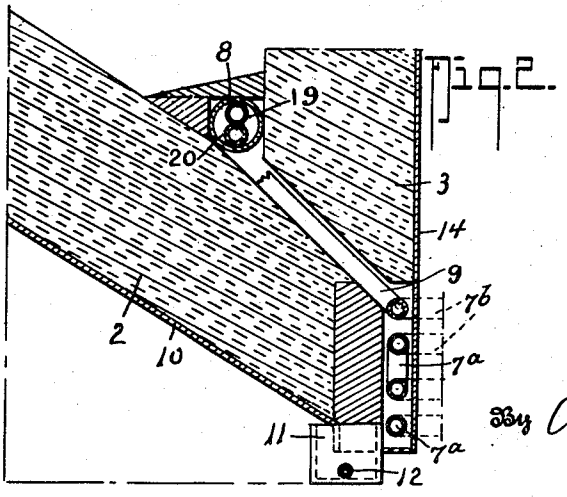


Fig. 2.



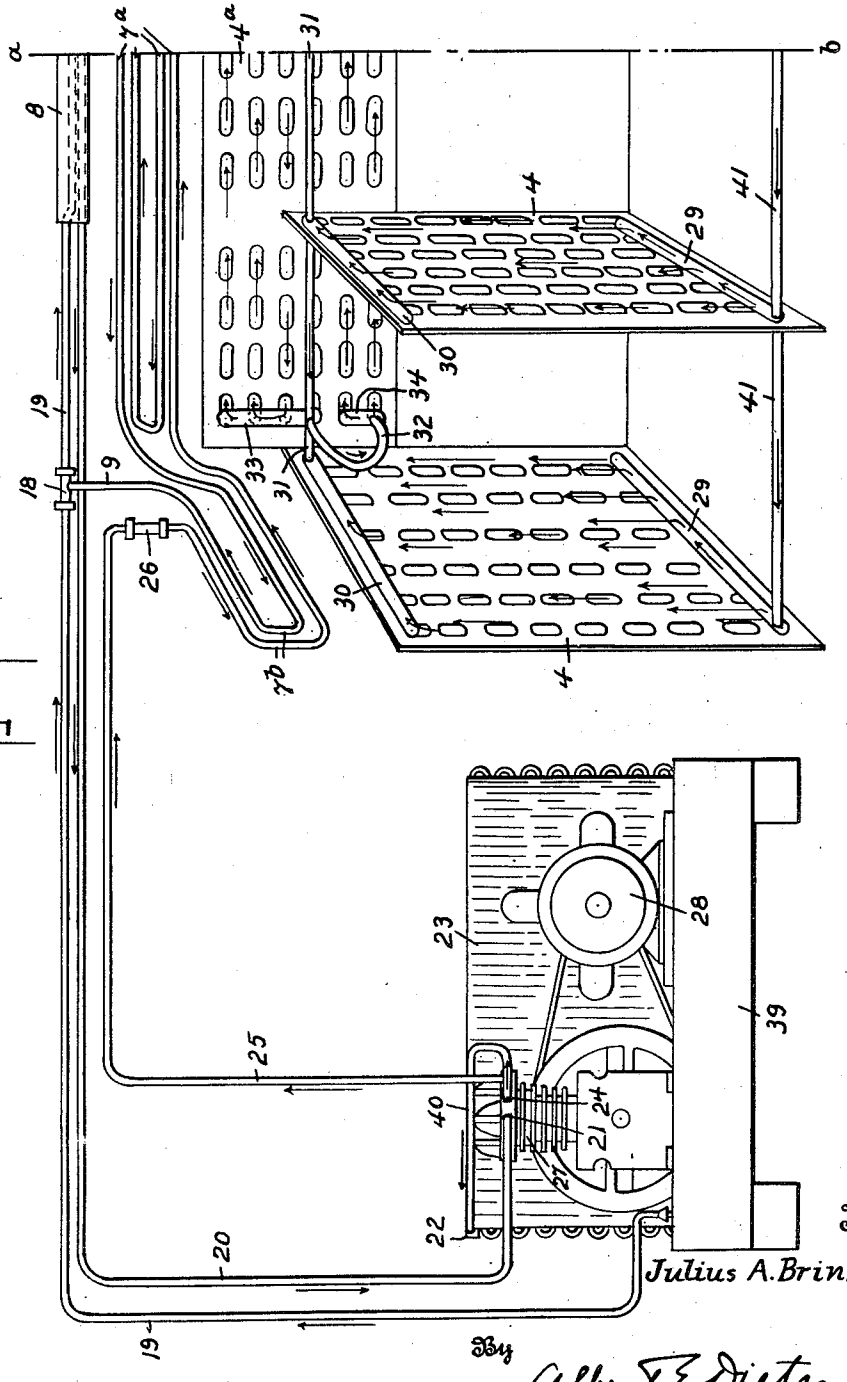
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Fig. 3.



