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A. R. COSTANTINI ETAL

3,154,931

REFRIGERATOR AIR CIRCULATING ARRANGEMENT

Filed June 21, 1963

2 Sheets-Sheet 1

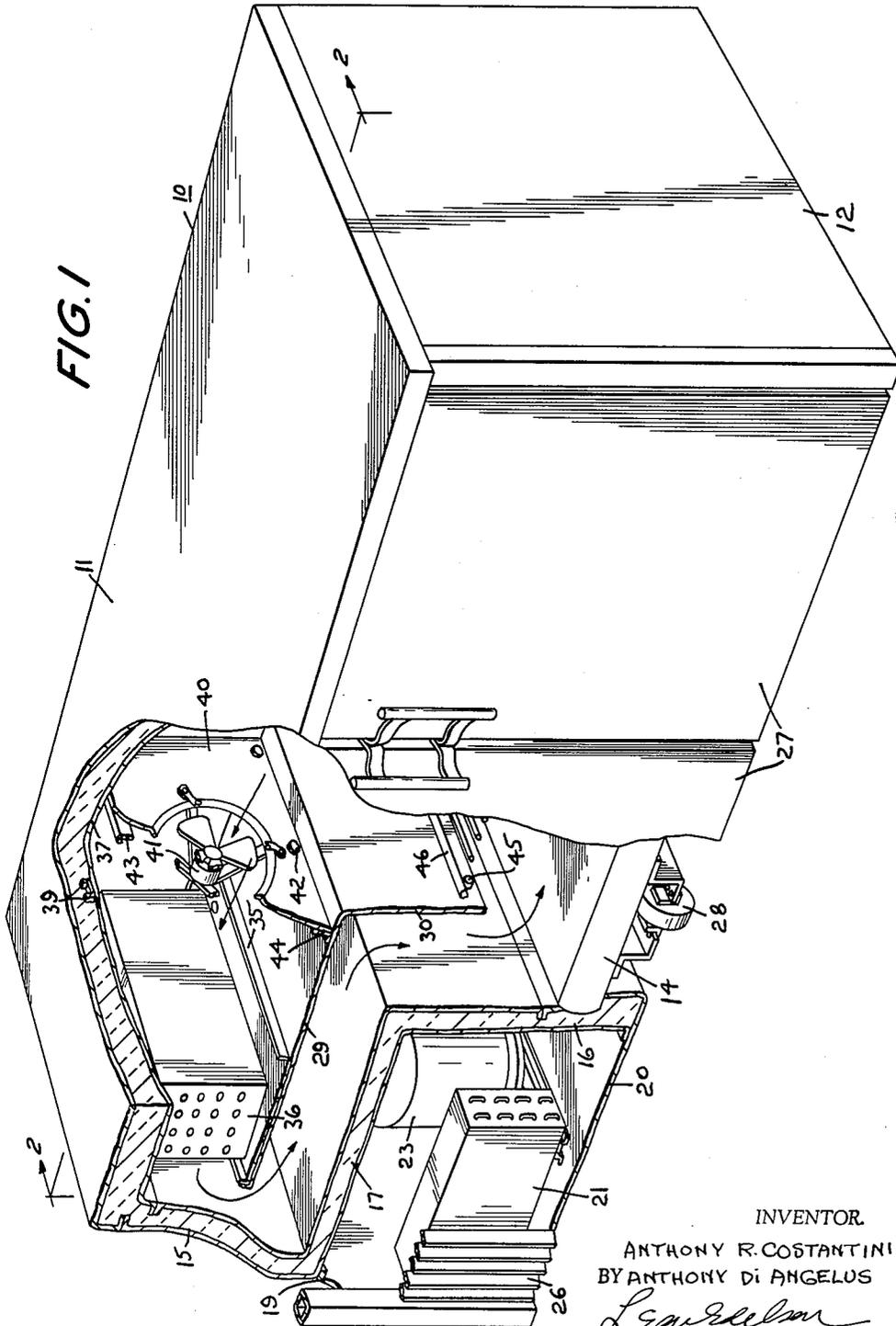


FIG. 1

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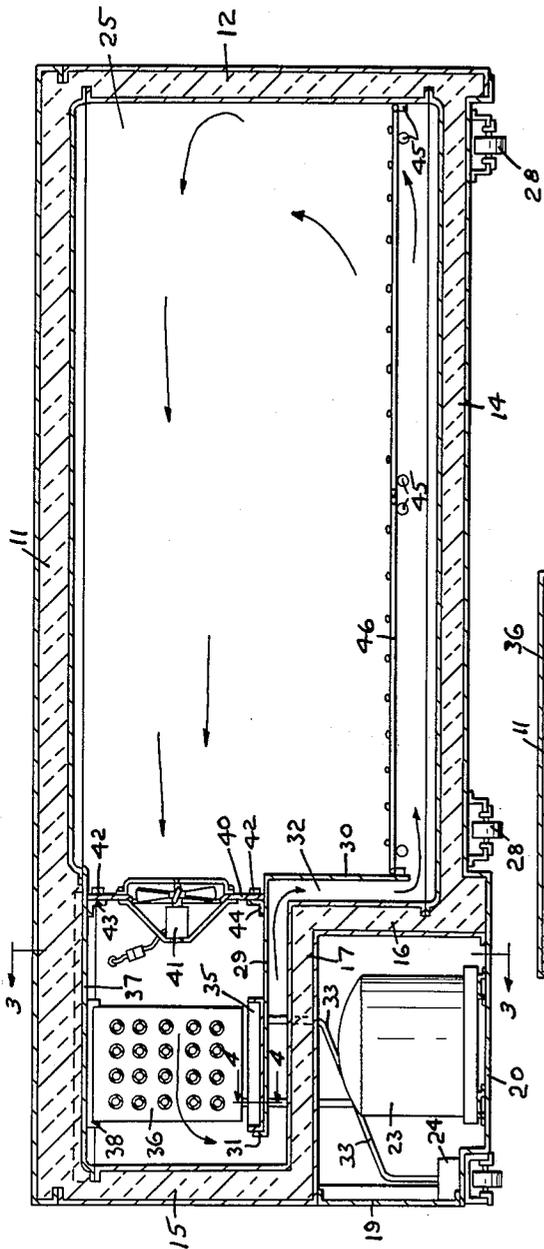


FIG. 2

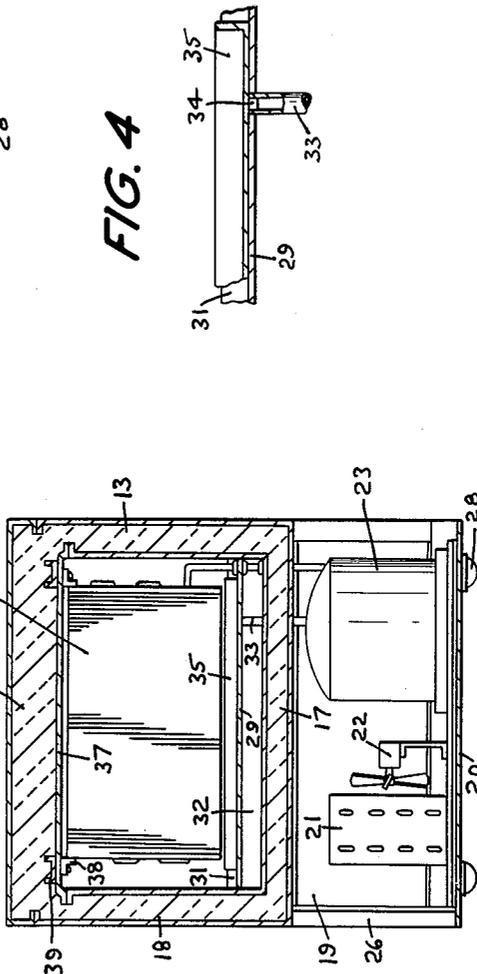


FIG. 3

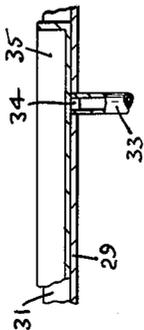


FIG. 4

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3,154,931  
REFRIGERATOR AIR CIRCULATING  
ARRANGEMENT

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2 Claims. (Cl. 62-279)

This invention relates generally to refrigerator constructions, and more particularly, relates to a refrigerator construction of the low-boy type wherein the major dimension of the refrigerator is horizontal rather than vertical. This type of construction may be employed where a limited amount of vertical space is available or in those cases where it is desired to use the top of the refrigerator cabinet for display purposes, as a work surface or counter top, or wherein the refrigerator is to be disposed beneath an existing counter or other work surface.

It is an object of this invention to provide a novel refrigerating apparatus of the low-boy type as hereinbefore described which includes a very simple but efficient air circulating arrangement which takes advantage of the characteristics of warm and cool air to respectively rise and settle.

Another object of this invention is to provide a novel refrigerator apparatus as aforesaid in which the refrigeration apparatus is located at one end of the refrigerator cabinet with the cooling coil structure located within the insulated portion of the cabinet and with the compressor and condenser structures enclosed within a ventilated compartment exterior to the insulated or refrigerated part of the cabinet.

