Oct. 31, 1933. L. G. GRAY 1,932,694

REFRIGERATOR DISPLAY CASE

Filed Jan. 20, 1932 4 Sheets-Sheet 1

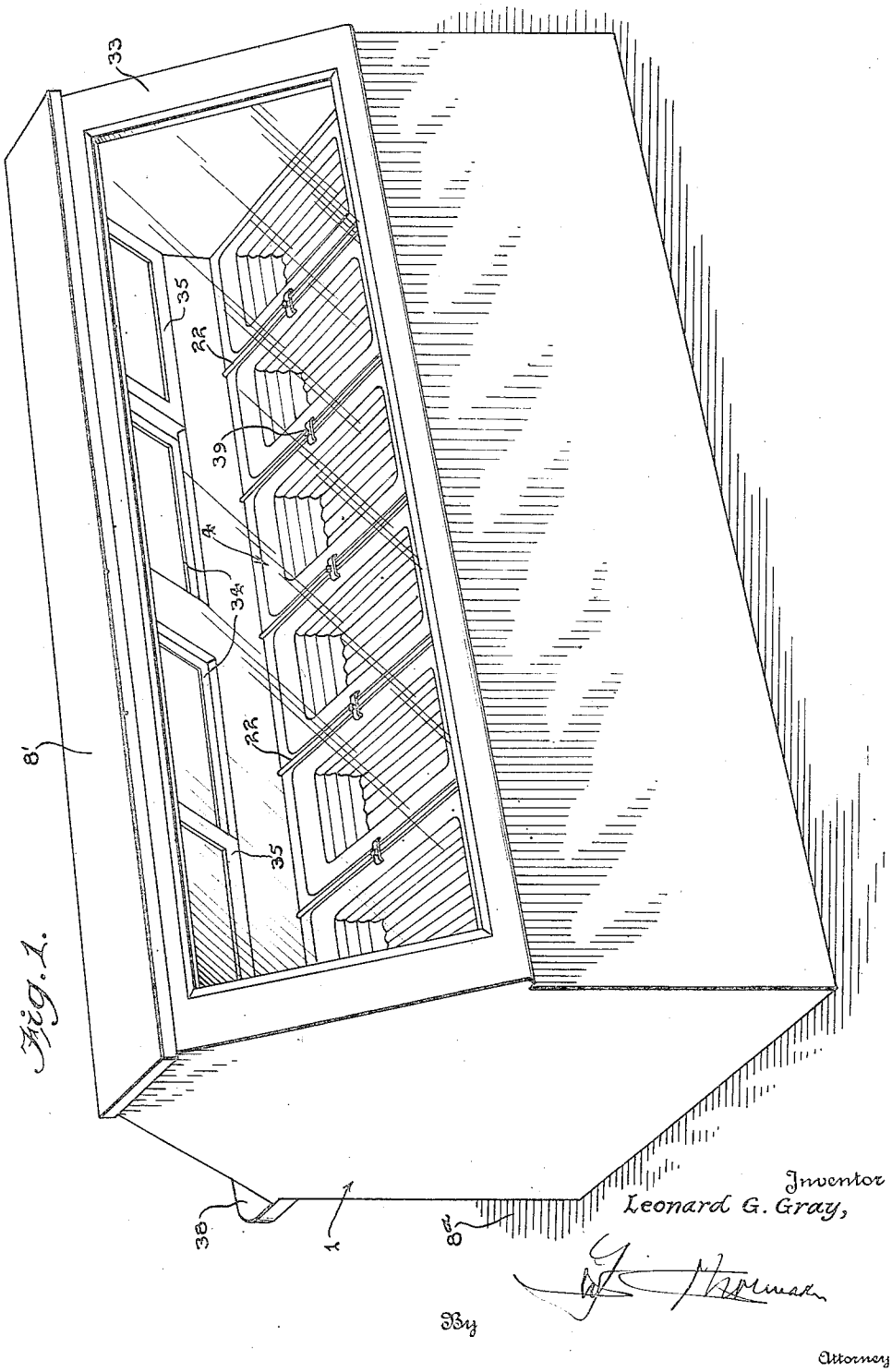


Fig. 1.

