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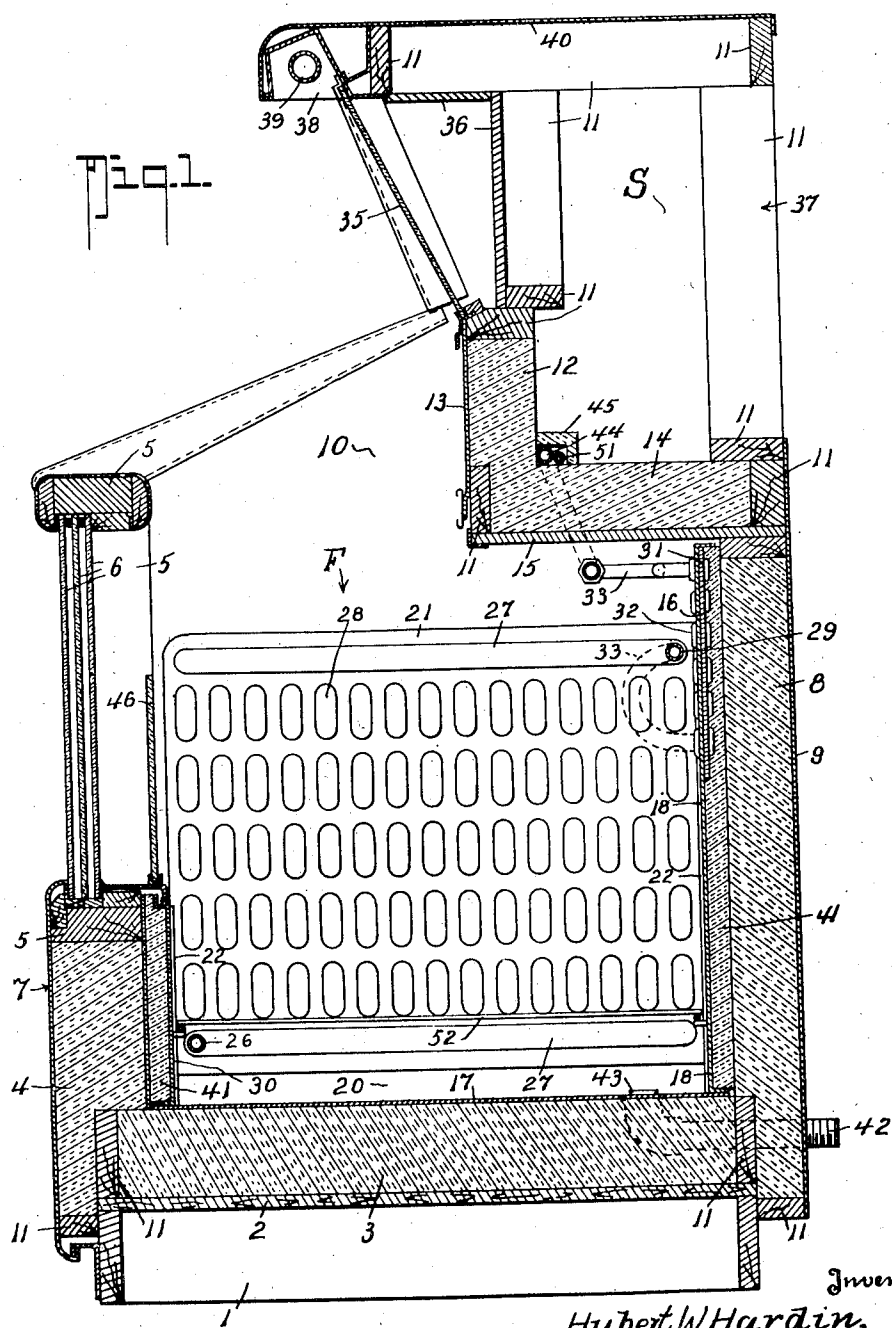
H. W. HARDIN

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OPEN TOP REFRIGERATED DISPLAY CASE

