

April 14, 1942.

C. F. HOFFMAN

2,279,945

SECTIONAL REFRIGERATED DISPLAY CASE

Filed Dec. 8, 1939

2 Sheets-Sheet 1

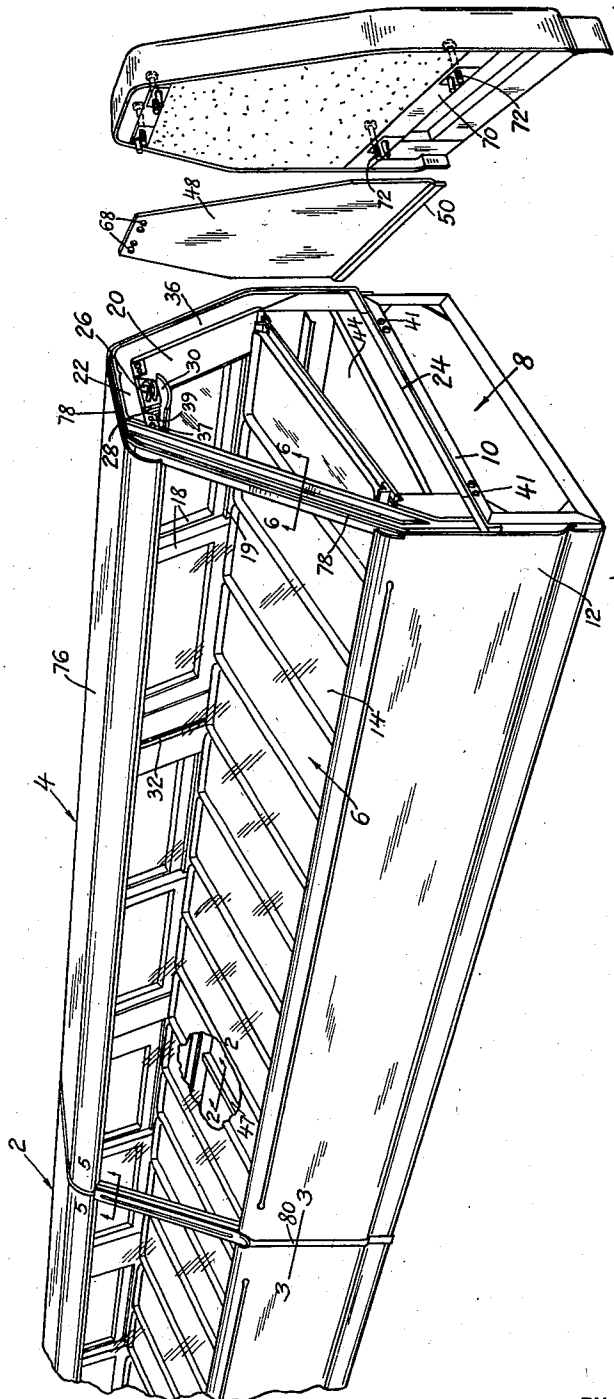


Fig. 1.

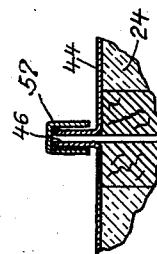


Fig. 2.

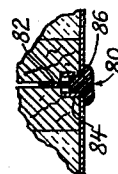


Fig. 3.

