Nov. 29, 1960 T. E. KENNEDY 2,961,845

REFRIGERATED GOODS CASE

Filed Aug. 27, 1959 2 Sheets-Sheet 1

Fig. 2.

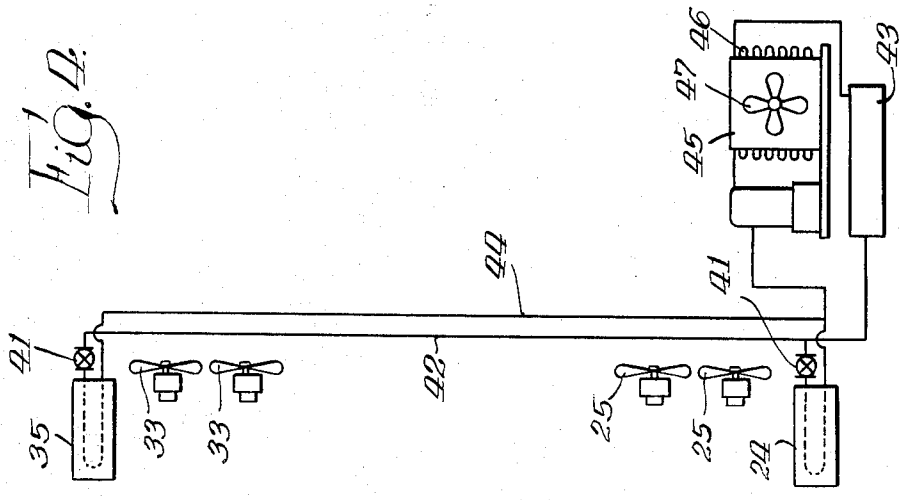
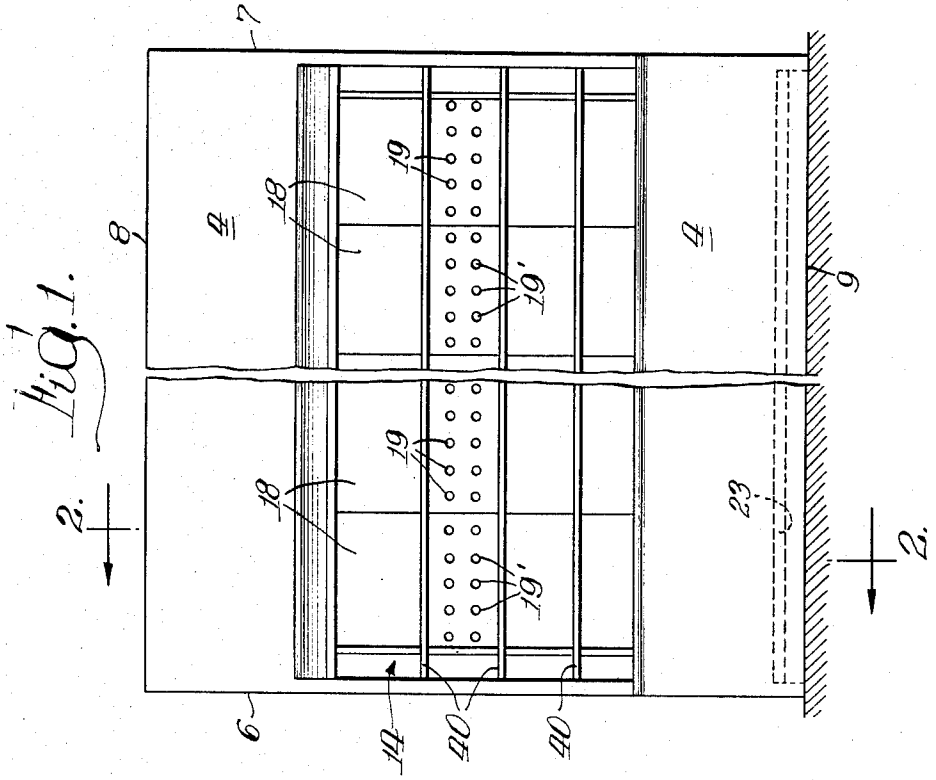



Fig. 1.




INVENTOR.
Thomas E. Kennedy,
BY Brown, Jackson
Boettcher & Dennis
Atty's.

Nov. 29, 1960 T. E. KENNEDY 2,961,845

REFRIGERATED GOODS CASE

Filed Aug. 27, 1959 2 Sheets-Sheet 2

Fig. 3.

