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REFRIGERATED DISPLAY AND STORAGE FIXTURE

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FIG. 1.

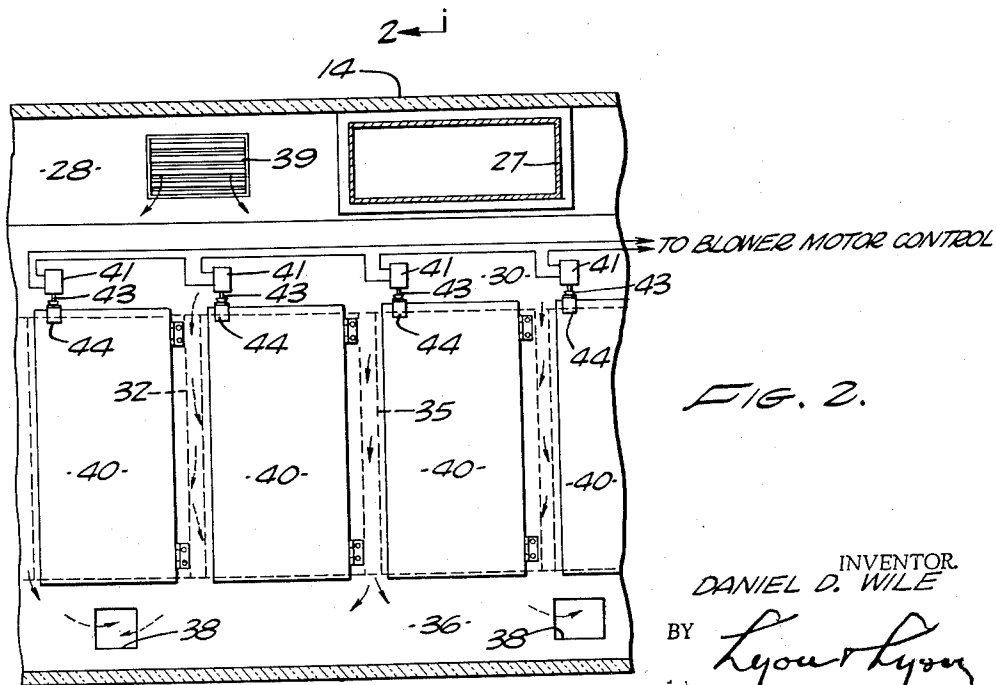
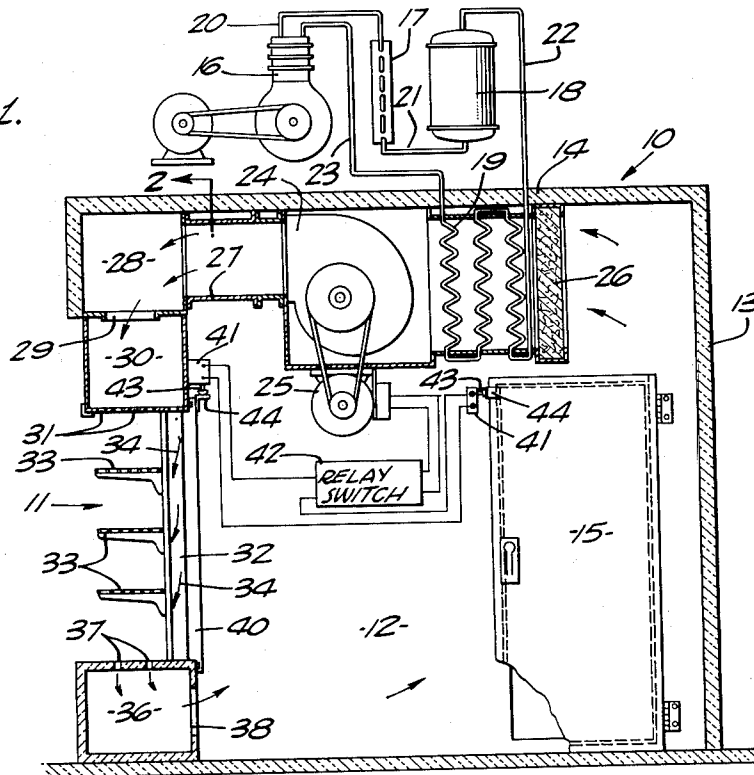


FIG. 2.