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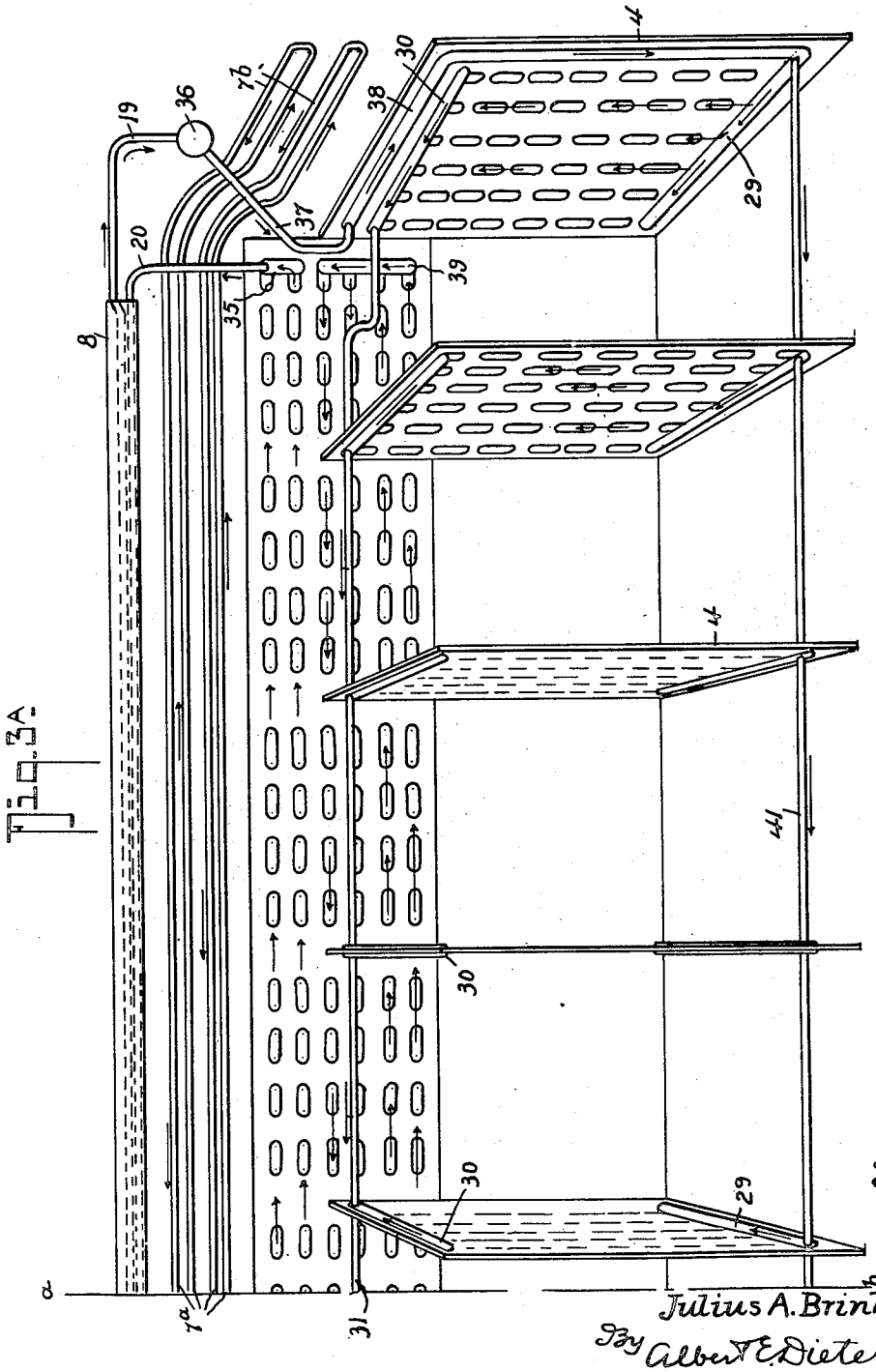