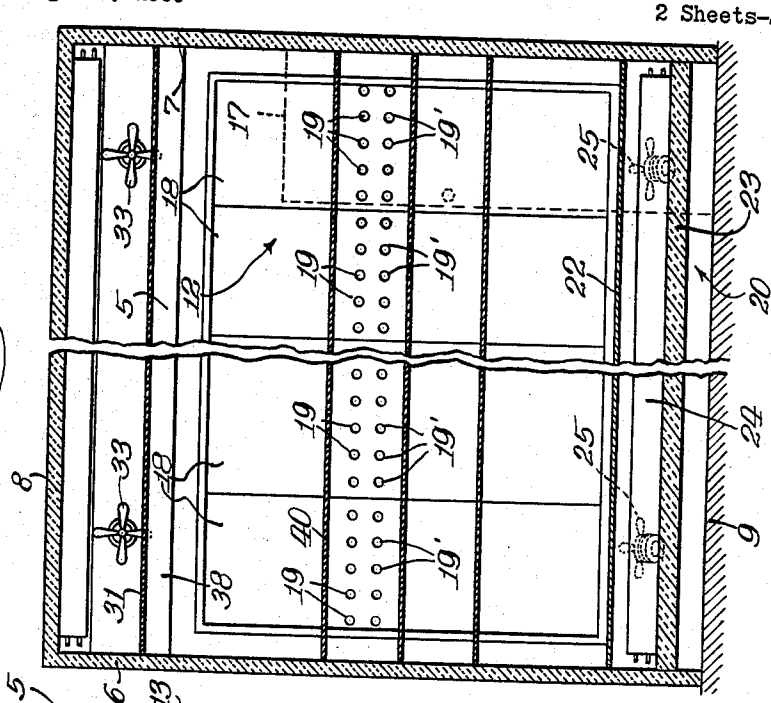
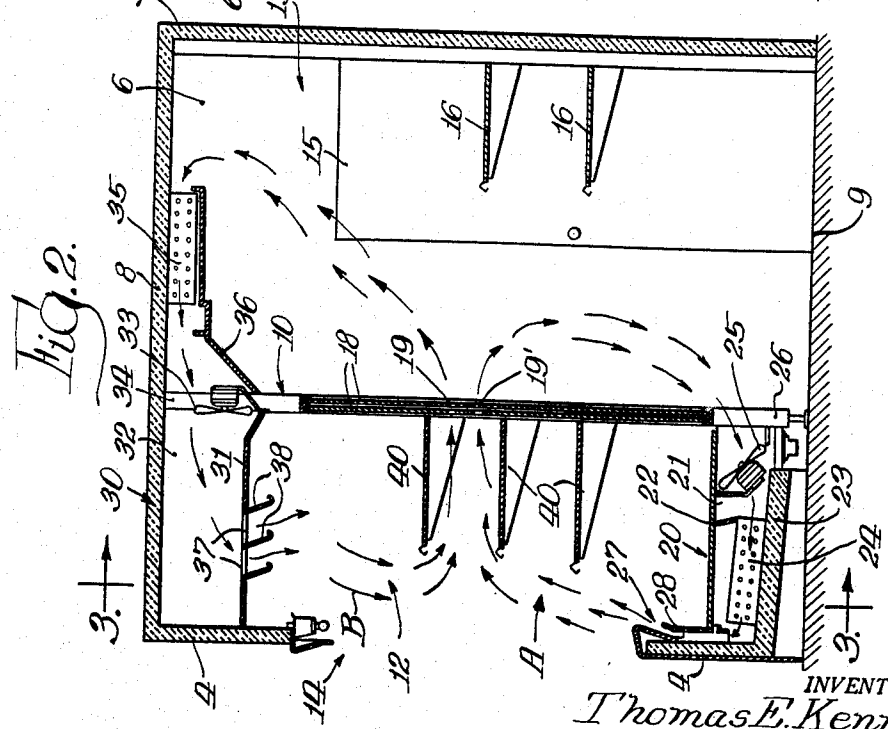


Fig. 2.



INVENTOR.
Thomas E. Kennedy
BY Brumm, Jackson
Brutsche & Skinner
Attys.

United States Patent Office 2,961,845 Patented Nov. 29, 1960



2,961,845

# REFRIGERATED GOODS CASE

Thomas E. Kennedy, Niles, Mich., assignor to Tyler Refrigeration Corporation, Niles, Mich., a corporation of Michigan

Filed Aug. 27, 1959, Ser. No. 836,454

6 Claims. (Cl. 62—256)

My invention relates to a refrigerated goods case of the class customarily used in self-service stores for the merchandising of commodities maintained under refrigeration.

