

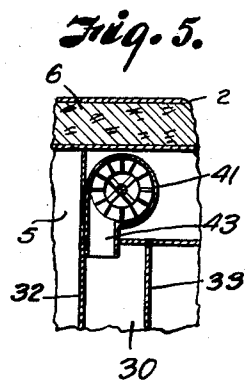
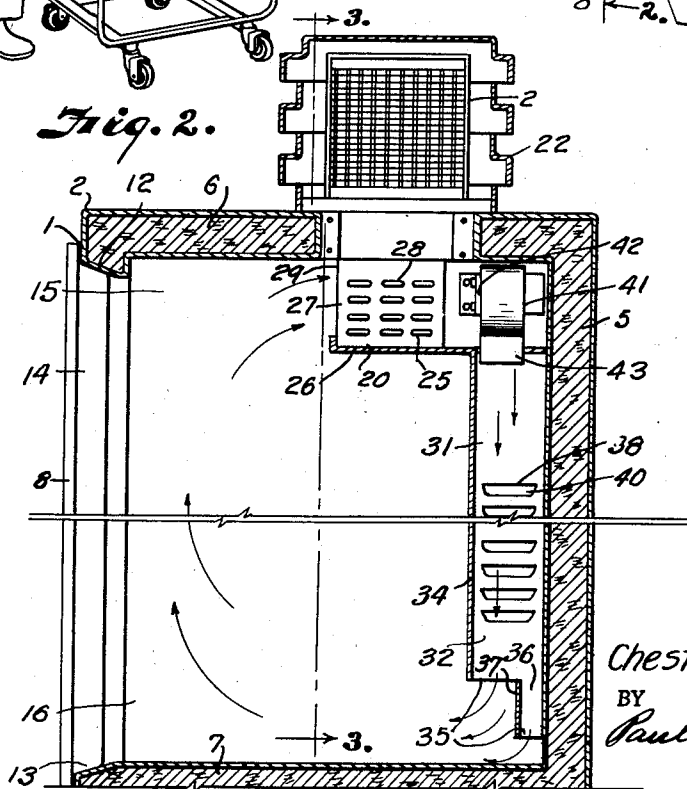
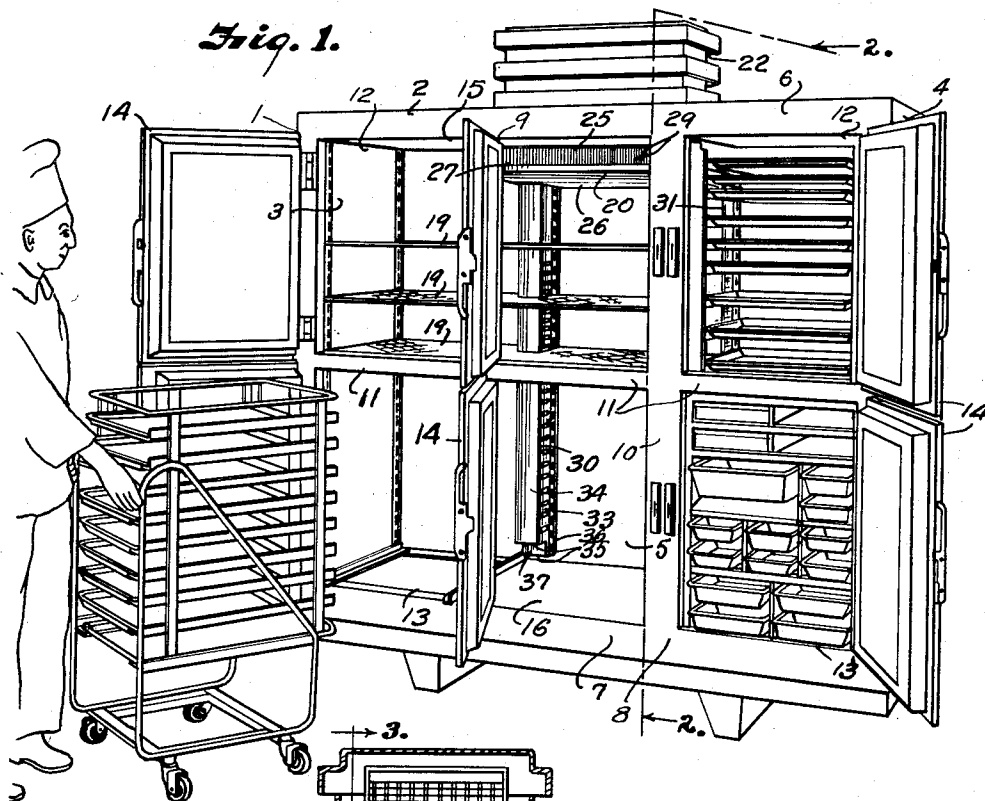
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REFRIGERATOR

