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REFRIGERATED DISPLAY CASE

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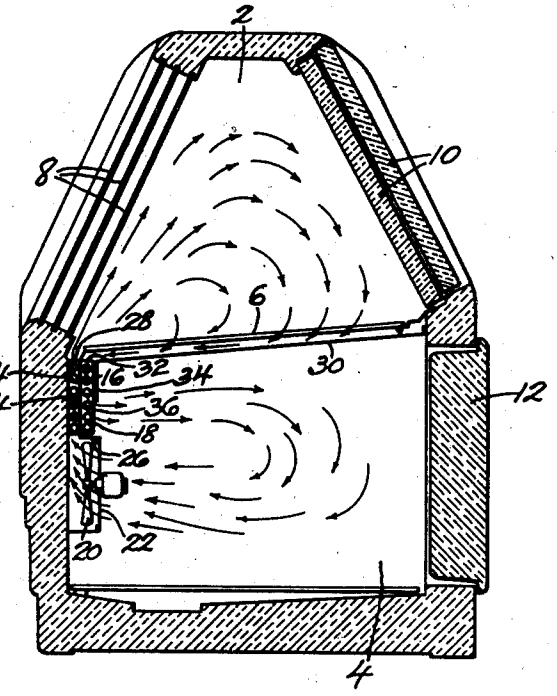


Fig. 1.

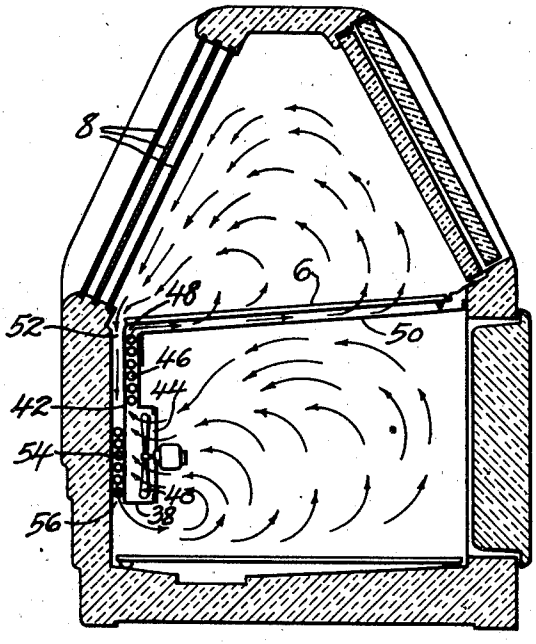


Fig. 2.

INVENTOR.
MALCOLM D. MacMASTER
BY
Albert Sperry
ATTORNEY

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REFRIGERATED DISPLAY CASE

Malcolm D. MacMaster, Woodside, Pa., assignor to C. V. Hill & Company, Inc., Trenton, N. J., a corporation of New Jersey

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My invention relates to refrigerated display cases which embody an upper display chamber and a lower storage chamber, and particularly to constructions in which the air within said case is cooled and circulated through the display and storage chambers.

Many types of display cases have been designed heretofore in which the air is cooled and positively circulated through storage and display chambers. However, constructions of this character have not always been satisfactory because of the difficulties encountered in cooling each chamber to the desired temperature. These difficulties have been due primarily to the fact that when the air is passed over a single cooling coil and then successively through both chambers, the air entering the second chamber has its temperatures raised by the heat absorbed in the first chamber. On the other hand those constructions in which more than one coil is used have been complicated and expensive to construct and the coils have occupied much of the space which is needed for storage or display of the articles being cooled.

In accordance with the present invention these objections to construction of the prior art are overcome by the use of two cooling coils, one of which is associated with each chamber, and by providing means for directing air over one of these coils into one chamber and over the other coil into the other chamber.

One of the objects of my invention is to provide a refrigerated display case with a novel type of air circulating system.

Another object of my invention is to insure the desired control and circulation of air used in cooling the display and storage chambers of a display case.

A further object of my invention is to provide simple, economical air cooling and circulating means for display cases wherein the parts may be readily kept in a clean, sanitary condition.

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

In the drawings:

Fig. 1 is a vertical sectional view through a preferred type of refrigerated display case embodying my invention, and

Fig. 2 is a similar view illustrating a modified form of my invention.

In each of the forms of my invention illustrated, air which has been cooled by passage over one refrigerating coil is delivered into the display

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chamber whereas air cooled by passage over another refrigerating coil is delivered into the storage chamber. In each construction a single air circulating means receiving air from the storage chamber serves to cause air to flow over each coil and thence into the chamber with which that coil is associated. Although a single air current is caused to flow successively through both chambers the temperature of the air in each chamber may be controlled so as to maintain the desired temperature therein.