In refrigerated commodity cases to which my present invention pertains, it is known to provide a display and dispensing area and an adjoining storage area. Access is had by a customer to goods supported on the goods supporting members in the display and dispensing areas through an access opening in the front wall of the case, and across which access opening refrigerated air is continuously caused to flow to form what may be termed an air barrier to prevent undue warming of the air in the case by the outside surrounding air. Cases of the class noted further include partition means for separating the dispensing and display area from the storage area, and such partition means include suitable opening means, closable by doors or otherwise as desired, affording access to the plurality of goods supporting members of the display and dispensing area to replenish goods thereon from the storage area. The arrangement thus affords for the convenient storage of goods, and the shelves or goods supporting members of the display and dispensing area may be replenished from the stock of goods in the storage area as the goods are removed from the display and dispensing area by the customers.

It is an object of my invention to provide a refrigerated case of the class above noted having means for circulating refrigerated air in circuitous paths between the display and dispensing area and the storage area, and through the partition means separating the display and dispensing area from the storage area, in which one path traverses the lower portion, and a second path traverses the upper portion, respectively, of the opening affording customer access to the display and dispensing area.

A further object is to provide a refrigerated case as last noted, in which separate air impeller means are provided for each of the circuitous air paths.

A further object is to provide a case as above related including upper and lower head assemblies with which the air impeller means are associated, and, additionally air refrigerating means for each of the head assemblies to cool the air in the circuitous paths traversing the opening affording customer access to the display and dispensing area.

A further object is to provide a case of the class indicated having a plurality of goods supporting members, or shelves, arranged in superposed vertical spaced relation within the display and dispensing area between the upper and lower edges of the access opening, with the rear edges of such goods supporting members or shelves disposed adjacent the partition means, and in which air return opening means for the aforementioned circuitous paths of air are located in the partition means.

The above and other objects and advantages of my



invention will appear from the following detail description of a preferred embodiment of my invention.

Now in order to acquaint those skilled in the art with the manner of constructing and utilizing a refrigerated case in accordance with the principles of my present invention, I shall describe, in connection with the accompanying drawings, a preferred embodiment of my invention.

In the drawings:

Figure 1 is a front elevational view of a case constructed in accordance with the principles of my invention, with the case being broken away lengthwise to indicate that it may be of any lengthwise extent desired;

Figure 2 is a transverse vertical cross-sectional view taken along the line 2—2 on Figure 1, and looking in a direction indicated by the arrows;

Figure 3 is a longitudinal vertical cross-sectional view of the case shown in Figure 1, with the view being taken along the line 3—3 on Figure 2, and looking in a direction indicated by the arrows; and

Figure 4 is a diagrammatic illustration of a suitable refrigeration circuit embodying the case shown in Figures 1 through 3.

Referring now to the drawings, I have shown my invention embodied in a refrigerated case comprising, front and rear walls 4 and 5, respectively, side or end walls 6 and 7, respectively, a top wall 8, and a floor 9. The several walls of the illustrated case of my invention are largely diagrammatically shown in that they may be constructed in accordance with conventional practices presently followed in building refrigerated cases or cabinets, and the front wall and other of the walls may be provided with decorative sheet panel members or the like as may be desired.

The refrigerated case of my invention further comprises a longitudinally extending partition means or wall member 10, which extends parallel with and intermediate the front and rear walls 4 and 5 of the case to divide the latter into what may be termed a display and dispensing area, indicated generally at 12, and a refrigerated storage area indicated generally at 13. As will be observed, in Figures 1 and 2, the front wall 4 is provided with an access opening 14 through which customers may reach into the display and dispensing area 12. As previously indicated, the refrigerated case may be of any desired length and the access opening 14 preferably should be of a convenient vertical height, for example, in a range from about 3 feet to about 5 feet, with the width of the longitudinal extent of the opening 14 being compatible with the width or length of the case. It will be observed that the side or end wall 6 is provided with a hinged door 15 to afford access to the storage area 13. Thus, store personnel may enter the storage area 13 through the door 16. The refrigerated storage area as shown in Figure 2 may be provided with a plurality of shelves 16 for the storage of goods thereon. It will be readily comprehended, of course, that the goods may be stacked on the floor of the storage area, or otherwise, arranged as desired or required for a particular commodity. In lieu of the door 16, or in addition thereto, the rear wall 5 may have provision made therein for a door or closable opening 17, indicated by dotted lines in Figure 3, so that when the case is mounted with the back wall thereof against a door or delivery opening in the outside wall of a store or building in which the case is to be employed, may provide access for delivery of goods, for example, from a refrigerated truck directly into the refrigerated storage area 13. It will be readily apparent, however, that the location of doors 16 and 17 and of other openings to the storage area may be varied to suit