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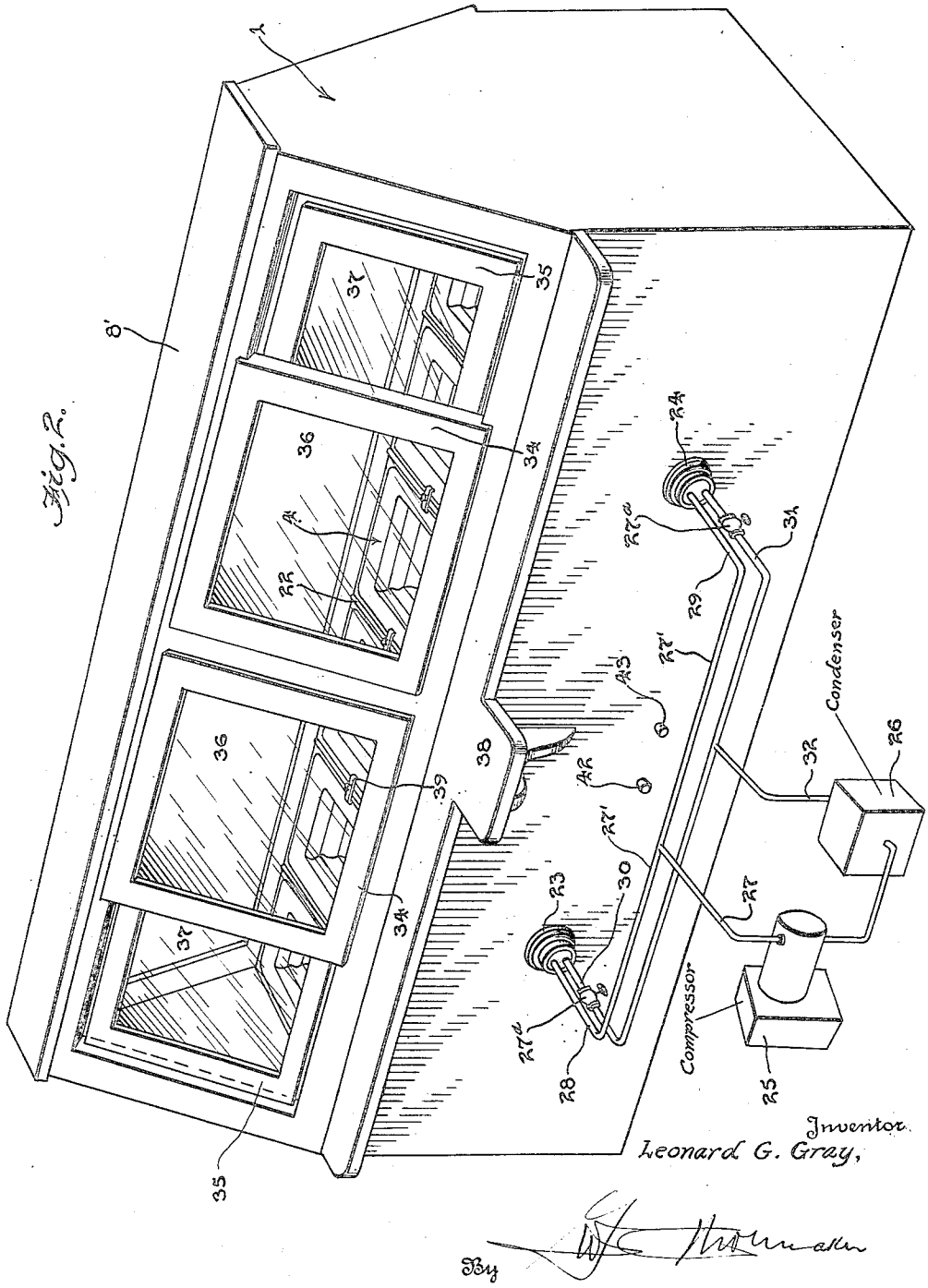


Fig. 2.