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3,139,737 REFRIGERATED DISPLAY AND STORAGE FIXTURE

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This invention relates to an improvement in refrigerated fixtures having both a storage space and an open front display case and, in particular, is directed to an improvement for use in such refrigerated fixtures where access doors to the storage space and display case are provided.

Upright type refrigerated display cases having a plurality of shelves for displaying various products have many advantages such as the number of products which may be displayed for the floor area occupied and from the standpoint of customer appeal. Recently, it has been found even more advantageous to provide these upright refrigerated cases with an open front for unimpeded customer access to the displayed products. Further, the open front display cases have been combined with refrigerated storage spaces such as conventional walk-in boxes with a single refrigerating unit functioning to cool both the display case and the storage space. The storage space or walk-in box is provided with one or more doors to permit access thereto by employees, and it has been found advantageous to also provide access doors between the display case and the storage space for allowing loading and unloading of the display case from the storage space.

Conventional open front upright display cases require a nearly continuous downward flow of cold air through the display case for maintaining the proper temperature of the case and the products therein. Generally one or more blowers are provided for drawing air from the storage space, circulating the air past the refrigerating unit to cool the air, discharging the cooled air through the display case, and returning the air to the storage space. It has been found that although access doors to the storage space and between the display case and the storage space have many advantages the opening of these doors has many adverse effects on this type of refrigerated fixture. One of these adverse effects is that a great deal of cold air is discharged to the outside of the fixture and warm air is drawn in due to the continued circulation of air by the refrigerating unit. Another adverse effect which has been observed is that the normal circulation of cold air is disturbed even though the blowers continue to run since the opening of an access door provides a passage for air not in accordance with the normal path of circulation for the air.

Accordingly, it is a principal object of this invention to provide an improved form of refrigerated fixture having both a storage chamber and an open front display case wherein the opening of an access door in the fixture will not result in an excessive loss of cool air from the fixture.

Another object of this invention is to provide means in a refrigerated fixture having an open front display case and a storage chamber for interrupting the normal circulation of cold air through the various portions of the fixture upon the opening of an access door to either the storage chamber or the display case to thereby eliminate the affirmative discharging of cold air from the fixture and drawing of warm air into the fixture by the air circulating apparatus.

Other and more detailed objects and advantages of this invention will appear from the following description and the accompanying drawings.

In the drawings:

FIGURE 1 is a sectional side elevation view of the re-

frigerated fixture employing the improvement of this invention.

FIGURE 2 is a fragmentary sectional elevation view from inside of the fixture taken substantially on the line 2—2 as shown in FIGURE 1.

Referring now to the drawings, the refrigerated fixture, generally designated 10, includes an open front upright case, generally designated 11, and a refrigerated storage chamber 12. The storage chamber 12 is similar to a conventional walk-in refrigerated box in that it is provided with insulated walls 13, an insulated ceiling 14, and an insulated door 15. The door 15 permits access to the chamber 12 from outside of the fixture 10.

Conventional means are provided for cooling the refrigerated fixture 10 and, as diagrammatically shown in FIGURE 1, these means may include a compressor 16, condenser 17, receiver 18, and evaporator coil 19. The compressor 16 compresses a gaseous refrigerant and delivers same through conduit 20 to condenser 17 where the refrigerant is condensed to a liquid and delivered through conduit 21 to receiver 18. The liquid refrigerant passes from receiver 18 through conduit 22 to evaporator coil 19 where the refrigerant is evaporated to cool the coil 19 and thereby cool any air passing over the coil. The evaporated refrigerant returns through conduit 23 to the suction side of compressor 16. A blower 24 is provided and driven by a motor 25 for drawing air from the storage chamber 12 through a filter 26 and over the evaporator coil 19 to cool the air.

