This invention relates generally to refrigerating constructions, and more particularly relates to novel structure which results in a unit which occupies less floor space than heretofore for a given interior storage compartment volume and which may be installed flush against a wall to provide a more sanitary condition by preventing rodents and other undesirable creatures from nesting therebene.

In the past, the million type of refrigeration cooling system has been employed in multiple section refrigerating units. The million cooling systems are those in which various components of the refrigeration system are built into the wall or walls which separate one section of such a refrigeration from another section. Of necessity, the walls in which the cooling apparatus is located are substantially thicker than if the cooling apparatus were placed elsewhere. For a refrigerating unit which occupies a given amount of floor space this means that the horizontal area of the refrigerating compartment is less than in the case where the intercompartmental walls are relatively thin and need only fulfill the function of insulating one compartment from another. By placing the entire refrigerating apparatus at the top of the refrigerating unit various advantages are made possible, one such being that the entire refrigerating apparatus may be placed flush against the wall because the top mounted location of the condenser and compressor portions of the refrigerating apparatus permits the free circulation of air therabouts for cooling purposes, this being a primary object of the invention.

Another object of the invention is to provide a novel refrigerating apparatus as aforesaid wherein the cooling coils are also located at the top of the unit to thereby utilize a novel air distribution system of relatively simple but very efficient configuration.

Yet another object of this invention is to provide a novel refrigerating apparatus employing a top mounted cooling coil and distribution duct structure in which the cold refrigerating air enters each of the refrigerating compartments at the top thereof and moves downward through the compartment to cool the interior thereof, the warmed return air being extracted from the compartments also at the top thereof toward which it tends to move when displaced by the denser cold air moving downward in the compartment.

The foregoing and other objects of the 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 a two compartment refrigerator constructed according to the invention, as would be seen when looking theretoward from a point diagonally upward and outward of the upper right-hand corner of the apparatus;

FIGURE 2 is a view similar to that of FIGURE 1 with portions of the front, the top and the side broken away to disclose certain organizational details of the apparatus;

FIGURE 3 is a vertical sectional view taken through the apparatus of FIGURE 1 as would be seen when viewed along the line 3—3 thereof, and is shown in enlarged scale;

FIGURE 4 is a perspective view from above of the

major portion of the structure which forms the novel ducted air circulation system;

FIGURE 5 is a vertical sectional view taken through the upper part of the refrigeration air duct system at substantially right angles to the showing of FIGURE 3 and as would be seen when viewed along the line 4—4 of FIGURE 3;

FIGURE 6 is a vertical sectional view also taken through the upper part of the apparatus shown in FIGURE 3 and substantially at right angles thereto as would be seen when viewed along the line 6—6 thereof;

FIGURE 7 is a horizontal cross sectional view taken through the refrigerating apparatus at two elevations, above and below the inside cabinet top-wall liners, as would be seen when viewed along the line 7—7 of FIGURE 3; and

FIGURE 8 is a horizontal cross sectional view on an enlarged scale looking downward into the cooling coil compartment above the distributor duct system as would be seen when viewed along the line 8—8 of FIGURE 3.

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

Turning now to the figures, and considering principally FIGURES 1 to 3, there will be seen a refrigerating structure designated generally as 20 having a leaving hand compartment 21 and a right hand compartment 22, the leaving hand compartment being closed by a single vertically extending door 25 while the right hand compartment is closed by a pair of vertically spaced upper and lower doors 24 and 25 respectively. Secured down upon and extending upwardly from the top wall of the refrigerating structure 20 are a compressor 26, condenser 27 and condenser fan 28, and a penthouse 29 having a front access door 30 secured in position by means of a plurality of thumb screws 31, these units being concealed from sight within an enclosing louvered grill 32.

As perhaps best seen in FIGURES 2, 3, 5, 6 and 7, each of the compartments 21 and 22 is formed by a plurality of side wall liners 33 and a top wall liner, the compartment 21 having a top wall liner 34 while the compartment 22 has a top wall liner 35. The top wall liners are vented at all four corners, the top wall liner 34 being provided with front vents 36 and rear vents 37 while the top wall liner 35 is similarly provided with front vents 38 and rear vents 39. Seated upon the top wall liners 34 and 35 is a duct structure designated generally as 40 and shown in perspective as a separate structure in the showing of FIGURES 4, various parts of the duct structure being illustrated in the other figures. The duct structure 40 has a front vent return duct portion 41 which is disposed above and encloses the front vents 36 and 38 respectively of the top wall liners 34 and 35, and also includes a rear vent discharge duct region 42 which is disposed above the rear vents 37 and 39 of the respective top wall liners 34 and 35.