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2 Sheets-Sheet 2

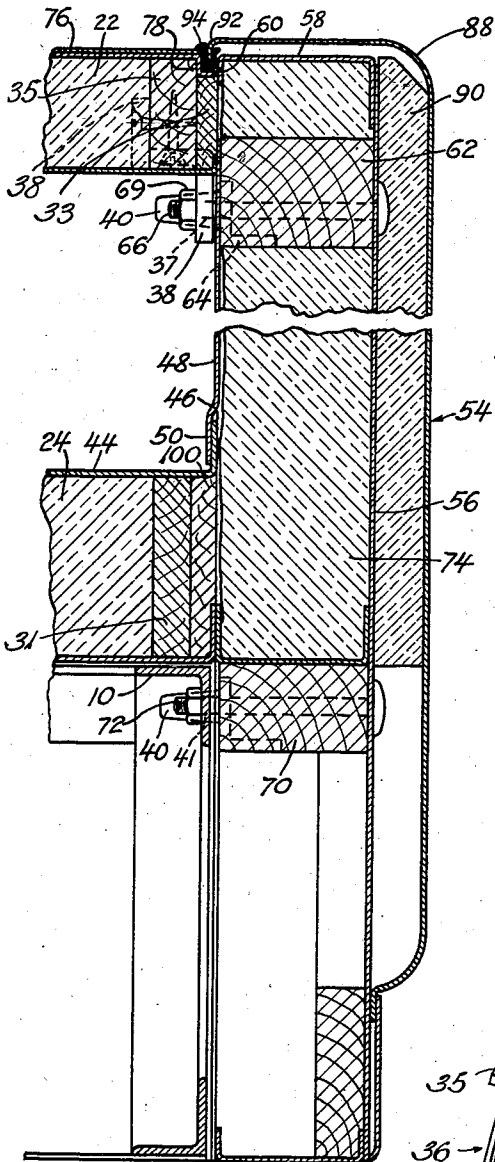


Fig. 4.

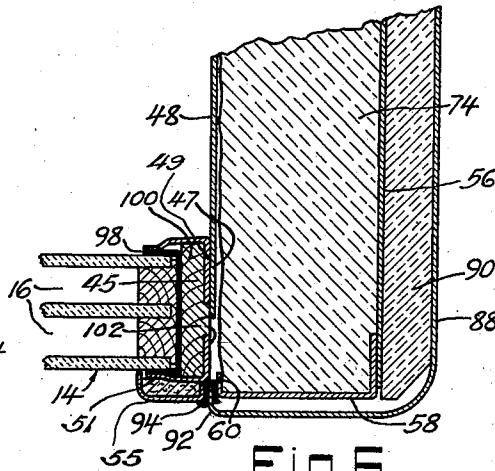


Fig. 6.

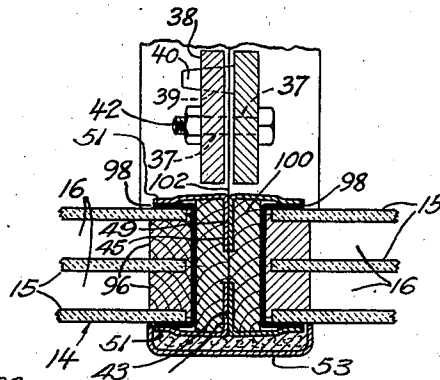


Fig. 5.

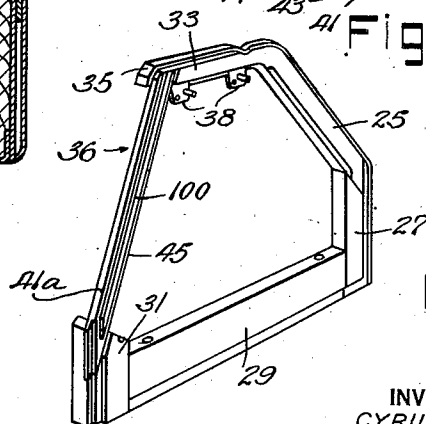


Fig. 7.

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SECTIONAL REFRIGERATED DISPLAY CASE

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8 Claims. (Cl. 312-107)

This invention relates to refrigerated display cases and particularly to display cases which are inexpensive to produce and are capable of being assembled in any location to provide refrigerated display cases of various lengths.

Refrigerated display cases as heretofore constructed have generally been made in standard lengths of 8, 10 or 12 feet or have been made on special order in any desired length. Both standard cases and custom made cases are assembled completely in the manufacturing plant and are shipped to the customer as a unit. The ends of the cases are permanently attached to the body by welding or otherwise and are fully insulated to prevent heat loss therethrough. Long display cases, say 20 or 30 feet in length, have not often been made because they are very expensive to build, and extremely difficult to handle and ship. For this reason when long cases are desired it is usual to employ two or more separate and completely insulated cases placed in end to end relation.

However, since each completed case is formed with a fully insulated end member at each end of the case the abutting end members of cases so aligned take up from 8 inches to a foot of storage space that might otherwise be utilized. The area of the display windows is similarly limited and the ends of the cases limit the customer's view so that one standing in front of one case may not look beyond the end thereof into an adjacent case to notice other articles on display only a short distance away. Moreover, when a store is rearranged or moved to a new location it is often necessary to use two short cases instead of one long case or vice versa. Heretofore such changes have been impossible or have made it necessary to buy new fixtures. Sometimes also one relatively short case is supplied with articles in great demand and the doors thereof are opened frequently so that the temperature of the interior is raised while the temperature of an adjacent case wherein the doors are opened only infrequently may be much lower. This is particularly objectionable in constructions wherein a number of cases are cooled by coils connected together without separate expansion valves, as is often true when the refrigerant used is ammonia. In such systems it is necessary to over cool the case which is opened only seldom in order properly to cool the case which is opened frequently.