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REFRIGERATOR DISPLAY CASE

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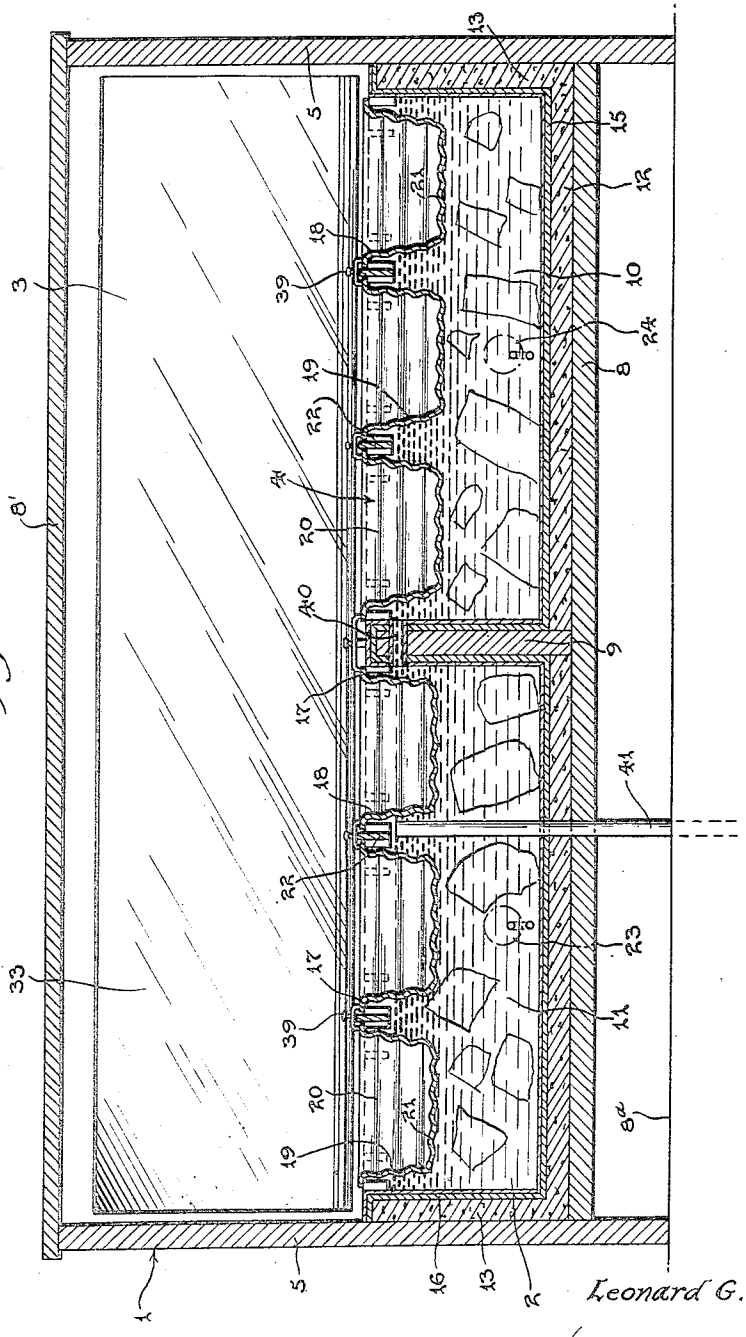


Fig. 3.

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REFRIGERATOR DISPLAY CASE

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Fig. 4.

