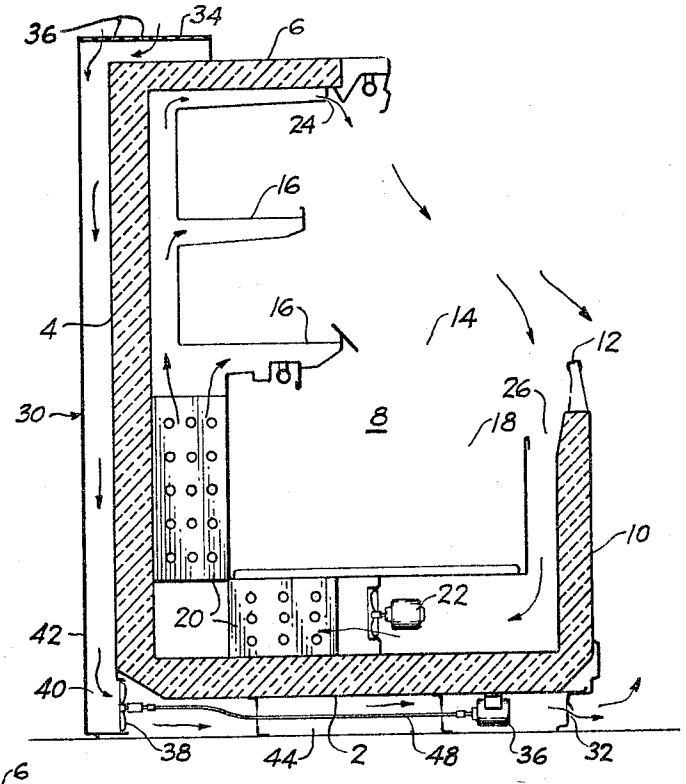
Aug. 2, 1966 J. HENRY 3,263,745

OPEN-FRONT REFRIGERATED DISPLAY CASE

Filed June 13, 1963 2 Sheets-Sheet 1

FIG. 1



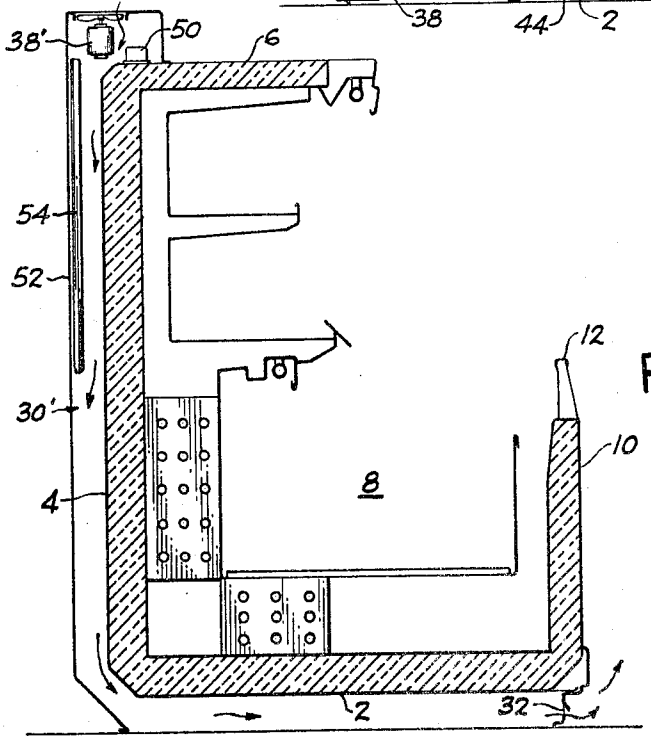


FIG. 2

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OPEN-FRONT REFRIGERATED DISPLAY CASE