In order to overcome these objections to constructions of the prior art and provide refrigerated display cases which may be of various desired lengths and provide a maximum of storage and display space, I have developed a refrigerated display case of a sectional type in which the body is formed of any desired number of open ended sections. Members which are formed separately of the body of the case and are simple in construction are attached to the ends of assembled

sections to provide ends for the case. Continuous display cases which are 20, 30 or 40 feet long or of other desired lengths can thus be made without the expense and difficulty in handling which would be inherent in equivalent constructions of the prior art. Furthermore, the extended and continuous length of the refrigerated space provides a large reservoir of cooled air which may flow readily from one section of the case to another and thus serve to maintain substantially uniform temperatures throughout the refrigerated space even though the doors of one section thereof are opened more frequently than those of another section.

An important advantage characterizing constructions embodying my invention resides in the ability to assemble or sub-divide cases or sections thereof to permit rearrangement of stores and store fixtures while using the same number of sections in the display cases. Thus a long case located on one side of a store may be subdivided into two short cases for use on opposite sides of a store or short cases used in a small store may be moved to a larger store and assembled as a long display case.

One of the objects of the present invention is to provide a novel type of refrigerated display case embodying elements adapted to be assembled to produce refrigerated display cases of various lengths.

Another object of my invention is to provide simple and inexpensive constructions capable of ready transportation and assembly on the site to produce refrigerated display cases having various forms.

A further object of my invention is to provide novel elements for use in constructing and assembling refrigerated display cases.

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 an extended perspective of a display case embodying my invention showing the elements thereof separated from their assembled positions;

Fig. 2 is a vertical sectional view of a detail of the construction illustrated in Fig. 1 taken on the line 2-2 thereof;

Fig. 3 is a horizontal sectional view of a detail of the construction illustrated in Fig. 1 taken on the line 3-3 thereof;

Fig. 4 is a vertical sectional view through an end member and a portion of a display section illustrating a typical construction embodying my invention;

Fig. 5 is a horizontal sectional view taken on the line 5-5 of Fig. 1;

Fig. 6 is a horizontal sectional view taken on the line 6-6 of Fig. 1.

Fig. 7 is a perspective of the end frame embodied in the section shown in Fig. 1.

In the construction illustrated in Fig. 1 a plurality of open ended display sections, indicated at 2 and 4, are connected together in end to end relation to provide a continuous refrigerated space which extends from one open end of section 2 to the opposite open end of section 4. Each section is formed with an upper insulated display portion 6 and a lower base portion 8 which may be open at the rear. The base portion as shown is provided with a supporting frame 10 formed of angle members or the like and is closed at the front by a lower panel 12.

The upper display portion of each section has a glass panel 14 in the front thereof formed of a plurality of glass panels spaced apart to provide insulating dead air spaces 16 as seen in Figs. 5 and 6. The rear of the display portion is provided with doors 18 slidably movable horizontally within a frame 19 supported by an insulated rear structure 20. An insulated top 22 extends from the front glass panel 14 to the rear structure 20 whereas a heat insulating partition 24 extends across the bottom of the display portion and separates the display portion from the base portion 8 of the section.

Each section of the case is provided with a refrigerating element 26 which, as shown, has heat absorbing fins 28 and is located near the top 22 of the case and is supported thereby. Beneath the refrigerating elements are located drip pans 30 which may be inclined toward the center of the section to discharge moisture collected thereby into a drain 32 which extends downward at the rear of the section between pairs of the sliding doors 18. While the refrigerating elements in adjacent sections may use ammonia or any other material as refrigerant and may be connected in series and controlled by a single expansion valve if desired, it is usually preferable to provide each section with a separate expansion valve so that when the sections are used independently it is unnecessary to make any changes in the refrigerating element.

The front 14, top 22, rear structure 20 and the partition 24 serve as longitudinally extending walls for the refrigerated space within the display portion 6 of each section. These elements are provided at each end with members that lie in a common vertical plane and serve as a frame 36 which extends about the ends of the display portion of each section. This frame shown in Fig. 7 serves to hold the elements in place so that the front and rear of the section will support the top 22 and the refrigerating element 26.