The display cases shown in the figures of the drawings are typical of those in which my invention may be embodied. Each case is provided with an upper display chamber 2 and a lower storage chamber 4. The display chamber is separated from the storage chamber by suitable article supporting means having air passages therethrough, such as the spaced slats or racks 6 upon which platters or other receptacles may be located to receive the articles to be cooled while on display. The front of the case is provided with conventional multiple glass panes 8 through which articles in the display chamber may be viewed, while the rear of the case is provided with sliding doors 10 for access to the upper display chamber and pivotally mounted doors 12 to provide access to the lower storage chamber.

In that form of my invention shown in Fig. 1 of the drawing, cooling coils 14 and 16 are located in a housing 18 and above a blower 20 mounted in the air inlet 22 of the housing. The housing 18 is provided with a baffle member 24 which extends vertically between the coils 14 and 16 and is turned rearwardly at 26 to provide a path for the flow of air from the blower to the coil 14 and through the housing to the upper air outlet 28 which communicates directly with the display chamber.

A horizontal baffle member 30 extends generally parallel with the rack 6 from the rear of the case to the housing 18 and thus serves to direct air from the display chamber back to the housing 18. The latter current of air enters the secondary inlet 32 in the housing and flows downwardly over the coil 16 between the vertical baffle member 24 and the rear wall 34 of the housing to the air outlet 36 from which the air flows into the storage chamber.

With this construction a single current of air is caused to flow over the coil 14 and into the display chamber and then is caused to flow over the coil 16 into the storage chamber. At the same time the construction and arrangement of the coils and blower are such that they are enclosed or

carried by the housing 18 and occupy a very limited space near the front of the storage chamber so that they will not materially limit the space available for the storage of goods in the case. Furthermore, the construction shown in Fig. 1 provides for the desired control in temperature of the air circulated through the display and storage chambers. One further feature of this construction resides in the circulation of all of the air over both coils whereby the velocity of flow of the air over the coils themselves may be relatively high and the efficiency of heat transfer therefore is increased, whereas the actual volume of air circulated and its velocity of flow through the storage and display chambers will not be objectionably high or such that drying out of the articles in the case will occur.

That form of my invention illustrated in Fig. 2 is generally similar to the construction of Fig. 1 in that all of the air is circulated successively through both the display and storage chambers of the case. However, as shown the direction of flow of the air in each chamber is reversed from that of Fig. 1 so that it circulates from the rear toward the front of the display chamber and enters the storage chamber near the lower portion thereof.

For this purpose the housing 38 is provided with a blower 40 and is divided interiorly by the vertical baffle 42 so that air entering the housing through the air inlet 44 will flow upward over the coil 46 and then be directed from the rearwardly facing upper outlet 48 in the housing into the space between the horizontal baffle 50 and the racks 6 so as to pass into the display chamber near the rear portion thereof. This air will flow upward and forward in the display chamber and thence downward adjacent the multiple glass panes 8 into the secondary air inlet 52 in the housing 38. The air then flows over the coil 54 so as to be cooled thereby and issues from the lower air outlet 56 of the housing and circulates through the storage chamber. This construction, like that of Fig. 1 serves to cause a single air current to be produced and passed through the housing and over a coil associated with the display chamber and thence over a coil associated with the storage chamber returning to a single air inlet which receives air from the storage chamber. The high efficiency of heat exchange due to rapid flow of the air over the coils themselves is thus assured without materially increasing or varying the rate of flow of air through the chambers of the case and over the articles therein.

In each of the forms of my invention described above, the temperature of the coils may be independently regulated to insure the desired temperature of the air circulated through each chamber. Furthermore, the construction is such that the blower and coils are compactly arranged and carried by a housing which occupies a very limited space so that they may be located adjacent one wall of the case and preferably the front wall of the storage chamber and thereby may be constructed and installed as a unit and positioned in such a way that they do not appreciably reduce the available capacity of the case. Numerous other coil arrangements and forms of housing and baffle members besides those here disclosed will occur to those familiar with this art, and in view thereof the particular embodiments of my invention chosen for purposes of illustration should be understood to be illustrative only and are not intended to limit the scope of my invention.