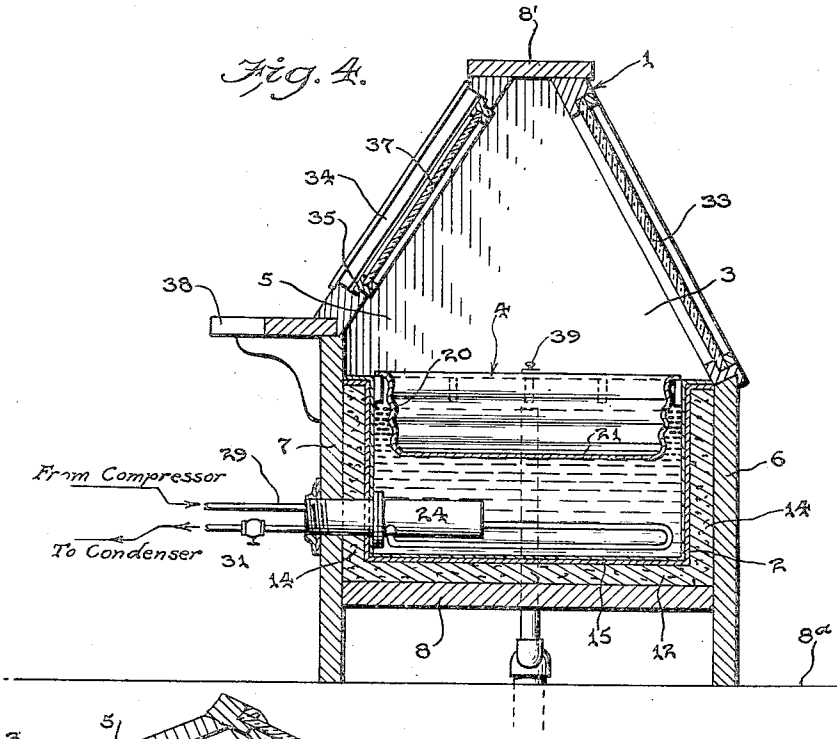
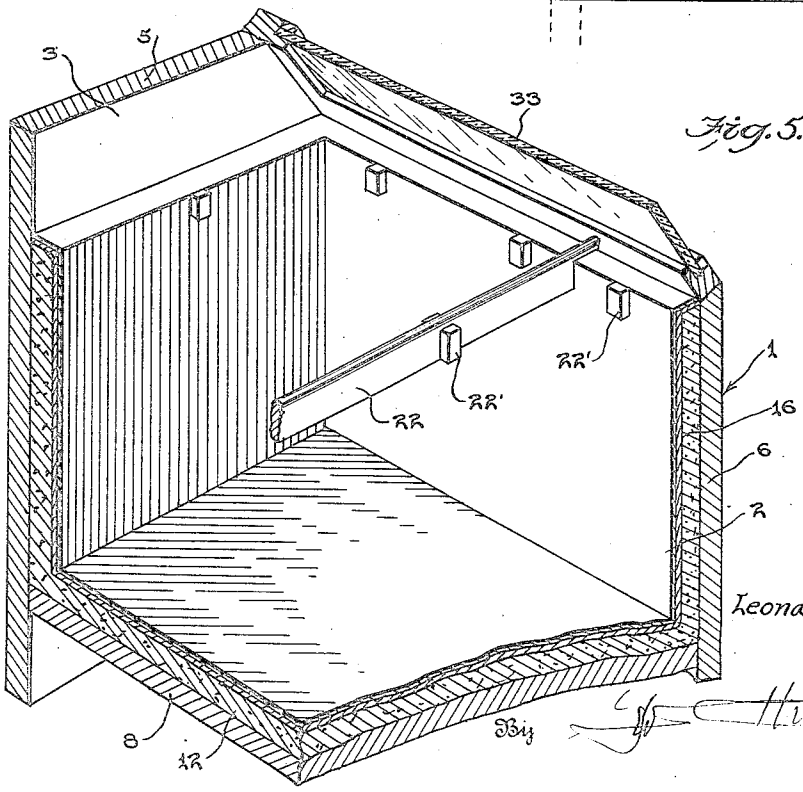


Fig. 5.



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UNITED STATES PATENT OFFICE

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REFRIGERATOR DISPLAY CASE

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Application January 20, 1932. Serial No. 587,827

13 Claims. (Cl. 62—89.5)

This invention relates to refrigerator display cases.

One object of the present invention is to provide a refrigerator display case, embodying, among other characteristics, a refrigerating medium in which the commodity-supporting pans are partially submerged or entirely surrounded by the refrigerating medium to thereby radiate the cold air into the pans to refrigerate the contents of the pans.

Another object of the present invention is to provide a refrigerator display case embodying means whereby to confine the refrigerating medium or means below the upper display portion of the case and below the supporting commodity-holding pans so as to conserve refrigeration and prevent loss of refrigeration as in the case where the refrigerating medium or means is arranged in the upper display portion of the case.

Another object of the invention resides in the provision of a display case constructed so that one degree of refrigerating effect may be realized or accomplished in one part of the case and another or different degree of refrigerating effect realized or maintained in another part of the case.

Another object of the invention is to support the commodity-holding or containing pans so that they in effect provide a partition between the refrigerating section and the display section of the case, the pans and their supporting means being such as to provide for the ready removal and replacement of the pans without experiencing any crowding or overlapping of the pans and to prevent difficult removal of the pans individually or collectively incident to frost which may collect thereon.

A still further object of the present invention is to provide a refrigerator display case of comparatively simple and inexpensive nature, durable in the matter of materials employed, and effective in operation, and with the thought in mind of providing a device of the character stated, wherein refrigerating mediums of various characters may be employed so that a purchaser or user of the case may, as a matter of choice, employ ice or water and ice to obviate the necessity of the use of expensive installation such as refrigerant coils, compressors, condensers, etc., and yet, if preferable, the latter may be employed.