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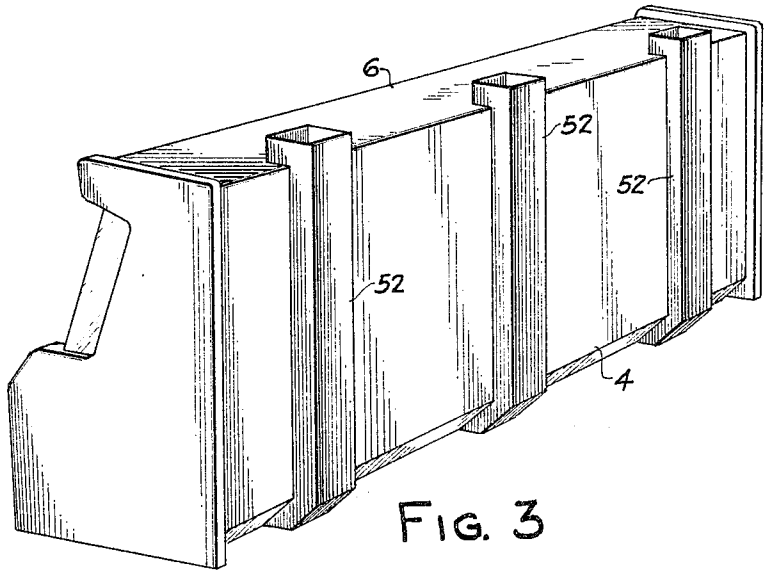


FIG. 3

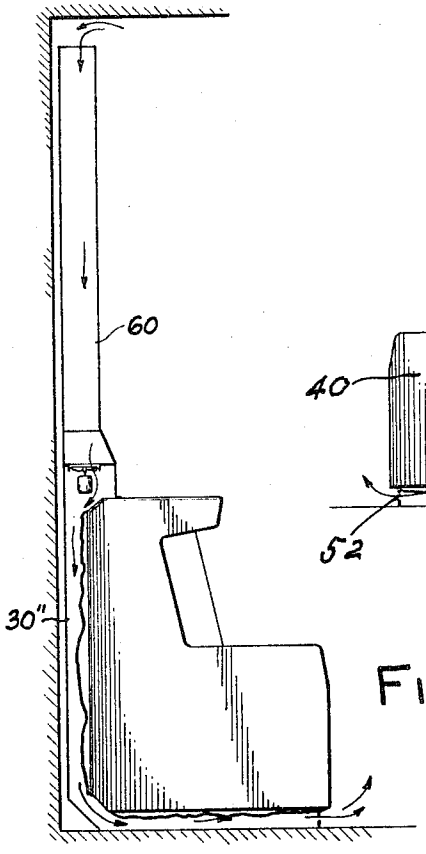


FIG. 4

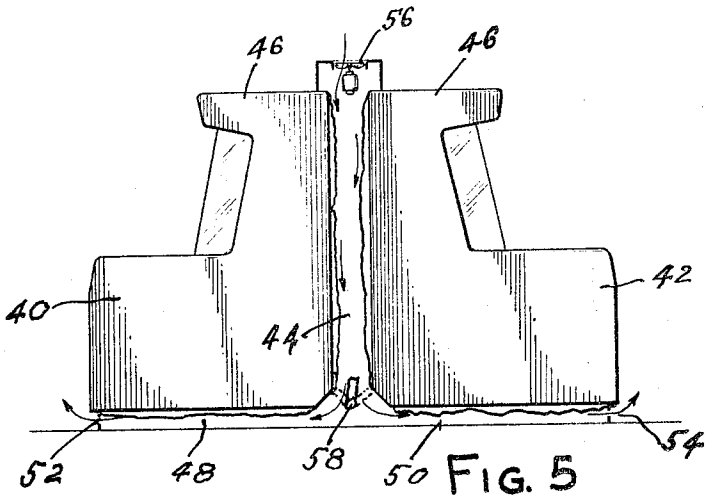


FIG. 5

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3,263,745

OPEN-FRONT REFRIGERATED DISPLAY CASE

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Filed June 13, 1963, Ser. No. 287,655
4 Claims. (Cl. 165—48)

This invention relates to self-service refrigerated display cases having a forwardly opening access opening, and is directed particularly to constructions which serve to raise the temperature of air in the space adjacent and in front of the access opening of the case so as to counteract the effect of cold refrigerated air which may spill out of the access opening.

Open-front self-service display cases are widely used, but refrigerated air frequently spills out of the front of such cases chilling the spaces in front of the case so that children, women wearing light dresses or shorts, and others often find it uncomfortable to stand in front of the case.

In accordance with the present invention, open-front self-service refrigerated display cases are provided with means for overcoming this objection and, for this purpose, are provided with means for discharging relatively warm air into the space in front of the display case. For reasons of economy, it is desirable to utilize waste heat from light ballasts or other heat-producing elements associated with the display case or warm air from other areas for raising the temperature of the air in front of the display case. However, electrical heating elements or other means may be employed for this purpose, and they may be used by themselves or in combination with waste heat sources.