In the construction shown in Figs. 1 and 7, the frame 36 is formed as a unit and includes a rear member 25, a rear support 27, a base 29 and a front support 31, each of which is formed of relatively heavy non-metallic material such as wood. The end frame is rabbeted at 41^a on the outer edges thereof, as seen in Figs. 5, 6 and 7, to receive the inturned flanges 43 of the outer metallic shell, and is similarly rabbeted at 45 on the inner edges to receive the outwardly turned flanges 49 of the inner metallic lining of the section. The front member 100 of the frame supports the spacing elements 96 for the glass panels and is relatively thin so that when the end frames 36 of adjacent sections are in abutment the front members 100 present but little obstruction to the view of articles on display within the display space. The inturned flange 43 of the

outer shell and the outwardly turned flange 49 of the inner lining lie substantially in the plane of the end face 102 of the front member 100 of the frame 36. These flanges are spaced apart to prevent direct transfer of heat from the outer shell to the inner lining. The portions 51 of the shell and lining overlie the free edges of the sealing element 98, as shown in Figs. 5 and 6, and hold said edges in contact with the glass panes. Insulated metallic cover plates, shown at 53 in Fig. 5 and at 55 in Fig. 6, extend over the outer portions 51 of the shell to present a neat finished appearance to the assembled units.

The top of the frame 36 is formed with a relatively thin framing member 33, the end of which overlaps and fits into the rear member 25. A top reinforcing member 35 is secured to the top frame member 33 to receive and support the brackets 38.

The sections are provided at each end with means for use in securing each section to an adjacent section or to an end member for completing the display case. Each case also may be provided with means for positioning the ends of the sections and the end members in alignment so that they may be easily and properly connected together even when placed on uneven flooring or on floors which sag somewhat between the ends of the assembled sections. For this purpose brackets 38 shown in Figs. 4 and 5 are secured to the top reinforcing member 35 of the end frame 36 of the sections and adjacent the ends thereof. The brackets located on one end of each section are provided with bolt receiving apertures 37 and with stud receiving apertures 39 whereas the brackets secured to the opposite ends of the sections are provided with complementary bolt receiving apertures and tapered studs 40 adapted to enter the apertures 39. When forced together the studs 40 and apertures 39 cooperate to align the bolt holes 37 and to bring the ends of the adjacent elements into proper registry. The frame 10 of the lower base portion of the section is provided with bolt receiving apertures 41 which are also brought into registry by the studs 40. Bolts 42 extend through the apertures in the brackets 38 and in the frame 10 to draw the sections together and hold them securely in place.

The upper surface of the insulated partition 24 which divides the display portion 6 from the base 8 of each section is provided with a porcelain-enamel liner 44, the ends of which are turned upward at 48 and lie substantially in the same plane as the frame 36. These upturned ends of the liner are located adjacent to each other when the sections are joined together and suitable sealing means such as the U-shaped sealing strip 57 shown in Fig. 2, are applied to the liners to seal the space between the same.

In applying an end to a section a closure plate 48 is employed and preferably is separable from the insulated end member to simplify the application thereof. The lower edge of the plate 48, as shown in Figs. 1 and 4, is offset at 50 so that it may be slipped down into overlapping relation with respect to the upturned end 46 of the liner 44. The remaining edges of the closure plate extend beyond the inner edges of the frame 36 and overlie the inturned flanges at the ends of the metal linings which lie in the rabbeted faces of the members forming the frame 36. The edges of the closure plate thus overlie the inturned flanges of the lining and bear against the wood of the frame which spaces the liner from

the outer metallic shell of the case as shown at 47 in Fig. 6 and if desired may be removably secured thereto. The inner surface of the closure plate is provided with a porcelain-enamel finish and presents a smooth surface having a neat appearance and capable of being readily cleaned.

An insulated end member 54 is secured to the section over the closure plate 48 to complete the structure and reduce heat losses through the closure plate. Preferably the end member is formed with a sheet metal frame having an outer surface 56 and a marginal flange 58 extending inward from the surface 56 about the front, top and rear edges thereof. The inner extremity of the flange 58 is turned inward at 60 parallel to the outer surface 56 and is positioned to engage the exposed face of the top framing member 33 of the end frame 36 of a section but is spaced from the edges of the closure plate 48 so that there is no direct heat transfer from the closure plate to the exterior of the case.