I claim:

1. In a refrigerated display case having an upper display chamber and a lower storage chamber, means for cooling and circulating air through both of said chambers, comprising a refrigerating coil associated with the display chamber, another refrigerating coil associated with the storage chamber, and means for forcing air over one of said coils and into the chamber with which that coil is associated and thence over the other coil and then into the chamber with which the other coil is associated.

2. In a refrigerated display case having an upper display chamber and a lower storage chamber, means for cooling and circulating air through both of said chambers, comprising a refrigerating coil associated with the display chamber, another refrigerating coil associated with the storage chamber, said coils both being located in the front of said storage chamber, a blower, and means for directing air from said blower over one of said coils and into the chamber with which that coil is associated and thence over the other coil and then into the chamber with which said other coil is associated.

3. In a refrigerated display case having an upper display chamber and a lower storage chamber, means for cooling and circulating air through both of said chambers, comprising a refrigerating coil associated with the display chamber, another refrigerating coil associated with the storage chamber, a single housing for both of said coils located in said storage chamber, a blower located adjacent said coils, and baffle means arranged to direct a portion of the air from said blower over one coil and into the chamber with which that coil is associated, and thence over the other coil and then into the other chamber.

4. In a refrigerated display case having an upper display chamber and a lower storage chamber, means for cooling and circulating air through both of said chambers, comprising a refrigerating coil associated with the display chamber, another refrigerating coil associated with the storage chamber, a housing for both of said coils located in the front of said storage chamber, a blower located adjacent said coils and supported by said housing, and baffle means arranged to direct the air from said blower over one coil and into the chamber with which that coil is associated and thence over the other coil and then into the other chamber.

5. In a refrigerated display case having an upper display chamber and a lower storage chamber, means for cooling air and for directing the same through each of said chambers, comprising two refrigerating coils, a blower, and means for directing air from said blower over one coil and thence into one chamber, and means for directing air thus circulated from the latter chamber over the other coil and thence into the other chamber.

6. In a refrigerated display case having an upper display chamber and a blower storage chamber, means for cooling air and for directing the same through each of said chambers, comprising two refrigerating coils, a blower located in the storage chamber, means for directing air from the blower over one coil into the display chamber, and means for directing air thus circulated from the display chamber over the other coil and thence into the storage chamber.

7. In a refrigerated display case having an upper display chamber and a lower storage chamber, means for cooling air and for directing the same through each of said chambers, comprising

two refrigerating coils located in the storage chamber adjacent the front wall thereof, a housing for said coils, a baffle member located between said coils and dividing said housing into two portions, a blower carried by said housing and communicating on the intake side thereof with the storage chamber, and means for directing air from the blower through one of said portions of said housing and over one coil into the display chamber and thence through the other portion of the housing and over the other coil into the storage chamber.

8. In a refrigerated display case having an upper display chamber and a lower storage chamber, a housing located in the front of the storage chamber and having two air inlets and two air outlets, one air inlet communicating with the storage chamber and with an outlet communicating with the display chamber, the other air inlet communicating with the display chamber and with an outlet communicating with the storage chamber, cooling coils within said housing, and means for forcing air through said inlets and outlets.

9. In a refrigerating display case having an upper display chamber and a lower storage chamber, a housing located in the front of said storage chamber and having means therein dividing the chamber into two portions one of which has an air inlet communicating with said storage chamber and an air outlet communicating with said display chamber, the other portion of said housing having an air inlet communicating with the display chamber and an air outlet communicating with said storage chamber, a refrigerating coil located in each of said portions of said housing between the air inlet and air outlet thereof and a blower for forcing air through said housing.

10. In a refrigerated display case having an upper display chamber and a lower storage chamber, a housing in the storage chamber having an air inlet communicating with said storage chamber, an air outlet from said housing communicating with said display chamber, means forming a passage for directing air from the display chamber through said housing and into the storage chamber, refrigerating means located between said air inlet and air outlet, and a blower for forcing air from the storage chamber into said housing and over said refrigerating means and thence through said air outlet and passage back to the storage chamber.

11. In a refrigerating display case having an upper display chamber and a lower storage chamber, a housing in the storage chamber having an air inlet communicating with said storage chamber, an air outlet from said housing communicating with said display chamber, means forming a passage for directing air from the display chamber into the storage chamber, a refrigerating coil located between said air inlet and air outlet, a refrigerating coil located in said passage between the display chamber and the storage chamber and a blower for forcing air from the storage chamber into said housing and over said refrigerating coil through the air outlet into the display chamber, and from there through said passage and over the coil therein back into the storage chamber.

MALCOLM D. MacMASTER.

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The following references are of record in the file of this patent:

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