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2 Sheets-Sheet 1



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2,928,262

REFRIGERATOR

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5 Claims. (Cl. 62—419)

This invention relates to a refrigerator for storing foods in pans, trays and cartons that are supported by racks and slides, in the manner disclosed in my copending applications for patents on Racks for Storage Cabinets, Serial No. 690,082, and Apparatus for Handling and Storing Repaired Foods, Serial No. 689,991, now Patent No. 2,883,253.

The present invention pertains to the refrigerator structure to facilitate the insertion of the racks and placement of the pan slides, and more particularly relates to the circulation of refrigerated air within the compartments of the refrigerator.

The principal objects of the present invention are to provide for the distribution of refrigerated air through vertical ducts that are associated with the pilasters at the sides of the door openings, so as to not interfere with placement of the trays, pans and racks; to provide for efficient distribution of the cooled air to the respective compartments; to provide an arrangement of the refrigerating element within the upper portion of the intermediate compartment and which is suitably enclosed to form an air inlet at one side and outlets at the opposite side in connection with the vertical ducts; and to provide the vertical ducts with blowers for promoting circulation of the cooled air.

In accomplishing these and other objects of the invention, I have provided improved structure, the preferred form of which is illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a refrigerator embodying the features of the present invention.

Fig. 2 is a vertical cross section through the refrigerator on the line 2—2 of Fig. 1.

Fig. 3 is a longitudinal section of the central portion of the refrigerator, the section being taken on the line 3—3 of Fig. 2.

Fig. 4 is a horizontal section through the central portion of the refrigerator, the section being taken on the line 4—4 of Fig. 3.

Fig. 5 is a fragmentary vertical section through one of the blowers, showing its connection with the vertical duct with which it is associated.

Referring more in detail to the drawings:

1 designates a refrigerator constructed in accordance with the present invention and which includes a casing 2, having side walls 3 and 4, a rear wall 5, a top 6, and a bottom 7, all being of suitably insulated construction. The front side 8 has parallel vertically arranged pilasters 9 and 10 spaced from each other and from the side walls 3 and 4, as shown in Fig. 1. The pilasters and side walls are connected intermediate their height by transverse members 11 to cooperate therewith in providing upper and lower rows of door openings 12 and 13 through which access is had to the interior of the refrigerator. The door openings are closed by insulated doors 14, suitably hinged to the side walls and one of the pilasters, as shown, whereby the doors may open outwardly with-

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out interference with the spaces provided by the door openings.

The interior of the refrigerator is in effect divided into a plurality of upper and lower storage spaces 15 and 16, each space being in connection with a door opening, whereby the racks and slides for supporting the pans and trays may be inserted into the compartments by way of the door openings 12 and 13 and leave vertical spaces 17 and 18 between the pans, trays and racks and directly back of the pilasters 9 and 10, as shown in Figs. 3 and 4. If desired, the upper and lower compartments may be separated at the level of the transverse members 11 by perforated shelves 19, on which individual food containers may be placed. It is obvious that while the interior of the refrigerator constitutes a space, it is, in effect, divided into the separate compartments, and free circulation of cooled air is afforded through all of the compartments for return to an air cooling compartment 20 in the upper portion of the top central compartment, as now to be described.