Within the frame of the end member is a horizontally extending wooden strip 62 located adjacent and parallel to the top framing member 33 of the end frame 36 to support a bracket 64 and a bolt 66. The bracket used on one end of the case is similar to the bracket 38 used on the opposite end of a display section and is formed with a stud 40 and a bolt receiving aperture 37. Similarly the bracket used on the end member to be applied to the opposite end of the case will be formed with an aperture 39 to receive the stud 40 carried by the adjacent end of a display section. The closure plate 48 is provided with apertures 68 which coincide with the apertures and stud of the brackets 38 carried by the top of the end frame of the case. The bolts 66 extend through the wooden strip 62, the aperture 37 in the bracket 38 and the complementary bracket on the display section and a nut 69 is applied to the end thereof to draw the parts together.

A transversely extending member 70 extends from the front to the rear of the frame of the end member adjacent the upper apertured angle member 10 of the base portion of the case and bolts 72 extend therethrough to enter the apertures 41 therein to secure the lower portion of the end member in place. Heat insulating material 74 is confined at the sides by the marginal flange 58 and the intumed extremity 60 of the frame of the end member and is supported by the member 70 in position closely adjacent or in contact with the outer face of the closure plate 48 to reduce heat loss therethrough.

The sections are each provided with an outer porcelain enamel shell 76 which is stepped in at the ends of the case along the top, and along the front and rear edges as shown at 78 in Fig. 1. A T-shaped rubber sealing strip 80 is located between the ends of adjacent sections as shown in Fig. 3, and is positioned so that the portion 82 thereof engages the adjacent end frames 36 of the sections. The shoulder 84 of the sealing strip is thus located in the recess formed by the adjacent stepped portions 78 of the sections and the projecting edges 85 of the strip extend beyond the edges of the recess to provide an effective seal and present an attractive appearance at the joint between the sections.

In order to provide a similar effective and attractive seal between a section and an end member, the end member is provided with an outer porcelain-enamel shell 88 which is spaced from the surface 56 of the end frame member by in-

sulation 90. The inner marginal extremity of the shell is turned inward at 92 and extends into the stepped-in recess 78 on the end of the adjacent section. A rubber sealing strip 94 of S-shape is applied to the intumed extremity and the section to seal the joint between the end member and section. The beading on the projecting portion of the sealing strip thus conceals the joint and serves to present a neat appearance.

The construction and manner of sealing and supporting the multiple glass panes which form the panel in the front of the display sections of the case may be varied considerably, but in order to provide a narrow construction at the point of connection between the sections and at the same time provide a construction which serves to provide adequate support for the top of the case, I prefer to form the front portion 100 of the frame 36 as shown in Figs. 5, 6 and 7. With this construction the glass panes 15 are held in spaced relation by means of spacing strips 96 and the dead air spaces are sealed by a sealing element 98 which extends beneath the strips 96 and inward adjacent the outer faces of the outer glass panes 15. The spacing strips 96 are supported and held in place by the frame member 100 which is in the form of a strip which presents an outer face 102 lying in the same plane as the corresponding faces of the remaining portions of the frame 36.

When sealing means such a rubber sealing strip of the type shown in Fig. 3 are located between the adjacent members 100 of the frame in forming a long display case, the frame members, of course, are not in direct contact but bear against the sealing means and are drawn together by the attaching bolts 42 so as to insure proper positioning of the ends of the display sections and proper sealing of the multiple glass panels in the front of each display section. The width of the frame and of abutting frame members at the adjacent ends of the sections is very limited whereas the members 100 are so held in place that they cooperate to insure adequate support for the top 22 of the case and the refrigerating element 26 for each section.

The use of open ended display sections and detachable end members in forming refrigerated display cases as described above serves to permit any desired number of sections to be assembled in end to end relation to provide a long display case having a maximum window area and an extended communicating interior. The refrigerated space also provides a reservoir of cool air which serves to maintain uniform temperatures throughout the refrigerated space and thereby compensates for the frequent opening and resulting rise in temperature of those of the connected sections wherein the doors are opened frequently. At the same time the construction permits the sections to be separated and reassembled in any desired arrangement for use in other stores or in other portions of the same store. In order to effect such rearrangement of the sections of a display case it is simply necessary to remove or disconnect the connecting means 42 which hold the sections together and to apply a closure plate 48 and an end member 54 to the open end of each of the separated sections. Similarly the end members and closure plates of separated sections may be removed and the sections placed in end to end relation to form a long display case.