The upright type open front display case 11 may be basically of any conventional design which employs the circulation of cold air therethrough to accomplish the cooling of the case and the displayed products. The cooling of the upright case 11 may be accomplished through the utilization of a cold air curtain wherein air at the desired temperature is forced under pressure to flow between the openings 31 and 37.

The display case 11 may also be maintained at the desired temperature as follows: after the air is drawn over the evaporator coil 19 to cool the air, the blower 24 discharges the cooled air through duct 27 into a plenum 28 associated with the display or through individual ducts (not shown) to desired portions of the display case. The plenum 28 may be an integral part of the fixture 10 or a separate component and preferably extend substantially the length of the refrigerated fixture 10 so that the cooled air is discharged downwardly from the plenum through the openings 29 into a distribution duct 30 of the display case 11. As is conventional, the cold air is discharged from duct 30 downwardly through apertures 31 in the upper portion of display case 11 and also downwardly through a plurality of laterally spaced vertical ducts 32. The cold air flowing downwardly in ducts 32 is discharged outwardly through the shelves 33 of the display case as represented by arrows 34. The cold air which has circulated outwardly through the shelves 33 and downwardly from apertures 31 is then drawn through separate portions of the shelves 33 into a second plurality of vertical ducts 35 and downwardly in ducts 35 to a lateral duct 36 in the lower portion of display case 11. Vertical ducts 32 and 35 may be provided adjacent one another or, as shown in the drawings, the ducts may be alternately spaced throughout the lateral length of the display case. Apertures 37 may also be provided in the upper wall of duct 36 for maintaining the downward flow of cold air for the entire height of the display case 11. The air drawn into duct 36 is then drawn through openings 38 into the storage chamber 12. A reduced air pressure within chamber 12 is needed to create the downward flow of air in ducts 35 and into duct 36, and then from duct 36 into chamber 12 through openings 38; and this reduced air pressure is created by blower 24 as the blower draws air from

the storage chamber 12 as heretofore described. Adjustable grills 39 may be provided in plenum 28, as shown, or in duct 27 (not shown) or other ducts (not shown) for permitting some of the cold air discharged from blower 24 to pass directly into storage chamber 12, before passing through the display case, for maintaining the proper temperature in chamber 12. Thus, it may be seen that the entire air circulation needed for cooling both the display case 11 and the storage chamber 12 is accomplished by blower 24.

Access doors 40 may be provided in the back wall of the display case 11 for permitting employees to load and unload shelves 33 of the display case from the storage chamber 12. In order for the blower 24 to maintain the desired air circulation as heretofore described, and to minimize the exchange of air between the inside of and the outside of storage chamber 12, the door 15 and access doors 40 are generally provided with sealing gaskets and are relatively air tight when closed. Thus, it may be seen that the normal path of air circulation created by blower 24 and the relative air pressures within the various ducts and chambers of the fixture 10 is substantially unaffected by doors 15 and 40 when all of such doors are closed.

Means are provided for interrupting the circulation of air by blower 24 when an access door 15 or 40 is opened and, as shown in the drawings, these means may include an electrical switch 41 associated with each of the access doors 40 and 15 and a relay switch 42. Each of the switches 41 is provided with a plunger 43 for actuating the switch and each plunger is adapted to engage a cam bar 44 mounted on the respective door 40 or 15. The switches 41 are wired together in series so that when all of the doors 40 and 15 are closed, all of the switches 41 will also be closed to thereby actuate the relay switch 42. The motor 25 serving to operate blower 24 may be turned on or off as desired, but is also controlled by relay switch 42 in a manner whereby motor 25 is stopped whenever a switch 41 is opened by the opening of a door 40 or 15. Thus, it may be seen that if a door 15 or 40 is opened, the operation of blower 24 is interrupted by turning off motor 25 so that blower 24 does not draw in warm air or discharge cold air through such open access door. With blower 24 turned off, the increased or reduced air pressures in various portions of the fixture are quickly equalized thereby minimizing any exchange of air between inside and outside the fixture due to pressure differentials. Therefore by this invention the efficiency of operation of refrigerated fixtures having a storage chamber and an open front display case are improved through the elimination of affirmative transfer of air between the exterior of the fixture and the interior of the fixture.