Filed March 17, 1947

3 Sheets-Sheet 1



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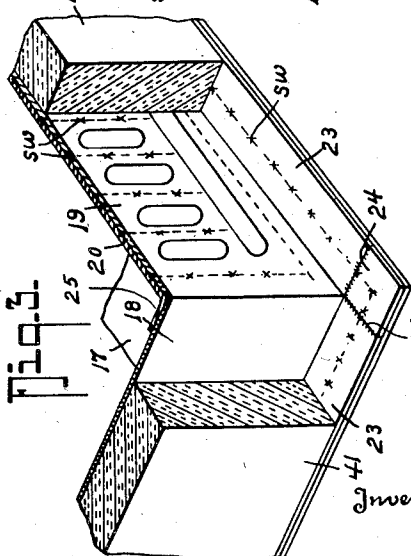
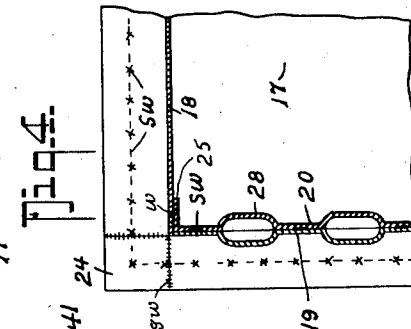
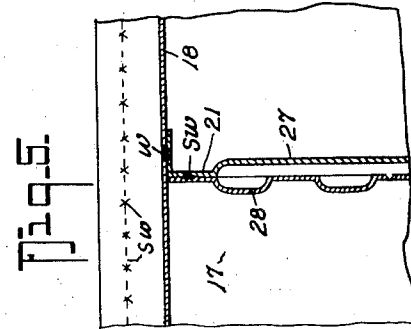
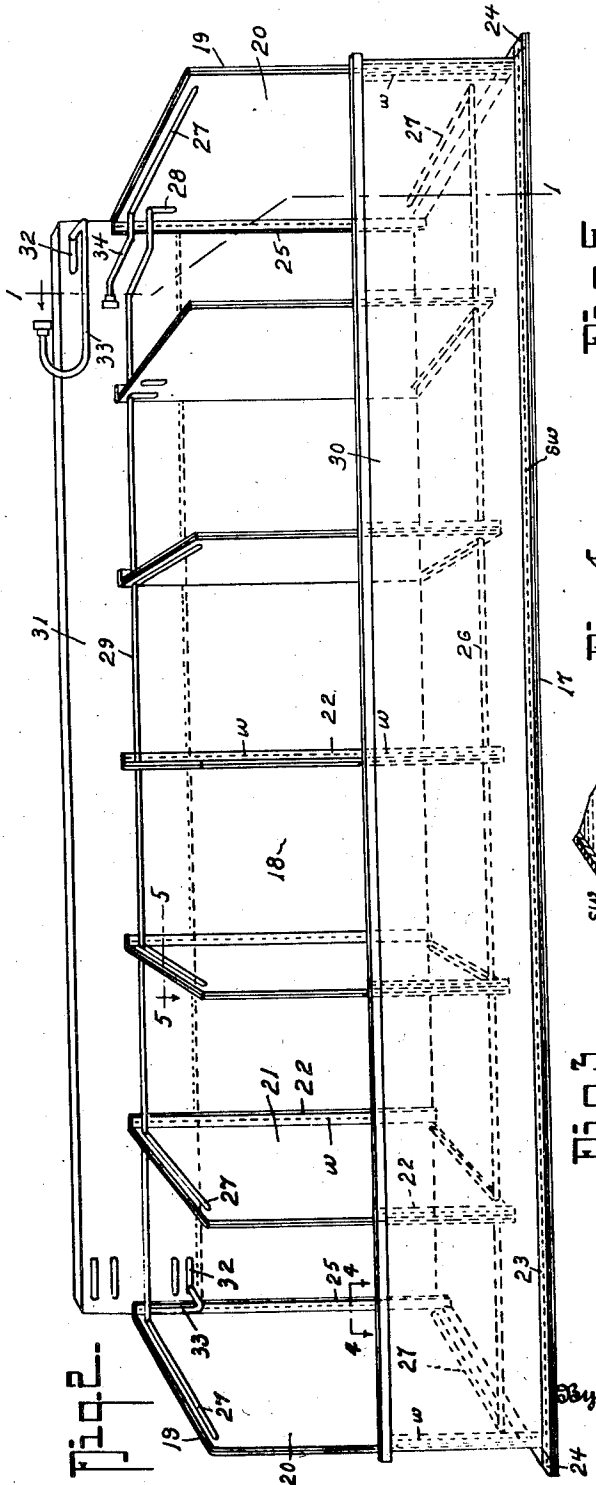
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OPEN TOP REFRIGERATED DISPLAY CASE