A still further object is to provide a refrigerator display case, embodying, among other characteristics, an upper display section and a lower refrigerating section, the two sections being divided by means of a plurality of side-by-side commodity-containing pans which may be of the same or different sizes and which may have the same or different depths and which may be readily removable, one independently of another, to permit access to the refrigerating section either for cleaning purposes or for repairs or interior painting, or to permit the ready insertion of ice or water, or both, and, which facilitates the making of repairs or the cleaning or painting of the apparatus, especially when coils are located in the lower section.

A still further object of the invention resides in the provision of a refrigerator display case embodying means whereby perishable commodities of different characters may be subjected to different degrees of temperature as, for instance, vegetables may be subjected to one degree of temperature while meats may be subjected to another degree of temperature, according to requirements or the particular goods or commodities contained within the case.

A still further object is to provide a refrigerator display case wherein the refrigerating medium is confined to the lower section of the case, and wherein a blanket of chilled, dense air is maintained in the respective commodity-containing pans irrespective of whether the doors in the upper section are left open momentarily or for a relatively long time and thereby maintaining an effective refrigeration.

A still further object of the invention is to employ commodity-containing pans which are preferably corrugated and which are so mounted in the refrigerating medium that the cold air is effectively radiated into the pans and by virtue of which the contents of the pans are properly refrigerated, the greater number of corrugations, the more effective the radiation of refrigeration, and when meat is contained in the pans, the meat is prevented from coming into contact with the slight amount of dampness or condensation which forms on the inside of the pans.

A still further object of the invention is to provide a refrigerator display case embodying a lower refrigerating section and an upper display section and in which suitable provision is made for overhead overflow from the compartments to prevent the escape of any cold air and without trapping the overflow and avoiding possibility of flooding the pans.

It is still further designed to provide a refrigerator display case of any suitable general outline of structure and in which is embodied a lower refrigerating section and an upper display section and in which the lower refrigerating section may

or may not be divided into separate compartments and in which the commodity-containing pans are so mounted as to provide for an effective refrigeration of the commodities or goods and by virtue of which construction and arrangement of parts, the necessity for employment of a plurality of thicknesses of glass is obviated and single panes of glass employed and yet do not steam up or become murky or frosted as has been found to be the case where the refrigerating coils or ice have been housed in the upper or display section of the case and because of which, two or more thicknesses of glass have been necessary, which are difficult to clean, if they can be properly cleaned at all, without removal of at least one or more glass sections, and it is obvious that the present case is more efficiently maintained in a clean and sanitary condition and is less expensive and permits of a more satisfactory view of the contents of the display case, and moreover, labels do not become loosened and detached from milk, beverage or other bottles displayed in the refrigerator display case.

It is still further designed to provide a cooling and display case whereby the foods displayed do not lose weight, flavor, moisture and nutritious food juices do not become dehydrated on account of exposure to bare refrigerator coils, because when refrigeration coils are used in the present invention they too are submerged and cannot collect frost as do exposed coils, which frost is largely evaporation of moisture and food juices from the foods, and causes loss of weight flavor and nutrition value in foods.

With these and other objects in view, the invention consists in the construction and novel combination and arrangemet of parts hereinafter described, illustrated in the accompanying drawings, and set forth in the claims hereto appended, it being understood that various changes in the form, proportion and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

In the accompanying drawings:

Fig. 1 is a perspective view of one embodiment of the invention looking toward the front of the case.

Fig. 2 is a perspective view looking toward the rear of the case and in which is indicated diagrammatically one type of refrigerating mechanism including a compressor and condenser and other operating parts.

Fig. 3 is a vertical longitudinal sectional view of the refrigerator display case.

Fig. 4 is a vertical transverse sectional view of the invention.

Fig. 5 is a fragmentary sectional view in perspective, illustrating particularly one manner of means for supporting the pans.

Referring now more particularly to the accompanying drawings, the reference character 1 indicates a refrigerator display case of any desired outline. As illustrated, the case includes a lower longitudinally extending section 2, an upper longitudinally extending display section 3, and a series of spaced, longitudinally arranged, transversely disposed pans 4, which in effect provide a partition between the lower and upper sections.

While the refrigerator display case may be constructed or formed of various exterior outlines, as stated, the form may take the shape as that illustrated and which will be found serviceable in use.

As illustrated, the present refrigerator display case embodies end members 5, front and back members 6 and 7, respectively, a bottom member 8, a top member 8', and it will be noted that the bottom member 8 is preferably supported above the floor-line 8*a*.