Having fully described my invention it is to be understood that I do not wish to be limited to the details herein set forth or to the details illustrated, but my invention is of the full scope of the appended claims.

I claim:

1. In a refrigerated fixture having a refrigerated storage chamber and a refrigerated open front display case with refrigeration means having air circulating means and with access doors into said storage chamber and between said storage chamber and said display case, an improvement comprising: control means associated with each of the access doors and with the air circulating means, said control means operative for interrupting the operation of the air circulating means upon the opening of an access door so that air is not drawn from outside the fixture or cooled air discharged to outside the fixture by said air circulating means.

2. A refrigerated fixture having a refrigerated storage chamber and a refrigerated open front display case, refrigeration means having air circulating means, access doors into said storage chamber and between said storage

chamber and said display case, and control means associated with each said access door and with the said air circulating means, said control means operative for interrupting the operation of said air circulating means upon the opening of an access door so that air is not drawn from outside the fixture or cooled air discharged to outside the fixture by said air circulating means.

3. A refrigerated fixture having a refrigerated storage chamber and a refrigerated open front display case; refrigeration means having air circulating means for drawing air from said storage chamber, cooling that air, passing that air through said display case and then discharging that air into said storage chamber; access doors into said storage chamber and between said storage chamber and said display case, each said access door having means for maintaining a relatively air tight seal when that door is closed; and control means associated with each said access door and with the said air circulating means for interrupting the operation of said air circulating means upon the opening of an access door so that air is not drawn from outside the fixture or cooled air discharged to outside the fixture by said air circulating means.

4. A refrigerated fixture having a refrigerated storage chamber and a refrigerated open front display case; refrigeration means having air circulating means for drawing air from said storage chamber, cooling that air, passing that air through said display case and then discharging that air into said storage chamber; access doors into said storage chamber and between said storage chamber and said display case, each said access door having means for maintaining a relatively air tight seal when that door is closed; switch means associated with each said access door; and second switch means associated with said air circulating means and responsive to the first mentioned switch means for interrupting the operation of said air circulating means upon the opening of an access door so that air is not drawn from outside the fixture or cooled air discharged to outside the fixture by said air circulating means.

5. A refrigerated fixture having a refrigerated storage chamber and a refrigerated open front display case; refrigeration means having air circulating means for drawing air from said storage chamber, cooling that air, passing that air through said display case and then discharging that air into said storage chamber for causing a closed half of continuous air circulation through said storage chamber and display case with said circulating air continuously exposed to the atmosphere through the open front of said display case; an access door from the atmosphere into said storage chamber, other access doors between said storage chamber and said display case for open communication between the storage chamber and the display case, and each said access door having means for maintaining a relatively air-tight seal when the door is closed; a switch means associated with each said access door and such plural switch means connected in series; and separate switch means associated with said air circulating means and responsive to the first mentioned switch means for interrupting the operation of said air circulating means upon the opening of any one of said access doors, the opening of any one access door functioning to modify said closed path of continuous air circulation and the interruption of the operation of said air circulating means preventing the circulating air from assuming such modified closed path of continuous air circulation.

References Cited in the file of this patent

UNITED STATES PATENTS

2,133,818	Hulse	Oct. 18, 1938
3,063,255	Fanick	Nov. 13, 1962