A further object of this invention is to provide a novel refrigerator construction in which the cooling and circulating system discharges the cooled air along the bottom region of the refrigerator storage compartment and extracts the relatively warmer air from the top of the compartment for purposes of cooling the same before discharging it again into the compartment lower region, means being provided for insuring the distribution of the cooled air through the most remote part of the cabinet compartment.

The foregoing and other objects of this invention will become clear from a reading of the following specification in conjunction with an examination of the appended figures, wherein:

FIGURE 1 is a perspective view of the refrigerator construction according to the invention with portions of the front and top broken away to disclose more clearly the interior structural details thereof;

FIGURE 2 is a longitudinal vertical sectional view through the refrigerator cabinet shown in perspective in FIGURE 1, as would be seen on a reduced scale when viewed along the lines 2-2 of FIGURE 1;

FIGURE 3 is a front to back vertical sectional view through the refrigerator cabinet structure as would be seen when viewed along the line 3-3 of FIGURE 2; and

FIGURE 4 is an enlarged fragmentary vertical sectional view through the cooling coil condensate drip pan and run-off drain line as would be seen when viewed along the line 4-4 of FIGURE 2.

In the several figures, like elements are denoted by like reference characters.

Referring now to the figures, the refrigerating apparatus is designated generally as 10 and includes an insulated top wall 11, insulated right end wall 12, insulated rear wall 13 and bottom wall 14, and a left hand end region formed by the left end half wall 15 and inwardly offset front to back extending vertical wall 16 joined by the horizontally extending platform section 17, and a left

end front wall portion 18 which joins the wall section 15 and platform 17 with the top wall 11. The left end section of the cabinet structure 10 beneath the insulated horizontal platform 17 is completed by an uninsulated left end lower wall section 19 in plane with the above lying insulated end wall section 15, and an uninsulated platform or floor section 20 upon which are secured a condenser 21, a condenser fan 22, compressor 23 and condensate evaporator 24.

The heat generating elements 21 through 24 are thus observed to be disposed within a compartment which is exterior to the insulated cabinet compartment 25 formed by the insulated walls 11 through 18. The front and rear of the compartment housing the heat generating elements are open so that air may be drawn freely therethrough by means of the fan 22 to dissipate the heat generated therein and cause proper operation of the condenser 21, the front of this open ended compartment being covered by an air pervious grille 26 which optically conceals from external view the operating components disposed therebehind. Access to the interior of the insulated compartment 25 is had by means of the insulated front doors 27, and the entire cabinet may be moved about for positioning as desired by means of the rollers 28 which are secured to and concealed beneath the insulated bottom wall 14 and floor section 20.

Extending from front to rear and secured within the insulated compartment 25 is an L-shaped member having a horizontally extending portion 29 parallel to and spaced above the upper surface of the insulated horizontal platform 17, and a vertical part extending downward from the right hand end of the horizontal part 29 and which is parallel to and spaced away from the right hand surface of the insulated vertical wall 16. The horizontal part 29 of the L-shaped member turns upward at its left hand end into a lip 31 which is spaced away from the inside surface of the insulated left half end wall 15, while the lower end of the vertical part 30 of the L-shaped member terminates above the inside surface of the insulated bottom wall 14, the L-shaped member thereby forming with the insulated walls 16 and 17 a duct structure 32 having an inlet above the left hand end of the insulated horizontal platform 17 and an outlet immediately below the lower end of the vertical part 30 of the L-shaped member.

The horizontal part of the L-shaped member is provided with a hole therethrough which acts as the mouth of a drain line 33 secured to the horizontal part 29 and extending downward therefrom through the duct 32 and insulated horizontal platform 17 into the compressor compartment and over to the condensate evaporator 24. Disposed within the mouth of the drain line 33 is an open ended fitting 34 which extends downward from the bottom of a condensate drip pan 35 seated flatwise upon the horizontal part 29 of the L-shaped member with its rear edge in abutment with the upturned lip 31. The drip pan 35 is positioned immediately beneath a cooling coil structure 36 supported from the compartment top liner 37 by means of the angle members 38 and channel members 39, the channel members 39 being disposed above the top liner 37 to take the weight of the cooling coil structure 36 and distribute the same over a relatively large area.

Extending from front to rear of the cabinet interior proximate the right hand end of the horizontal part 29 of the L-shaped member is an apertured fan mounting plate 40 to which is mounted a fan 41 oriented to draw air from the upper part of the insulated compartment 25 and blow the same across the cooling coil structure 36 between the vanes thereof and then downward into the duct 32 for discharge at the lower end thereof across the bottom of the compartment, the fan mounting plate 40 being detachably secured by thumb screws 42 to a pair of angle members 43 and 44 which latter are respectively

fixedly secured to the top liner 37 and the horizontal part 29 of the L-shaped member.