Accordingly, the principal objects of the present invention are to overcome the effect of the spillage of refrigerated air from the front of a refrigerated display case, to increase the temperature of the air in the space in front of a display case having a forwardly facing access opening, and to utilize waste heat produced or present in or about a display case to raise the temperature of the air in front of the case.

These and other objects and features of the present invention will appear from the following description thereof wherein reference is made to the figures of the accompanying drawings.

In the drawings:

FIG. 1 is a vertical sectional view through a typical form of refrigerated display case embodying the present invention;

FIG. 2 is a vertical sectional view through an alternative form of refrigerated display case embodying the present invention;

FIG. 3 is a rear perspective view of the construction shown in FIG. 2;

FIG. 4 is a diagrammatic illustration of a further alternative embodiment of the invention; and

FIG. 5 is a diagrammatic illustration of another alternative embodiment of the present invention.

In that form of the invention chosen for purposes of illustration in FIG. 1, the display case has a base **2**, a vertical rear wall **4** and a top **6** which projects forward from the rear wall above the display space **8** within the case. A lower front wall **10** extends upward from the base **2** and has an upper edge **12** spaced a substantial distance from the top **6**. In this way, a front access opening **14** is provided through which customers may reach to remove refrigerated articles from shelves **16** within the display space or from the lower portion **18** of the display at the rear of the lower front wall **10**.

The display case may be provided with refrigerating means of any suitable or preferred type represented generally at **20** for establishing and maintaining a desired

low temperature within the display space **8**. Such display cases generally are provided with a blower **22** which serves to cause the refrigerated air to be circulated through the display space and over articles on the shelves **16** and frequently are constructed to establish an air curtain flowing downward from an outlet opening **24** near the front of the top **6** of the case across the front access opening **14** to a return air duct as shown at **26**.

The action of such an air curtain, when used, in flowing downward across the access opening **14**, and the downward flow of air adjacent the front edges of the shelves **16** tends to cause some of the refrigerated air to spill over the upper edge **12** of the lower front wall **10** of the case and into the space in front of the case. In order to offset or counteract the resulting lowering in temperature of the air in the space in front of the case, the present invention provides warm air duct means **30** which are located on the exterior of the insulated walls and base of the display case and are arranged to discharge warm air toward the front of the case through suitably located outlet openings such as those indicated at **32** and formed in the kick-plate below the lower edge of the front wall **10**. The warm air thus discharged flows into the space or aisle in front of the display case and raises the temperature of the air in said space so as to render it comfortable for persons to stand in front of the case to make a careful selection of the articles therein.

As shown in FIG. 1, the warm air duct means **30** includes an upper inlet portion **34** extending parallel to the insulated top **6** of the display case and provided with a plurality of intake openings **36** through which relatively warm air from above the display case is drawn. The air is drawn into the inlet portion **34** by a blower **38** located in the space **40** at the lower end of a rear vertical duct portion **42** and is discharged forwardly through the duct portion **44** beneath the base **2** of the case to the outlet openings **32** at the front of the case.

If desired, as shown in FIG. 1, the motor **46** for driving the blower **38** may be located directly adjacent the discharge openings **32** and connected to the blower **38** by a flexible drive shaft **48**. In this way, any heat developed upon operation of the motor **46** will aid in raising the temperature of the air discharged into the aisle in front of the case. Further, if desired, other sources of heat may be used to raise the temperature.

As shown in FIG. 2, the ballast box **50** associated with the lights and other electrical elements employed in the operation of the display case may be located adjacent or within the upper end of a vertical portion **52** of warm air duct means **30'**. Such a ballast box becomes heated during operation of the display case and the blower **38'** which forces air through the warm air duct means can be located adjacent the ballast box so as to direct air over the ballast box and through the warm air duct means to outlet openings **32'** adjacent the front of the display case. Further, as shown in FIG. 2, an electrical heating element **54** or other suitable heating means may be located in the vertical portion **52** or elsewhere in the warm air duct means **30'** to supply additional heat to the air discharged into the aisle or space in front of the display case. Moreover, as shown in FIG. 3, the warm air duct means may embody a plurality of longitudinally spaced vertical duct portions **52** and each such duct means may be provided with its own blower so as to assure the distribution of warm air flowing outward adjacent the front of the case throughout the length of the case.