Fig. 3A.

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Patented June 21, 1949

2,473,781

UNITED STATES PATENT OFFICE

2,473,781

MEANS TO ELIMINATE DRIPPAGE OF CONDENSATION IN OPEN-VIEW FROZEN FOOD CASES

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Application October 28, 1947, Serial No. 782,514

4 Claims. (Cl. 62—89.5)

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Open top or openview refrigerator cases usually have a horizontal semi-ceiling or overhang above the food chamber and to the rear of the top opening. Experience has shown that the walls of the refrigerator surrounding the opening in the top and the semi-ceiling sweat or cause condensation of moisture thereon.

Heretofore it has been found that by applying a certain amount of heat to the walls surrounding the top opening, the condensation can, in large measure, be eliminated. However, it has been thought inadvisable to apply heat to the semi-ceiling and hence moisture will condense thereon.

My invention has for its object to provide an improved semi-ceiling construction whereby any condensation thereon will gravitate to a drain trough or gutter from which it will be conducted to a main drain pipe at the back of the refrigerator.

To the attainment of the aforesaid object invention resides in the novel details of construction, combinations and arrangements of parts, all of which shall first be fully described hereinafter and then be specifically pointed out in the appended claims, reference being had to the accompanying drawing in which:

Fig. 1 is a cross-sectional view of a refrigerator with my invention applied.

Fig. 2 is an enlarged detail section of a portion of the same.

Figs. 3 and 3[a] when connected on the line *a—b* constitute a schematic view of the circulating system employed in connection with my invention.

In the drawing 1 represents the refrigerator case, which according to my invention is provided with an overhang 2 beginning at a suitable distance above the level of the front window 6 and extending downwardly forwardly from the rear wall to a suitable point above the cooling plates 4, thus providing a chamber or recess P.

A vertical wall 3 extends up from the front end of the ceiling 2 a substantial distance where it meets a forwardly-upwardly inclined mirror 17 that extends up to a canopy 15 which carries a suitable luminary 16. The front face of wall 3 is metal lined as at 14 behind which lining at the lower end of the ceiling 2 is a warming coil 7[a] that is connected with side warming coils 7[b] and with the usual compressor (not shown) via pipe 9.

The underside of the inclined ceiling 2 is also metal lined, as at 10. Just back of the lower part of the coil 7[a] is a gutter 11 which extends from end to end of the case 1 and below the lower edge

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of the lining 10 and into which gutter condensate that forms on lining 10 will drip. A pipe 12 connects the trough or gutter 11 with the main drain pipe 13 of the refrigerator.

The usual cooling coils 4 are provided in the food compartment, the contents of which compartment can be viewed via window 6 or via mirror 17 through the top opening T. O.

The cooling coils 4 are connected with a heat exchanger 8 and are connectable to refrigerating lines in the usual way.

5 is an open chamber above the semi-ceiling 2 and in back of the mirror 17 in which the heat exchanger 8 lies.

In practice I prefer to make the lining 10 of aluminum, although other suitable metals can be employed.

Due to warm air meeting cold air below the semi-ceiling condensation on the liner 10 will take place and run down into trough or gutter 11 from whence the liquid will drain out via pipe 12 as before intimated.

The constructions of the cooling or freezing plate-coils 4, the warming coils 7[a], 7[b], the heat exchanger 8 are not of my invention but are already known; see, for example, these structures as disclosed in the application filed September 15, 1947 by Clinton C. Brinkoeter, Serial No. 774,055. In practice the coils 7[a], 7[b] are connected in series to the high side of the compressor in a by-pass that is provided with a restrictor that allows but a small amount of the refrigerant to flow through the coils 7[a], 7[b].