Secured to the inside wall liners are a plurality of supports 45 which may be utilized to support an open shelf or rack 46 if so desired, the use of such a rack insuring unobstructed travel of cold air discharged from the lower end of duct 32 across the entire bottom of the insulated compartment 25 so that cooling of the compartment to a uniform temperature may be most quickly effected.

Having now described our invention in connection with a particularly illustrated embodiment thereof it will be appreciated that variations and modifications of the same may now occur from time to time to those persons normally skilled in the art without departing from the essential scope or spirit of the invention, and accordingly it is intended to claim the same broadly as well as specifically as indicated by the appended claims.

What is claimed as new and useful is:

1. A refrigerator apparatus comprising in combination,
  - (a) a thermally insulated refrigerated compartment formed by front, back, top, bottom and end walls one of which has a door fitted therein for providing access to the compartment interior, a portion of said compartment bottom wall at one end thereof being vertically upwardly offset from the remaining major portion of the bottom wall and forming an insulated horizontal platform extending from front to back of the compartment and from the said one end inward to the upper end of a vertically extending insulated wall which latter is joined at its lower end to the said major portion of the bottom wall,
  - (b) an L-shaped member extending from front to back of the compartment and having a horizontal leg disposed in above-lying substantially parallel planar spaced relation to said insulated horizontal platform with one end of said leg terminating short of the proximate compartment end wall, and having a vertical leg disposed in laterally spaced substantially parallel planar relation to said insulated wall extending vertically downward from said horizontal platform with one end of said leg terminating above the said major portion of the bottom wall, said L-shaped member forming a duct extending from front to back of the compartment with said insulated platform and vertically extending wall,
  - (c) a cooling coil extending substantially from front to back of the compartment, downward substantially from the top wall to the horizontal leg of the said L-shaped member, and spaced inward from the end wall proximate to the end of said horizontal leg,
  - (d) blower means positioned above the horizontal leg of said L-shaped member between said cooling coil and the major portion of said compartment effective to draw air from the top region of the compartment and blow the same across the cooling coil and downward into the aforesaid duct for discharge back into the compartment at the lower end of the duct and across the entire bottom surface of the compartment, and
  - (e) horizontal open rack means spaced above the compartment bottom for supporting articles to be refrigerated to thereby insure free circulation of cooled air emerging from the duct uniformly across the bottom of and upward through the compartment.
2. A refrigerator apparatus comprising in combination,
  - (a) a thermally insulated refrigerated compartment

formed by front, back, top, bottom and end walls one of which has a door fitted therein for providing access to the compartment interior, a portion of said compartment bottom wall at one end thereof being vertically upwardly offset from the remaining major portion of the bottom wall and forming an insulated horizontal platform extending from front to back of the compartment and from the said one end inward to the upper end of a vertically extending insulated wall which latter is joined at its lower end to the said major portion of the bottom wall,

- (b) an L-shaped member extending from front to back of the compartment and having a horizontal leg disposed in above-lying substantially parallel planar spaced relation to said insulated horizontal platform with one end of said leg terminating short of the proximate compartment end wall, and having a vertical leg disposed in laterally spaced substantially parallel planar relation to said insulated wall extending vertically downward from said horizontal platform with one end of said leg terminating above the said major portion of the bottom wall, said L-shaped member forming a duct extending from front to back of the compartment with said insulated platform and vertically extending wall,
- (c) a cooling coil extending substantially from front to back of the compartment, downward substantially from the top wall to the horizontal leg of the said L-shaped member, and spaced inward from the end wall proximate to the end of said horizontal leg,
- (d) blower means positioned above the horizontal leg of said L-shaped member between said cooling coil and the major portion of said compartment effective to draw air from the top region of the compartment and blow the same across the cooling coil and downward into the aforesaid duct for discharge back into the compartment at the lower end of the duct and across the entire bottom surface of the compartment,
- (e) an open-ended compartment located beneath said insulated horizontal wall in which are housed the condenser and compressor portions of the refrigerating apparatus, and blower means for circulating external air through the open-ended compartment to dissipate the heat dumped therein by the condenser and compressor,
- (f) cooling coil condensate collecting and evaporating means, said condensate collecting portion being disposed immediately beneath said cooling coil and being provided with conduit means for delivering the condensate to the evaporating portion which is located in the aforesaid open-ended compartment, and
- (g) horizontal open rack means spaced above the compartment bottom for supporting articles to be refrigerated to thereby insure free circulation of cooled air emerging from the duct uniformly across the bottom of and upward through the compartment.

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