A partition 9 divides the lower section of the case into a plurality of compartments 10 and 11 for the refrigerating medium. To prevent the loss of cooling effect of the refrigerating medium, suitable insulating material is preferably provided at the bottom, end and side walls, as indicated by the reference characters 12, 13 and 14. Within these compartments 10 and 11, there are located tanks 15 and 16, preferably of zinc or which may be of any other relatively non-corrosive material which serves to actually receive and hold the refrigerating medium. Thus, it will be seen that insulating material is interposed between the tanks 15 and 16 and the walls of the case.

The refrigerating medium may be ice or water and ice, with the ice floating in the water or, the refrigerating medium may be brine or other liquid which is cooled or chilled by a refrigerating apparatus as hereinafter more fully explained.

The pans 4 are arranged between the lower and upper sections of the case. These pans are arranged preferably side-by-side throughout the length of the case. Each pan 4 has flanges 17 and the bottom portions 18 of the pans are divided, as shown, by relatively upright wall portions which slope downwardly and inwardly in order to provide a relatively tapered cross section that results in a construction permitting of effective radiation and of a ready removal and replacement of the pans.

The walls of the pans 4 may be plain but, as shown, the side walls, end walls and the bottom of each pan are preferably corrugated, as indicated at 19, 20 and 21, respectively. While the corrugations are regarded as preferable, it will be understood that in certain broader aspects of the invention it is not intended to limit the invention to the use of corrugated pans. The more the pans are corrugated, the more the radiation of refrigeration and for this reason, it is preferable to corrugate the pans.

To support the pans, the case is provided with a series of transversely disposed supporting bars 22, spaced apart, as shown, and preferably secured in place as at the upper portions of the tanks 15 and 16. These supporting bars and the upper portion of the tanks are provided with lugs 22' which are secured thereto or are associated therewith in such a manner that the lugs can be relied upon to receive the outer flanged portions of the pans and thereby support the pans, the pans resting on said lugs.

These transverse supporting bars 22 serve to divide the spaces that receive the pans, the pans projecting downwardly into the lower section of the case into the refrigerating medium as shown and in which refrigerating medium the pans are partially submerged as is apparent by reference particularly to Figs. 3 and 4.

In one aspect of the invention, the lower refrigerating section of the case may be provided with cooling coils 23 and 24 and, as shown in Fig. 2, there is illustrated one type of refrigerating apparatus which comprises a compressor 25 and a condenser 26. The compressor 25 is connected by a main pipe 27 and branches 27' with the coils 23 and 24, the branches being provided with controlling valves 27*a*. Leading from the

coils 23 and 24 are pipe branches 30 and 31 which are connected by the pipe 32 leading to the condenser 26. The valves 27a permit of regulation of the supply of refrigerating medium to the compartments 10 and 11 so as to have different or uniform degrees of temperature in these two compartments and thereby refrigerate goods of different kinds disposed in the pans over the different compartments.

Instead of the use of a mechanical refrigerating apparatus, such as alluded to immediately above, the refrigerating medium may be water and ice which may be readily placed within the respective compartments 10 and 11.

There are certain users of refrigerating apparatus of the present character who may prefer the less expensive apparatus while others may prefer the more expensive installation. Conditions in certain localities are such as to require the use of the water and ice refrigerating medium and while conditions may not require it, there are times when users of the display case prefer for other reasons to use the less expensive apparatus. Accordingly, the present invention is so constructed that either the mechanical installation may be employed or the less expensive arrangement utilized. To use the water and ice refrigerating medium in the compartments 10 and 11, it is simply necessary to open the corresponding glass doors 34 and 35 and remove one or more pans 4, and supply the ice after which the pans may be replaced and the doors closed and the commodities on display readily viewed through the glass doors 34 and 35 or through the fixed glass front 33 of the upper section of the case. The doors 34 and 35 may be mounted in any suitable manner, but, as illustrated, they are of the slidable type and may be mounted to slide in any suitable manner. If desired, a suitable shelf 38 may be provided and located at the rear of the case. This shelf may be utilized for various purposes in the use of the refrigerating case.

In the use of either of the refrigerating methods described, it will be seen that the pans are partially submerged in the refrigerating liquid for the purposes previously stated, and, as the pans are relatively shallow, as shown particularly in Figs. 3 and 4, a uniform or even temperature is maintained in the pans and without danger of loss of temperature incident to opening or closing of the doors of the upper section of the case. The cold air gravitates downwardly and, as stated, is confined for effective refrigerating purposes below and around the pans and the temperature of the contents of the pans is not lowered incident to the opening of the doors.