Constructions embodying the present inven-

tion have the further advantage that sections of uniform length may be made much more economically than when a number of display cases of different length or special lengths are produced. Moreover, the display sections and end members may be shipped and handled easily and can be assembled in place much more readily than has been possible heretofore. If desired a number of section lengths may be made and kept in stock to provide display cases of any desired length. Thus by forming sections in standard 6 and 8 foot lengths two 6 foot sections can be connected to produce a case 12 feet in length, a 6 and an 8 foot section can be connected for a 14 foot case, two 8 foot sections will form a 16 foot case and three 6 foot sections will be used in an 18 foot case. Other variations and combinations of sections may be similarly joined to form very long or very short cases.

It will also be evident that the form and construction of cases and parts thereof embodying my invention may be varied to produce display cases with bottom storage chambers or to produce cases of different appearance and construction. In view thereof it should be understood that the embodiment of my invention herein shown and described is intended to be illustrative thereof and is not intended to limit the scope of the invention.

I claim:

1. A refrigerated display case comprising an open ended section having an insulated upper display portion and a lower base portion open at the ends and the rear and closed at the front, an insulating partition separating said display portion from said base portion, a closure plate removably secured to said section and presenting an inner surface closing the end of said display portion, an insulated end member removably secured to said section over said closure plate to reduce heat loss through said plate, said end member having a portion thereof extending downward and closing the end of the base portion of the case and means detachably securing said end member to said section.

2. A refrigerated display case comprising an open ended section having an upper insulated display portion and an open lower base portion, an insulating partition separating said display portion from said base portion, an end member removably secured to said section, said end member having a marginal frame and a support extending from the front to the rear of said frame parallel to said partition, a closure plate engaging the end of said section and closing the end of the display portion thereof and insulating material located above said support and confined at its edges by the marginal frame of said end member and said support, said insulating material lying closely adjacent the outer surface of said closure plate to prevent heat loss therethrough.

3. A refrigerated display case comprising an open-ended display section having a top, a bottom and front and rear structures serving as horizontally extending walls defining a refrigerated space, said walls having non-metallic elements at the ends thereof constituting a frame lying in a common plane normal to said walls, a metallic closure plate presenting an inner surface closing the end of said refrigerated space and having marginal portions engaging said frame, an insulated end member having a metallic shell also engaging said frame but spaced from said closure plate and insulated therefrom by said elements and serving to reduce heat loss through

said closure plate, and means on said end member cooperating with means on said section for securing said end member to said section.

4. A refrigerated display case comprising an open ended display section having a metallic liner, non-metallic frames at opposite ends of said section, a metallic closure plate engaging said end frame and liner, and an insulated end member removably secured to the end of said section to reduce heat loss through said closure plate, said end member being formed with an outer metallic surface having a flange extending inward therefrom with the extremity of the flange turned inward parallel to said outer surface and engaging the non-metallic frame of said section and insulated from said liner and closure plate by said end frame.

5. In a refrigerated display case, an open ended section having an outer metallic shell and an inner metallic liner with insulating material located between the same, end frames located at opposite ends of said sections and formed of non-metallic material serving to space the outer shell from the inner liner, a metallic closure plate closing one end of said section and secured to the end frame thereof with the edges of the plate spaced from the outer metallic shell and an insulating end member also secured to said end frame closely adjacent said closure plate and serving to prevent heat loss through said closure plate.

6. A refrigerated display case comprising a plurality of similar open ended sections each having an outer metallic shell and an inner metallic liner with insulating material located between the same, end frames on said sections each formed of non-metallic material and serving to space said outer shell from said inner liner, means on said end frames for connecting said sections together in end to end relation with the outer metallic shell of each section spaced from the inner metallic liner of the adjacent section and insulating end members closing the opposite ends of the terminal sections of said case.

7. A refrigerated display case comprising an open ended section having an outer metallic shell with a flange turned inwardly adjacent the end of the section, an inner metallic liner with a flange turned outwardly adjacent the end of the section, heat insulating material located between the shell and liner, a non-metallic frame adjacent the end of the section and spacing the flanges on said shell and liner, a metallic closure plate for the end of said section secured to the frame and overlying the outwardly turned flange on the liner but having its edges spaced from the inwardly turned flange on the outer metallic shell and an end member also secured to said frame and embodying heat insulating material held closely adjacent said closure plate to reduce heat loss therethrough.

8. A refrigerated display case comprising a plurality of similar open ended display sections each having spaced glass panels in the front thereof, spacing strips for holding said panels in position, cooperating end frames on said sections each including a non-metallic member supporting said spacing strips and means on said end frames for securing said sections together with said members in contact so that said members cooperate in strengthening the support for said spacing strips.

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