Due to the back refrigerating plate-coil 4[a], the air when cooled drops, causing air to circulate, somewhat as indicated by the arrows in Fig. 1. The warm air entering the opening T. O. in the case flows under the gutter 11, replacing the cooler air in recess P that has dropped at the back plate-coil 4[a].

The cold surface of the metal lining 10 will cause moisture to condense on it as the air passes over it, which moisture, due to the sharply angled surface, will not drip but will flow down into gutter 11 from whence it will flow via pipe 12 to drain pipe 13.

The coils 7[a], 7[b] prevent condensation on the front face of the wall 3 and on the end walls of the case.

Referring now to Figs. 3, 3[a], the arrangement and operation of the fluid circulating system will be clear. In these figures 18 is a T which is connected in the line 19. The line 19 runs from a reservoir 39 through the heat exchanger 8 to an expansion valve 36 that is in turn connected via a

pipe 37 to the duct 38 in the right hand plate 4 (Fig. 3ª).

20 is a pipe that leads from the manifold 35 of the plate coil 4ª through the heat exchanger 8 to the inlet 21 of the compressor 27.

22 designates the inlet to the condenser 23 to which the pipe 40 from the outlet 24 of the compressor connects.

A pipe 25 from the compressor outlet side connects to a restriction capillary tube 26 to which the intake end of the sweat eliminator coils connects. The outlet end of the sweat eliminator 7ª—7ᵇ connects via the pipe 9 to the T 18. The compressor 27 is driven by the usual motor 28.

29 indicates the lower manifold and 30 the upper manifold of each plate coil 4. The several manifolds 29 are connected to the main expansion line manifold 42 while the several manifolds 30 are connected to the suction line manifold 31.

The line 31 is connected to the intake end of the plate coil 4ª via a connection 32, and the outlet end of the plate coil 4ª is connected to the suction line 20.

33, 34, 35 and 39 are manifolds of plate coil 4ª. The direction of the flow of fluid in the system is indicated by arrows.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, operation and advantages of the invention will readily appear to those skilled in the art.

What I claim is:

1. In an open top frozen food refrigerator case having a back wall, side walls and a front window with a top rail and having warming coils around two sides and the back of the top opening of the refrigerator: the invention which comprises a semi-ceiling extending upwardly-rearwardly from the back of the top opening of the refrigerator and cooperating with the back wall of the case to provide a recess, and a condensate drain gutter along the lower edge of said semi-ceiling, and a drain pipe leading from said gutter to the outside of the case.

2. In an open top frozen food refrigerator case having a front wall with a top window and having side and end walls and an intermediate vertical wall extending upwardly from a point below the level of the top of the window: the invention which comprises a semi-ceiling of heat insulation which semi-ceiling extends upwardly-rearwardly from the lower edge of said intermediate wall to said back wall, a metal sheath over the face of said semi-ceiling, and a drain trough at the bottom of the same to catch condensate that drips from said sheath.

3. In an open top refrigerator case, rear, end and front walls and a bottom wall enclosing a food chamber, cooling plates in said chamber, a semi-ceiling over the rear portion of said food chamber, a vertical intermediate wall extending from the front of said semi-ceiling upwardly therefrom, the semi-ceiling adjacent the rear wall being at a higher level than the front of the semi-ceiling, a condensing plate on the under face of said semi-ceiling, a gutter under the lower edge of said plate, and a drain from said gutter to the outside of the case.

4. In an open top refrigerator case, rear, end and front walls and a bottom wall, enclosing a food chamber, transversely disposed cooling plate-coils in said food chamber and a longitudinally extending back plate-coil adjacent said rear wall and extending above the transversely disposed plate-coils, a semi-ceiling located over the rear portion of the food chamber, a vertical intermediate wall extending upwardly from the front of said semi-ceiling, said semi-ceiling being upwardly-rearwardly inclined, and having on its lower face a metal liner, a gutter under the lower edge of said liner, and a drain from said gutter to the outside of the case.

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No references cited.