the requirements of the particular installation of the case in a store or elsewhere. The aforementioned partition means or wall 10, as best seen in Figures 2 and 3, provides for the support by any conventional known components of pairs of sliding doors 18, movable in conventional guide tracks, to separate and yet afford communication between the storage area 13 and the display and dispensing area 12. The sliding doors 18 as shown are provided with horizontal upper and lower rows of apertures 19 and 19' which, as will later appear, serve to provide air return opening means for circuitous paths of refrigerated air, as shown at A and B, for traversing the access opening 14 of the display and dispensing area 12.

Referring now more particularly to Figure 2, a lower head assembly 20 is incorporated in the lower end portion of the display and dispensing area 12 and extends longitudinally of the case between the side or end walls 6 and 7. The lower head assembly 20 comprises, a plenum chamber 21 formed, by way of example, by members 22 and 23 with the latter preferably being of insulating material and affording a support or base for a refrigerator coil 24 of conventional construction, and extending lengthwise of the case. Air impeller means comprising, for example, a pair of fans 25 driven by an electric motor of conventional construction are disposed within the plenum chamber 21 to draw air inwardly through an opening 26 provided therefor in the lower margin of the partition means or panel 10. Air drawn into plenum chamber 21 by the fans 25 passes through refrigerator coil means 24, is cooled thereby, and is discharged through air discharge opening means defined by a throat or duct 27 formed by an inner sheet metal panel 28 and the bottom front wall portion of the case to be discharged inwardly of and below the access opening 14 in a direction to traverse the lower portion of the latter. It will be seen that the air discharged at the throat 27 aforementioned moves upwardly and inwardly of the display and dispensing area 12, and passes through the lower row of air return openings 19' in the partition or panel 18 and into the storage area 13 for return to the suction sides of the air impeller means 25 as above described. Thus, a first circuitous path of refrigerated air, as indicated at A, is established between the display and dispensing area 14 and the storage area 13 with the air passing from the air discharge opening means at throat 28 through the air return opening means afforded by the row of apertures 19'.

A second or upper head assembly 30 is suitably incorporated in the upper end portion of the display and dispensing area 12 and above the upper edge of access opening 14, and extends longitudinally of the case between the side walls 6 and 7. A suitable sheet metal member 31 forms a bottom wall of a plenum chamber 32 at the upper end portion of the display and dispensing area, and second air impeller means, comprising a pair of fans 33 are disposed in openings 34, provided in the upper end portion of the partition or panel 10. A suitably formed sheet metal member 34 provides for the support of a conventional refrigerator coil 35 through which air of circuitous path B passes for admission to the inlet or suction side of the fans 33. The fans 33, when energized, draw air through the refrigerator coil 35 into plenum chamber 32 from whence it is discharged through lengthwise extending slots or openings 37 in the sheet panel member 31. Deflecting louvers 38, defined by material displaced in forming the lengthwise extending slots 37, extend angularly inwardly toward the partition 10 to aid or guide air movement of circuitous path B in the case. The refrigerated air of circuitous path B follows the path indicated by the arrows and passes through the upper row of air return apertures 19 in the sliding doors 18 to return to the suction sides of fans 33 after passing through the refrigerator coil 35. It will be observed that the circuitous path of air B travels between the display and dispensing area 12 and a storage area 13, and from the air discharge openings 37 at the bottom wall of the upper plenum chamber 32 to the air return opening means afforded by the upper row of apertures 19 in the slide doors supported in partition or panel 10.

From the above description it will be observed that I have provided an arrangement in which the pair of circuitous paths of refrigerated air A and B effectively traverse the access opening 14 to the display and dispensing area 12 of the case shown.

As previously indicated a plurality of horizontally goods supporting members or shelves 40 are arranged in the display and dispensing area 12 in vertical superposed relation, and preferably with their rear edges adjacent the surface of the partition or panel 10 so that the shelves may be conveniently loaded from storage area 13 by opening doors 18 from within the storage area. After the shelves have been loaded, the doors are then, of course, closed and the system affords for the circulation of refrigerated air paths as above related.