The conservation of refrigeration in the present invention, as compared with the loss of refrigeration in types of refrigeration display cases wherein the refrigerating coils are located in the upper display section, is apparent from the foregoing. When refrigerating coils are placed in the upper display section of a case, the coils absorb the moisture from the foods and the nutritious juices of meats, while, with the system of refrigeration herein described, there is no dehydration of foods.

It will thus be seen that the present refrigerator may be operated with ice and water or a brine solution in conjunction with a refrigerating coil, and it will be understood that in either method of operation the pans are all submerged in the water to a point adjacent their upper marginal flanges and are held thus submerged against a rising or floating movement by suitable holding means, such for instance, as by the fastening or holding devices 39. As in the method of mechanical refrigeration, the ice and water method may be regulated to provide for different temperatures in the compartments 10 and 11, depending upon the nature of the commodities or goods in the pans of the different compartments. This regulation may be accomplished by different quantities of ice in the two compartments. In both methods of refrigeration, the pans being entirely surrounded by the chilled or cold liquid, the cold air is radiated into the pans and in this manner, the contents of the pans are efficiently refrigerated, and, as previously stated, the more the pans are corrugated, the greater the radiation of refrigeration. As cold air falls and warm air rises, the cold air is, therefore, held in the pans and does not escape from the display case when the doors of the upper section are opened.

Automatic overhead overflow is provided to prevent the pans from flooding, which overflow does not admit of the escape of any substantial amount of cold air and this may be accomplished without trapping the overflow. For instance, in the partition 9, at the upper edge thereof, and at either end of the same, or intermediate the ends, I may provide an opening 40, as shown particularly in Fig. 3. Assuming that the refrigerating medium in compartment 10 should rise to the level of this opening 40, the overflow would pass through said opening 40 into compartment 11 and vice versa if the overflow should take place from compartment 11. This overflow may occur upon the pressing down of one or more pans into the respective compartment and to take care of the overflow to prevent flooding of the pans, the passageway or opening 40 is provided. To relieve both compartments of a surplus amount of refrigerating fluid or liquid, there is provided an overflow pipe 41 which may be located in either of the compartments 10 and 11 and which extends through the bottom of the case to any suitable point of discharge, and by virtue of which, there is no danger of an overflow of refrigerating liquid above the tops of the pans.

To completely drain the lower section of the display case to permit the making of repairs or for painting or cleaning purposes, there may be provided suitable plugged outlets 42 and 43 leading, respectively, from the compartments 10 and 11.

It is customary to illuminate refrigerator display cases and, of course, in the use of the present invention certain electrical or other manner of illuminating the case will be employed, but as this forms no part of the present invention, it is deemed unnecessary to illustrate it.

As previously stated, the shallow pans now illustrated may have different depths and in fact, some of the pans may be lengthened to extend to the bottom of the case for storage purposes or some of the pans may be lengthened to extend into the refrigerating medium to a depth according to the temperature desired. The deeper the pans, the lower the temperature that would be provided in the same, particularly with mechanically cooled brine. When these pans are lengthened for storage purposes, it will be understood that they will be surrounded by the refrigerating medium.

A deep storage receptacle for frozen foods might be permanently located at each end of the case and disposed within the compartments so as to be surrounded by the refrigerating medium. In such an arrangement, a shallow pan of the character illustrated and described could be sus-

pended or mounted within the permanently located storage receptacle. As many of these storage receptacles as might be desired could be employed and located as best suited in the refrigerating medium-containing compartments.

While in Fig. 3 the ice and water is illustrated and also the coils, it will be understood that when the ice and water is used, the coils will not be employed. The invention being otherwise the same, in the use of these different refrigerating mediums, it is thought unnecessary to provide an additional view which would otherwise be the same as Fig. 3, except to show the ice and water.

What is claimed is:

1. A refrigerator display case comprising in combination a rectangular lower section for holding refrigerating medium, a display section above the lower section, and removable pans in longitudinal arrangement supported in normal position along the upper portion of the lower section so as to provide in effect a partition between the refrigerating section, and the refrigerating medium therein, to which the pans are directly exposed, on the one hand, and the display section on the other hand, the front of the display section having fixed glass whereby commodities on display within the section can be seen from the front, the back of the display section having slidable doors with glass therein providing closures for the openings that permit access to the interior of the display section, said lower section being divided into a plurality of brine receiving compartments, each having a cooling coil, said display case having in operative arrangement therewith refrigerating means comprising a compressor and a condenser constituting part of a refrigerating system that includes the cooling coils, there being piping leading from the compressor with valve controlled branches leading to each coil, there being branches leading from each coil and constituting part of return piping leading to the compressor.