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3 Sheets-Sheet 2



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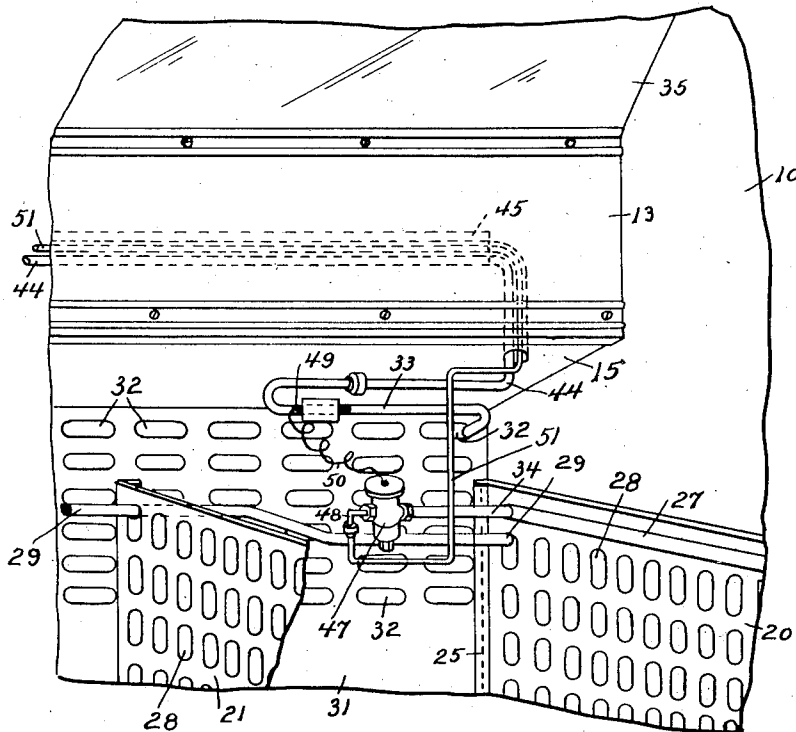
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OPEN TOP REFRIGERATED DISPLAY CASE

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Fig. 5.



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UNITED STATES PATENT OFFICE

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OPEN-TOP REFRIGERATED DISPLAY CASE

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9 Claims. (Cl. 62—89.6)

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My invention relates to display refrigerators which are particularly useful for keeping articles of merchandise in a refrigerated condition and at the same time permit ready and free access to such merchandise by the customer.

Objects of the invention are, (1) to provide a refrigerator in which packaged frozen foods may be stored in full view of the customer through a transparent front wall, the packaged goods being well located below the top of the front wall in what may be termed a dead air chamber, (2) to provide a novel refrigerating coil unit which also serves as a partitioned receptacle for the packaged goods, (3) to provide means for effecting a layer of more or less quiescent cool air above the contents of the said receptacle, (4) and in general to provide an improved refrigerator of the type stated which will be neat and artistic in appearance as well as efficiently useful in the performance of its function.

Other objects will in part be obvious and in part become apparent hereinafter.

To the attainment of the aforesaid objects and ends invention further resides in the novel details of construction, combinations and arrangement of parts all of which will first be fully described and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings in which:

Fig. 1 is a cross section of a refrigerator embodying my invention, the section of the plate coil unit being taken on the line 1—1 of Fig. 2.

Fig. 2 is a schematic perspective view of the plate-coil-food-receptacle unit.

Fig. 3 is an enlarged detail perspective section of a portion of my invention.

Fig. 4 is an enlarged detail section on the line 4—4 of Fig. 2.

Fig. 5 is an enlarged detail section on the line 5—5 of Fig. 2.

Fig. 6 is a detail perspective view later again referred to.

In the drawing in which like numerals and letters of reference indicate like parts in all the figures, 1 represents the base of the refrigerator case, 2 the sub-floor on which is laid a layer or layers of insulation 3. The framing of the case is indicated by 11.

The front wall comprises the insulation 4, the metal facing 7, window frame and sheathing 5, and the window panes 6.

The back wall of the cabinet includes the insulation 8 and metal facing 9. The side or end walls 10 are likewise formed of metal sheathing

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over insulation and present a similar cross-section to the back wall.