As is perhaps best illustrated by the showings of FIGURES 2 through 5, the air within the compartments 21 and 22 is drawn upward through the front vents 36 and 38 and into the return duct 41 from which it flows inward into the open topped central region 43 of the duct structure 49 and upward into the front part of the penthouse 29, being positively drawn thereinto by the fans 44 carried by the angularly extending panel 45 secured to the top and sides of the penthouse 29. The air then moves the upwardly flowing return air through the cooling coil structure 46 which is secured by brackets 46A to the top wall of the penthouse, downward therebene, and laterally into the rear vent discharge duct 42 so that the cooled air is discharged downward into the compartments 21 and 22 through the rear vents 37 and 39.

As is best seen in FIGURES 2, 4 and 5, a pair of end brackets 47 are secured upon the rear wall 48 of the open
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(a) a plurality of side by side refrigerating storage compartments each of which is provided with:

(d) a plurality of side by side refrigerating storage compartments each of which is provided with:

(b) an open bottomed air duct structure seated upon the topwall linings of the storage compartments which latter form the bottom of the duct structure, including:

(c) a housing overlying and extending upwardly above at least a portion of said duct structure and having an inlet region communicating with the said first air duct, and an outlet region communicating with said second air duct,

(d) a plurality of side by side refrigerating storage compartments each of which is provided with:

(e) a housing overlying and extending upwardly above at least a portion of said duct structure and having an inlet region communicating with the said first air duct, and an outlet region communicating with said second air duct,

(e) means effective for moving air from said compartments upward into said housing inlet region through said first air duct and the vents which it overlies, then passing the air across the cooling coil and downward into said compartments through said housing outlet region into said second air duct and through the vents which the latter overlies.

2. A refrigerator apparatus comprising in combination, 75

(a) a plurality of side by side refrigerating storage compartments each of which is provided with:

(d) a plurality of side by side refrigerating storage compartments each of which is provided with:

(b) an open bottomed air duct structure seated upon the topwall linings of the storage compartments which latter form the bottom of the duct structure, including:

(c) a housing overlying and extending upwardly above at least a portion of said duct structure and having an inlet region communicating with the said first air duct, and an outlet region communicating with said second air duct,

(d) a plurality of side by side refrigerating storage compartments each of which is provided with:

(e) means effective for moving air from said compartments upward into said housing inlet region through said first air duct and the vents which it overlies, then passing the air across the cooling coil and downward into said compartments through said housing outlet region into said second air duct and through the vents which the latter overlies.

3. A refrigerator apparatus comprising in combination, 

(a) a plurality of side by side refrigerating storage compartments each of which is provided with:

(d) a plurality of side by side refrigerating storage compartments each of which is provided with:

(b) an open bottomed air duct structure seated upon the topwall linings of the storage compartments which latter form the bottom of the duct structure, including:

(c) a housing overlying and extending upwardly above at least a portion of said duct structure and having an inlet region communicating with the said first air duct, and an outlet region communicating with said second air duct,

(d) a plurality of side by side refrigerating storage compartments each of which is provided with:

(e) means effective for moving air from said compartments upward into said housing inlet region through said first air duct and the vents which it overlies, then passing the air across the cooling coil and downward into said compartments through said housing outlet region into said second air duct and through the vents which the latter overlies.

4. A refrigerator apparatus comprising in combination,
(a) a plurality of side by side refrigerating storage compartments each of which is provided with:

(1) a floor and a plurality of sidewall liners,
(2) a door fitted into one wall of the compartment and openable for gaining access to the compartment interior, and
(3) a topwall liner apertured completely therethrough at spaced apart regions thereof to provide at least one vent located near the front of the liner and at least one vent located near the rear of the liner, said vents both placing the compartment in communication with the region above the topwall liner,
(b) an open bottomed air duct structure seated upon the topwall liners of the storage compartments which latter form the bottom of the duct structure, including:

(1) a first air duct overlying the compartments' front vents, and
(2) a second air duct substantially isolated from said first air duct and overlying the compartments' rear vents,
(c) a housing overlying and extending upwardly above at least a portion of said duct structure and having an inlet region communicating with the said first air duct, and an outlet region communicating with said second air duct,
(d) a cooling coil structure mounted within said housing between the housing inlet and outlet regions to substantially isolate said regions from one another, and
(e) blower means mounted within said housing on the inlet region side of said cooling coil effective to draw air upward from said compartments through the front vents and first air duct, then blow the air across the cooling coil structure and downward into the compartments through the second air duct and rear vents.