Referring now to Figure 4, I have shown diagrammatically a refrigeration circuit suitable for incorporation in the aforedescribed refrigerated case. The aforementioned refrigeration coils above described at 24 and 35 are shown as having conventional connection with expansion valves 41 which, in turn, are connected by a common liquid line 42 to the receiver reservoir 43. The pair of coils 24 and 35 also have connection with a common suction line 44 leading to a conventional compressor 45 which, in turn, has connection with any suitable condensor 46. The condensor 46 may, for example, be air cooled by means of a power driven fan 47. In the embodiment of the invention shown in the drawings two air impellers 33 are provided for the upper head assembly and a pair of air impellers 25 are provided for the lower head assembly. Such pairs of air impellers are illustrated diagrammatically in Figure 4, but it will be understood that any number of impellers may be employed as desired and required to meet the air volume requirements of a particular size of refrigerated case.

Upon reference again to Figure 2, it will be observed that the two uppermost goods supporting members or shelves 40 are of equal width, but narrower than the width of the lowermost of the shelves 40. In the specific arrangement shown, the pair of rows of air return apertures 19 and 19' are located in the partition or panel 10 between the uppermost and next succeeding shelf of the vertical array of shelves 40. Such relationship is not critical, but the arranged preferably should be proportioned so that each of the circuitous paths of air at A and B should control or afford a refrigerated air barrier approximately one-half each of the vertical height of the access opening 14. The relationship noted may, of course, vary dependent upon the number of air impeller means 33 and 25 provided in association with each of the upper and lower head assemblies to afford the desired air flow pattern for the case. It will be observed, however, that the two circuitous air paths A and B effectively cooperate one with the other to provide a refrigerated air barrier traversing the access opening 14 and through which the customer reaches to remove goods from any of the several goods supporting members or shelfs 40 disposed within the display and dispensing area 12.

While I have shown what I consider to be a preferred embodiment of my invention, it will be understood that various modifications and rearrangements may be made therein without departing from the spirit and scope of my invention.

I claim:

1. In a case of the class described having a display

and dispensing area provided with an unobstructed access opening in an upright front wall thereof, a storage area, and upright partition means rearwardly of said front wall of the case for separating and affording communication between the display and dispensing area and the storage area, the combination of first air discharge opening means inwardly of said front wall and below said access opening, first air return opening means in said partition means intermediate the upper and lower ends thereof, second air discharge opening means inwardly of said front wall and above said access opening, second air return opening means in said partition means above said first air return opening means, air impeller means for effecting circulation of air in a first circuitous path between said display and dispensing area and said storage area and from said first discharge opening means upwardly and inwardly to said first air return opening means, and in a second circuitous path between said display and dispensing area and said storage area and from said second air discharge opening means downwardly and inwardly to said second air return opening means to provide air barriers traversing the lower and upper portions of said access opening, respectively, and means for refrigerating the air in said circuitous paths of air.

2. In a case of the class described having a display and dispensing area provided with an unobstructed access opening in an upright front wall thereof, a storage area, and upright partition means rearwardly of the front wall of the case for separating and affording communication between the display and dispensing area and the storage area, the combination of first air discharge opening means inwardly of said front wall and below said access opening, first air return opening means in said partition means intermediate the upper and lower ends thereof, first air impeller means for effecting circulation of air in a first circuitous path between said display and dispensing area and said storage area and from said first discharge opening means upwardly and inwardly to said first air return opening means to provide an air barrier traversing the lower portion of said access opening, second air discharge opening means inwardly of said front wall and above said access opening, second air return opening means in said partition means above said first air return opening means, second air impeller means for circulating air in a second circuitous path between said display and dispensing area and said storage area and from said second air discharge opening means downwardly and inwardly to said second air return opening means to provide an air barrier traversing the upper portion of said access opening, and means for refrigerating the air in said circuitous paths of air.