In carrying out the present invention, the top 6 of the refrigerator carries a refrigerating unit 21 that is enclosed in a ventilated housing 22. The refrigerating unit 21 includes a compressor 23, a condenser 24, and other appurtenances necessary to supply a refrigerating medium to a refrigerant evaporating or expansion element 25 which is horizontally supported in the compartment 20. The compartment 20 is formed by a horizontal partition 26 extending transversely of the central portion of the rear wall of the refrigerator and forwardly therefrom, as shown in Fig. 2, but terminating short of the front of the refrigerator to provide an elongated air inlet opening 27. The ends of the refrigerant compartment may be open to facilitate return of air from the endmost compartments of the refrigerator.

The refrigerating element 25 may be of any suitable design, but is illustrated as comprising a series of coils 28 extending through fins 29 and between which the returned air circulates into contact with sections of the coils 28 to effect cooling and recoiling thereof. Extending downwardly of the rear wall 5 and in accordance with the spacing of the pilasters 9 and 10 are depending air distributing ducts 30 and 31, each having sides 32 and 33 connected by a front side 34, all of which terminate short of the bottom 7 of the refrigerator, to provide air outlets 35 thereunder. To better distribute the cooled air through the outlets 35, the rear portions 36 of the sides 32 and 33 extend downwardly a greater distance than the front portions thereof and the forward edges are connected by a baffle 37 to divide the downflowing stream of air and effect a secondary flow directly over and across the bottom of the refrigerating compartments. The sides of the ducts are preferably provided along the height thereof with outlets 38 and 39 for discharging separate streams of air into the respective compartments. Each of the outlets 38 and 39 is preferably covered by an inwardly and upwardly directed louver 40 to assure a positive discharge of air therethrough.

In order to provide for forced circulation of the air, the upper portion of each duct is equipped with a blower 41, each having an inlet 42 directly connected with the compartment 20 and an outlet 43 opening downwardly into each duct, as best shown in Figs. 4 and 5.

Assuming that the refrigerator is constructed and assembled as described, and that the refrigeration unit is in operation, with the various food carrying racks and slides in position in the different compartments, the air circulation is as follows:

Air is drawn by the blowers from the different compartments through the air inlet 27 and passes between the fins 29 of the evaporator 25, where the air is cooled

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by contact with the fins 29 and coils 28 for discharge through the outlets 43 of the blowers into the upper ends of the depending ducts 30 and 31. The air moves under pressure downwardly through the ducts and portions are discharged through the louvered openings 38 and 39 laterally into the rear portions of the outermost compartments and into the central compartments. The major portion of the air is carried downwardly and is discharged through the bottom outlets 35 of the ducts, from where it circulates upwardly through the compartments for return to the inlet 27 of the refrigerating compartment for refrigeration and recirculation.

If desired, the rear wall of the refrigerator may be provided with doors, so that the racks, trays and pans may be inserted at one side and removed through the doors at the opposite side. This is made possible because the air flow ducts 30 and 31 are located in registry with the pilasters.

From the foregoing, it is obvious that I have provided a refrigerator construction which is well adapted to the inventions covered in the above described applications, and that the air circulation which is provided by the present invention provides optimum circulation of the air around the individual foods when contained in the racks, pans and/or trays, as disclosed in the copending applications.

What I claim and desire to secure by Letters Patent is:

1. A refrigerator, including a casing having side and rear walls, a top and bottom and spaced apart pilasters in the front of the casing providing sides of door openings in connection with food storage spaces in the casing, said food storage spaces corresponding in width to the width of the door openings, means providing an air cooling compartment within the upper portion of the casing and spaced inwardly from the pilasters, said compartment having an opening therein in direct connection with the upper portion of one of the food storage spaces, a duct in connection with said air cooling compartment and extending downwardly along said rear wall in a position thereon corresponding to the position of one of the pilasters in the front of the casing, said duct being spaced from the pilaster to provide a connection between said storage spaces, a refrigerating element in said air cooling compartment, said duct having openings therein in direct connection with the storage spaces and cooperating with the opening in the air cooling compartment for passing air to and from said storage spaces in circulating contact with the refrigerating element, a blower in connection with said air cooling compartment for forceably circulating the air, and a refrigerant supply unit having support on the top of the casing above said air cooling compartment for supplying a refrigerant to the refrigerating element.