5. A refrigerator apparatus comprising in combination,

(a) a plurality of side by side refrigerating storage compartments each of which is provided with:

(1) a floor and a plurality of sidewall liners,
(2) a door fitted into one wall of the compartment and openable for gaining access to the compartment interior, and
(3) a topwall liner apertured completely therethrough at spaced apart regions thereof to provide at least one vent located near the front of the liner and at least one vent located near the rear of the liner, said vents both placing the compartment in communication with the region above the topwall liner,
(b) an open bottomed air duct structure seated upon the topwall liners of the storage compartments which latter form the bottom of the duct structure, including:

(1) a first air duct overlying one of the vents in each of said compartments, and
(2) a second air duct substantially isolated from said first air duct and overlying the other of said vents in each of said compartments,
(c) a housing overlying and extending upwardly above at least a portion of said duct structure and having an inlet region communicating with the said first air duct, and an outlet region communicating with said second air duct,
(d) a cooling coil structure mounted within said housing, and
(e) means effective for moving air from said compartments upward into said housing inlet region through said first air duct and the vents which it overlies, then passing the air across the cooling coil and downward into said compartments through said housing outlet region into said second air duct and through the vents which the latter overlies.

6. A refrigerator apparatus comprising in combination,

(a) a plurality of side by side refrigerating storage compartments each of which is provided with a topwall liner apertured completely therethrough at spaced apart regions thereof to provide at least two vents which place the compartment in communication with the region above the topwall liner,
(b) an open bottomed air duct structure seated upon the topwall liners of the storage compartments which latter form the bottom of the duct structure, including:

(1) a first air duct overlying one of the vents in each of said compartments, and
(2) a second air duct substantially isolated from said first air duct and overlying the other of said vents in each of said compartments,
(c) a housing overlying and extending upwardly above at least a portion of said duct structure and having an inlet region communicating with the said first air duct, and an outlet region communicating with said second air duct,
(d) a cooling coil structure mounted within said housing, and
(e) means effective for moving air from said compartments upward into said housing inlet region through said first air duct and the vents which it overlies, then passing the air across the cooling coil and downward into said compartments through said housing outlet region into said second air duct and through the vents which the latter overlies.
8. A refrigerator apparatus comprising in combination,
   (a) a refrigerating storage compartment provided with:
   (1) a floor and a plurality of sidewall liners,
   (2) a door fitted into one wall of the compartment and operable for gaining access to the compartment interior, and
   (3) a top wall liner apertured completely therethrough at spaced apart regions thereof to provide at least one vent located near the front of the liner and at least one vent located near the rear of the liner, said vents both placing the compartment in communication with the region above the top wall liner,
   (b) an air duct structure above the topwall liner of the storage compartment, including:
   (1) a first air duct having an opening communicating with the compartment front vent, and
   (2) a second air duct substantially isolated from said first air duct and having an opening communicating with the compartment rear vent,
   (c) a housing overlying and extending upwardly above at least a portion of said duct structure and having an inlet region communicating with the said first air duct, and an outlet region communicating with said second air duct,
   (d) a cooling coil structure mounted within said housing, and
   (e) means effective for moving air from said compartment upward into said housing inlet region through said first air duct and the vent with which it communicates, then passing the air across the cooling coil and downward into said compartment through said housing outlet region into said second air duct and through the vent with which the latter communicates.

9. A refrigerator apparatus comprising in combination,
   (a) a refrigerating storage compartment provided with a topwall liner apertured completely therethrough at spaced apart region thereof to provide at least two vents which place the compartments in communication with the region above the top wall liner,
   (b) an air duct structure above the topwall liner of the storage compartment, including:
   (1) a first air duct having an inlet communicating with one of the vents in said compartment, and
   (2) a second air duct substantially isolated from said first air duct and having an outlet communicating with the other of said vents in said compartment,
   (c) a housing overlying and extending upwardly above at least a portion of said duct structure and having an inlet region communicating with the said first air duct, and an outlet region communicating with said second air duct,
   (d) a cooling coil structure mounted within said housing, and
   (e) means effective for moving air from said compartment upward into said housing inlet region through said first air duct and the vent with which it communicates, then passing the air across the cooling coil and downward into said compartment through said housing outlet region into said second air duct and through the vent with which the latter communicates.

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