3. In a case of the class described having a display and dispensing area provided with an unobstructed access opening in an upright front wall thereof, a storage area, and upright partition means rearwardly of said front wall of the case for separating and affording communication between the display and dispensing area and the storage area, the combination of a lower head assembly below said access opening, an upper head assembly above said access opening, first air discharge opening means for said lower head assembly below said access opening, first air return opening means in said partition means intermediate the upper and lower ends thereof, first air impeller means for said lower head assembly for effecting circulation of air in a first circuitous path between said display and dispensing area and said storage area and from said first discharge opening means upwardly and inwardly to said first air return opening means to provide an air barrier traversing the lower portion of said access opening, second air discharge opening means for said upper head assembly above said access opening, second air return opening means in said partition means above said first air return opening means, second air impeller means for said upper head assembly for circulating air in a second circuitous path between said display and dispensing area and said storage area and from said second air discharge opening means downwardly and inwardly to said second air return opening means to provide an air barrier traversing the upper portion of said access opening, and means for refrigerating the air in said circuitous paths of air.

4. In a case of the class described having a display and dispensing area provided with an unobstructed access opening in an upright front wall thereof, a storage area, and upright partition means rearwardly of the front wall of the case for separating and affording communication between the display and dispensing area and the storage area, the combination of a lower head assembly below said access opening, an upper head assembly above said access opening, first air discharge opening means for said lower head assembly below said access opening, first air return opening means in said partition means intermediate the upper and lower ends thereof, first air impeller means for said lower head assembly for effecting circulation of air in a first circuitous path between said display and dispensing area and said storage area and from said first discharge opening means upwardly and inwardly to said first air return opening means to provide an air barrier traversing the lower portion of said access opening, second air discharge opening means for said upper head assembly above said access opening, second air return opening mean in said partition means above said first air return opening means, second air impeller means for said upper head assembly for circulating air in a second circuitous path between said display and dispensing area and said storage area and from said second air discharge opening means downwardly and inwardly to said second air return opening means to provide an air barrier traversing the upper portion of said access opening, an air refrigerating means in said lower head assembly and said upper head assembly for refrigerating said first and second circuitous paths of air.

5. In a case of the class described having a display and dispensing area provided with an unobstructed access opening in an upright front wall thereof, a storage area, and upright partition means rearwardly of the front wall of the case for separating and affording communication between the display and dispensing area and the storage area, the combination of a plurality of horizontally extending goods supporting members mounted in superposed vertical relation within said display and dispensing area and with their rear edges adjacent said partition means, first air discharge opening means inwardly of said front wall and below said access opening, and the lowermost goods supporting member of said plurality of goods supporting members, first air return opening means in said partition means between the uppermost and lowermost of said goods supporting members, first air impeller means for effecting circulation of air in a first circuitous path between said display and dispensing area and said storage area and from said first discharge opening means upwardly and inwardly to said first air return opening means to provide an air barrier traversing the lower portion of said access opening, second air discharge opening means inwardly of said front wall and above said access opening, and said uppermost goods supporting member, second air return means in said partition means below said uppermost goods supporting member and above said first air return opening means, second air impeller means for circulating air in a second circuitous path between said display and dispensing area and said storage area and from said second air discharge opening means downwardly and inwardly to said second air return opening means to provide an air barrier traversing the upper portion of said access opening inwardly of the latter, and means for refrigerating the air in said circuitous paths of air.

6. In a case of the class described having a display

and dispensing area provided with an unobstructed access opening in an upright front wall thereof, a storage area, and upright partition means rearwardly of the front wall of the case for separating and affording communication between the display and dispensing area and the storage area, the combination of a lower head assembly below said access opening, an upper head assembly above said access opening, a plurality of horizontally extending goods supporting members mounted in superposed vertical spaced relation between said upper and lower head assemblies within said display and dispensing area and with their rear edges adjacent said partition means, first air discharge opening means inwardly of said front wall and below said access opening, and the lowermost goods supporting member of said plurality of goods supporting members, first air return opening means in said partition means between the uppermost and lowermost of said goods supporting members, first air impeller means for effecting circulation of air in a first circuitous path between said display and dispensing area and said storage area and from said first discharge opening means upwardly and inwardly to said first air return



opening means to provide an air barrier traversing the lower portion of said access opening, second air discharge opening means inwardly of said front wall and above said access opening and said uppermost goods supporting member, second air return means in said partition means below said uppermost goods supporting member and above said first air return opening means, second air impeller means for circulating air in a second circuitous path between said display and dispensing area and said storage area and from said second air discharge opening means downwardly and inwardly to said second air return opening means to provide an air barrier traversing the upper portion of said access opening inwardly of the latter, and means for said upper and lower head assemblies for refrigerating the air in said circuitous paths of air.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 2,794,325 | Shearer | June 4, 1957 |
| 2,890,573 | Lamb | June 16, 1959 |