Within the food space of the case is located a combined plate coil cooling and food receptacle unit which is composed of a bottom, ends, a back wall and a front wall as will hereinafter more fully appear; the over-all height of this unit, when in place in the case, is less than the height of the front wall and window of the same.

Adjacent the top of said unit and extending from the back wall of the case but terminating short of the front wall thereof is a semi-ceiling composed of insulation 14 and a fiber board sheathing 15, supported by an adjacent portion of the frame 11 of the case. At the front of the semi-ceiling 14, 15 is an upstanding wall, formed of insulation 12 and a metal facing 13, that extends upwardly above the level of the window frame 5. Above the wall 13 is a forwardly upwardly inclined mirror 35 and a light well 38 containing a fluorescent tube 39. In back of the mirror is a dead air space bounded in back and on top by fiber boards 36 and behind that space is a storage chamber S open at the back as at 37, the top of the storage space being covered by a metal sheathing 40.

The combined unit hereinbefore mentioned consists of a bottom plate 17, two end plate coils composed of an outer plate 19 and an inner plate 20 suitably embossed to provide refrigerant circulating passages 28 and top and bottom headers 27, similarly constructed partition plate coils 21, a front plate 30 of a height to reach the bottom of the window of the case when the unit is in place, and a back wall 18 of a height greater than that of the end and intermediate plate coils and extending approximately to the ceiling 14, 15. The end and intermediate plate coils have flanges 25 and 22 respectively by means of which and spot welding *w* the plate coils are united to the back and front plates 18 and 30. The end coil plates and the front and back walls also have flanges 23, which are seam welded to the bottom plate 17 (see Figs. 3, 4 and 5), corner pieces 24 being gas welded, between the flanges 23, to the plate 17 (see Figs. 2 and 3).

26 indicates the liquid line connecting the lower headers 27 of the several plate coils, while 29 indicates the suction line which joins the top header 27 of one end plate coil with the top headers 27 of the several intermediate plate coils and to one of the circulating embosses 28 of the other end plate coil (see Fig. 2).

A back plate coil 16 is formed in part by the upper portion of the wall 18 and a back plate 31,

the embossings 32 of which at diagonally opposite corners are respectively connected to suction line 29 and to the connection 33 which joins suction line 44 that passes through the heat exchanger 45.

34 is a connection from the header 27 of one end plate coil to an expansion valve 47 which valve has a connection 48 to the liquid line 31 which passes through the heat exchanger 45. 49 is the control bulb of the expansion valve 47.

The cooling unit shown in Fig. 2 is sheathed with insulation 41 on four sides (Figs. 1 and 3) and is drained via a drain pipe 42 having a removable plug 43.

A glass shield 46 is provided adjacent the exposed front edges of the plate coils 20, 21, which shield is spaced from the window glasses 6 as best shown in Fig. 1.

By virtue of the construction shown a dead air space is provided between the shield 46 and window glass 6.

Also the food chamber F to the level of the semi-ceiling contains cold air which is quiescent or substantially so until disturbed by the customer removing food packages. After the removal the cold air level soon becomes re-established and remains approximately quiescent until again disturbed by a customer.

A shelf 52 is adjustably held in the cooling unit in any approved way.

From the foregoing description taken in connection with the accompanying drawings it is thought the construction, operation and advantages of my invention will be clear to those skilled in the art to which it appertains.

What I claim is:

1. In a refrigerator of the class described wherein is provided an insulated case having a bottom, end walls, a back wall, a front wall with a transparent window and containing a food chamber: the improvement which comprises a cooling unit fitting within the food chamber and itself comprising plate-coil end walls, intermediate plate-coil partition walls, a bottom, a back wall and a front wall, an auxiliary plate coil on said back wall of the unit and extending a substantial distance above the same; an insulated ceiling extending from the back wall of the case forwardly a substantial distance at a lower level than the top of the front wall of the case, and means for circulating a suitable refrigerant through said plate coils.