2. A refrigerator, including a casing having side and rear walls, a top and bottom and spaced apart pilasters in the front of the casing cooperating with each other and with the side walls for providing door openings therebetween in connection with a center and side food storage spaces in the casing substantially corresponding in width to the respective door openings, means providing a transverse air cooling compartment within the upper portion of the center food storage space and having ends terminating in rearwardly spaced relation with the backs of the pilasters, ducts in connection with said ends of the air cooling compartment and extending downwardly along said rear wall in a position thereon corresponding to the position of the pilasters within the front of the casing, said ducts being spaced from the pilasters to provide a connection between said storage spaces, a refrigerating element in said air cooling compartment, said ducts having openings therein in direct connection with the storage spaces and said air cooling compartment having an opening therein in direct connection with the center storage space for passing air to and from said storage spaces in circulating contact with the refrigerating element, blowers

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in connection with said air cooling compartment and with the said connection of the ducts for forceably circulating the air, and means for supplying refrigerant to the refrigerating element.

3. A refrigerator, including a casing having side and rear walls, a top and bottom and spaced apart pilasters in the front of the casing cooperating with each other and with the side walls for providing door openings therebetween in connection with a center and side food storage spaces in the casing substantially corresponding in width to the respective door openings, means providing a transverse air cooling compartment within the upper portion of the center food storage space and having ends terminating in rearwardly spaced relation with the pilasters, ducts in connection with said ends of the air cooling compartment and extending downwardly along said rear wall in a position thereon corresponding to the position of the pilasters within the front of the casing, said ducts being spaced from the pilasters to provide a connection between said storage spaces, a refrigerating element in said air cooling compartment, said ducts having openings therein in direct connection with the storage spaces and said air cooling compartment having an opening therein in direct connection with the center storage space for passing air to and from said storage spaces in circulating contact with the refrigerating element, blowers in connection with said air cooling compartment and with the said connection of the ducts for forceably circulating the air, and a refrigerant supply unit having support on the top of the casing above said air cooling compartment for supplying refrigerant to the refrigerating element.

4. A refrigerator, including a casing having side and rear walls, a top and bottom and spaced apart pilasters in the front of the casing cooperating with each other and with the side walls for providing door openings therebetween in connection with a center and side food storage spaces in the casing substantially corresponding in width to the respective door openings, means providing an open front air cooling compartment within the upper portion of the casing and spaced inwardly from the pilasters, said air cooling compartment extending transversely of the center food storage space and having ends terminating back of the pilasters, ducts in connection with said ends of the air cooling compartment and extending downwardly along said rear wall in a position thereon corresponding to the position of the pilasters within the front of the casing and having lateral outlets along the length thereof into the storage spaces, said ducts being spaced from the pilasters to provide connections between the food storage spaces for return of air from the side storage spaces through the center storage space to the open front of the air cooling compartment, a refrigerating element in said air cooling compartment for cooling the air, blowers in connection with said air cooling compartment and with the said connection of the ducts for forceably circulating the air, and means for supplying refrigerant to the refrigerating element.

5. A refrigerator, including a casing having side and rear walls, a top and bottom and spaced apart pilasters in the front of the casing cooperating with each other and with the side walls for providing door openings therebetween in connection with a center and side food storage spaces in the casing substantially corresponding in width to the respective door openings, means providing an open front air cooling compartment within the upper portion of the casing and spaced inwardly from the pilasters, said air cooling compartment extending transversely of the center food storage space and having ends terminating back of the pilasters, ducts in connection with said ends of the air cooling compartment and extending downwardly along said rear wall in a position thereon corresponding to the position of the pilasters within the front of the casing and having lateral outlets along the length thereof into the storage spaces, said ducts being spaced from the pilasters to provide connections between the food storage

spaces for return of air from the side storage spaces through the center storage space to the open front of the air cooling compartment, a refrigerating element in said air cooling compartment for cooling the air, blowers in connection with said air cooling compartment and with the said connection of the ducts for forceably circulating the air, and a refrigerant supply unit having support on the top of the casing above said air cooling compartment for supplying refrigerant to the refrigerating element.

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