In the further embodiment of the invention illustrated diagrammatically in FIG. 4, the vertical portion **60** of the warm air duct means **30''** can be extended upward above the display case adjacent a wall or elsewhere so that the air entering the upper end of the vertical portion of the duct means will be drawn from a point adjacent the ceil-

ing where the temperature of the air is normally relatively high.

In the construction shown in FIG. 5, the invention is employed in combination with two display cases **40** and **42** which are positioned back to back. A common warm air duct means is employed with a vertical portion **44** extending downward between the cases from a point adjacent the tops **46** of the cases to lower oppositely directed horizontal portions **48** and **50**. The horizontal portions of the warm air duct are provided with outlet openings **52** and **54** adjacent the fronts of the respective cases. A blower **56** serves to force relatively warm air from above the case downward through the vertical portion **44** and means such as a damper **58** may be employed for controlling the amount of air discharged through either horizontal portion **48** or **50**.

In this way, a single warm air duct means may be employed with two display cases. Moreover, one case may be operated at a lower temperature or in a different manner and yet the aisle temperatures in front of both cases can be suitably modified to overcome excessive spillage of cold air thereinto.

In each of the forms of the invention shown and described, the air entering the warm air duct means is drawn from a point exterior to the display case and is unrefrigerated so that but little additional heat need be added thereto in order to effect the desired increase in temperature of the air in the space or aisle in front of the display case. It is, of course, possible to locate the outlet openings **32**, **32'** and **32''** at any suitable point or points adjacent the front of the display case. Nevertheless, such outlets are preferably positioned in or adjacent the lower front wall **10** of the case and serve to direct warm air in a direction which will serve to counteract the effect of any cold or refrigerated air which may spill over the upper edge **12** of the lower front wall **10** of the display case or flow outward from the front access opening **14** of the case.

It will, thus, be apparent that numerous changes in the form, construction and location of the warm air duct means may be made, and the warm air, waste heat or added heat utilized in raising the temperature of the air may be derived from any suitable or preferred source. In view thereof, it should be understood that the particular embodiments of the invention shown in the drawings and described above are intended to be illustrative only and are not intended to limit the scope of the invention.

I claim:

1. In a refrigerated display case having a display space therein, said case having an insulated base, an insulated rear wall, a top, a lower front wall having the upper edge thereof spaced from said top and cooperating with said top to define a normally open access opening in the front of said display case, and, means for refrigerating and circulating air within said display space, the combination of means for overcoming the effect of any spillage of refrigerated air from said access opening into the area in front of said case, comprising, duct means for non-refrigerated air extending adjacent but on the exterior of said rear wall and base of the display case, said duct means having an inlet opening located adjacent the top of the case and an outlet opening located in front of the case beneath the upper edge of said lower front wall of the case, and means for circulating air at a temperature above the temperature of the air circulated through the display space through said duct means and into the area in front of the display case.

2. In a refrigerated display case having a display space therein, said case having an insulated base, an insulated rear wall, a top, a lower front wall having the upper edge thereof spaced from said top and cooperating with said top to define a normally open access opening in the front of said display case, and means for refrigerating and circulating air within said display space, the combination of means for overcoming the effect of any spillage of refrigerated air from said access opening into the area in front of said case, comprising duct means for non-refrigerated air extending adjacent but on the exterior of said rear wall and base of the display case, said duct means having an inlet opening located adjacent the top of the case and an outlet opening located in front of the case beneath the upper edge of said lower front wall of the case, means for circulating air through said duct means to the area in front of said display case, and means for heating the air circulated through said duct means.

3. In combination with two open front self service refrigerated display cases arranged in back to back relation, means for overcoming the effect of any spillage of refrigerated air from the open fronts of said display cases into the area adjacent thereto, comprising duct means for non-refrigerated air having a portion extending vertically between said cases and having horizontally extending portions communicating with said vertical portion and terminating in outlet openings adjacent the fronts of said cases, and means for circulating non-refrigerated air through said duct means.

4. The combination as set forth in claim **3** wherein means are provided for controlling the amount of air flowing from said vertical portion to the horizontal portions of said duct means.

References Cited by the Examiner

UNITED STATES PATENTS

1,781,536	11/1930	Brown	62—455
2,246,999	6/1941	Morrison	62—454 X
2,706,387	4/1955	Swanson	62—255 X
2,855,760	10/1958	Simons	62—256 X
2,862,369	12/1958	Simons	98—36 X
3,025,681	3/1962	Booth	62—265 X
3,082,612	3/1963	Beckwith	62—256 X

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