2. In a refrigerator of the class described wherein is provided an insulated case having a bottom, end walls, a back wall, a front wall with a transparent window and containing a food chamber: the improvement which comprises a cooling unit fitting within the food chamber and itself comprising plate-coil end walls, intermediate plate-coil partition walls, a bottom, a back wall and a front wall, an auxiliary plate coil on said back wall of the unit and extending a substantial distance above the same and terminating at a substantially lower level than the front wall of the case; an insulated ceiling extending from the back wall of the case forwardly a substantial distance at a lower level than the top of the front wall of the case, and means for circulating a suitable refrigerant through said plate coils, said auxiliary plate coil lying vertical and normal to the remaining plate coils.

3. In a refrigerator of the class described wherein is provided an insulated case having a bottom, end walls, a back wall, a front wall with a transparent window and containing a food

chamber: the improvement which comprises a cooling unit fitting within the food chamber and itself comprising plate-coil end walls, intermediate plate-coil partition walls, a bottom, a back wall and a front wall, an auxiliary plate coil on said back wall of the unit and extending a substantial distance above the same and terminating at a substantially lower level than the front wall of the case; an insulated ceiling extending from the back wall of the case forwardly a substantial distance at a lower level than the top of the front wall of the case, and means for circulating a suitable refrigerant through said plate coils, said auxiliary plate coil lying vertical and normal to the remaining plate coils and extending from one end wall of the unit to the other end wall of the same.

4. In a refrigerator of the class described wherein is provided an insulated case having a bottom, end walls, a back wall, a front wall with a transparent window and containing a food chamber: the improvement which comprises a cooling unit fitting within the food chamber and itself comprising plate-coil end walls, intermediate plate-coil partition walls, a bottom, a back wall and a front wall, an auxiliary plate coil on said back wall of the unit and extending a substantial distance above the same and terminating at a substantially lower level than the front wall of the case; an insulated ceiling extending from the back wall of the case forwardly a substantial distance at a lower level than the top of the front wall of the case, and means for circulating a suitable refrigerant through said plate coils, the front wall of said unit being of substantially less height than the height of said end and partition plate coils; and a transparent baffle located between said window and the portions of said end and partition plate coils adjacent to said window.

5. In a refrigerator of the class described wherein an open top case contains a food chamber, the case having a bottom, end walls, a back wall and a front wall, the front wall being provided in its upper portion with a transparent window: the improvement which comprises a cooling unit composed of a bottom, end plate coils, intermediate partition plate coils, a back wall of greater height than that of said end and partition plate coils, a front wall of substantially less height than that of said plate coils, an auxiliary plate coil on the upper portion of the back wall of the unit and extending above said end and partition plate coils, all the aforesaid parts of the unit being integrally secured together and fitted into the food chamber of the case, the transparent portion of the front wall extending above the level of the front and back walls of the unit, means to circulate a refrigerant through said plate coils; and a semi-ceiling extending from the back wall of the case part way toward said window and at a lower level than the top of the front wall of the case.

6. In a refrigerator of the class described wherein an open top case contains a food chamber, the case having a bottom, end walls, a back wall and a front wall, the front wall being provided in its upper portion with a transparent window: the improvement which comprises a cooling unit composed of a bottom, end plate coils, intermediate partition plate coils, a back wall of greater height than that of said end and partition plate coils, a front wall of substantially less height than that of said plate coils, an auxiliary plate coil on the upper portion of

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the back wall of the unit and extending above said end and partition plate coils, all the afore-said parts of the unit being integrally secured together and fitted into the food chamber of the case, the transparent portion of the front wall extending above the level of the front and back walls of the unit, means to circulate a refrigerant through said plate coils; and a semi-ceiling extending from the back wall of the case part way toward said window and at a lower level than the top of the front wall of the case; and a transparent baffle disposed between said window and the exposed portions of the end and partition plate coils of said unit.

7. A refrigerator according to claim 1 wherein a top chamber is provided above said ceiling and out of communication with said food chamber, and wherein a suitable refrigeration heat inter-changer is located in said top chamber and operatively connected with said auxiliary plate coil and one of said end plate coils.

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8. A refrigerator according to claim 1 wherein the front wall of the unit is of substantially less height than the height of the end and partition plate coils, and wherein a transparent baffle is located between the window and the portions of said end and partition plate coils which are adjacent said window.

9. A refrigerator according to claim 1 wherein the auxiliary plate coil on the back of the unit terminates at a substantially lower level than the front wall of the case.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,207,586	Hill	July 9, 1940
2,430,329	Davis	Nov. 4, 1947