2. A refrigerator display case comprising in combination a lower section holding refrigerating medium, a display section above the lower section, and pans in longitudinal arrangement along the upper portion of the lower section and directly exposed to the cooling effect of the refrigerating medium, said lower section being divided into a plurality of brine receiving compartments, each having a cooling coil, said display case being connected to refrigerating means comprising a compressor and a condenser constituting part of a system that includes the cooling coils, there being piping leading from the compressor with valve controlled branches leading to each coil, there also being branches leading from each coil and constituting part of return piping leading to the compressor.

3. A refrigerator display case comprising in combination a rectangular lower section holding a liquid refrgerating medium, a display section above the lower section, and a partition in effect provided by removable pans along the upper portion of the lower section and extending downwardly into the liquid refrigerator medium, the front of the display section having fixed glass whereby articles on display within the section can be seen from the front, the back of the display section having slidable doors providing access to the pans, said lower section being provided with overflow means that determines the height of the liquid refrigerating medium, whereby to prevent flooding of the pans.

4. A refrigerator display case comprising in combination a longitudinally extending rectangular lower section divided into a plurality of compartments and adapted to receive a refrigerating medium, a normally closed upper display section of modified inverted V shape in cross section and having glass in the front thereof and access doors at the back thereof, and longitudinally arranged receiving pans located between the compartments that hold the refrigerating medium and the upper display section, the receiving pans when in normal position collectively providing a dividing partition between the lower section and display section, said case having along the upper part of the lower section a series of transversely extending supporting bars longitudinally arranged in spaced relationship and so that the spaced bars define the longitudinal arrangement of openings for the receiving pans, lugs on the case, some of which are arranged in relation to the transverse bars and others of which are arranged in relation to the top edge portions of the compartments, said pans having outwardly extending upper edge portions which when in normal position are supported by said lugs, said pans also having body portions the exteriors of which have general inward and downward inclination, each pan and the supporting structure therefor being such that each pan can be moved into and out of normal position without any appreciable binding action.

5. A refrigerator display case comprising in combination a longitudinally extending rectangular lower section constructed so as to provide a plurality of compartments adapted to receive a refrigerating medium, a normally closed upper display section having glass in the front thereof and access doors at the back thereof, and receiving pans longitudinally arranged between the space that holds the refrigerating medium and the upper display section, the pans when in normal position collectively providing a dividing partition between the lower and the upper display sections, said case having along the upper part of the lower section a series of transversely extending supporting bars longitudinally arranged in spaced relationship and so that the spaced bars define the longitudinal arrangement of openings for the receiving pans, lugs on said case, some of which are arranged in relation to the transverse bars and others of which are arranged in relation to the top edge portions of the compartments, said pans having outwardly extending upper edge portions which when in normal position are supported by said lugs, said pans and the supporting structure thereof being such that each pan can, independent of any other pan, be moved into and out of normal position without any appreciable binding action.

6. A refrigerator display case comprising a lower section having a partition dividing the lower section into a plurality of compartments to receive refrigerating medium the partition being impervious except that it is constructed so as to provide an overflow establishing communication between the compartments so that if refrigerating liquid rises in one compartment above a predetermned level it will overflow to the other compartment, an overflow pipe leading from one of the compartments, a plugged drain outlet at the lower portion of each compartment, an upper display section, and means between the sections for the support of commodities to be viewed through the display section.

7. A refrigerator display case comprising a lower section having a partition dividing the section into a plurality of compartments to receive

a refrigerating medium, the partition constructed to provide an overflow at its upper portion to thereby permit communication between the compartments so that as refrigerating liquid rises in one compartment above a predetermined level it will overflow past said partition to the other compartment, an overflow pipe leading from one of the compartments, and means between the sections for the support of commodities to be refrigerated in the lower section and to be viewed through the upper section.

8. A refrigerator display case comprising a longitudinally extending lower section to contain a refrigerating medium, an upper longitudinally extending display section provided with a transparent front and a rear opening, a movable closure means for said rear opening, relatively narrow transversely extending spaced bars extending entirely across the lower section at the upper portion of said lower section, and a series of pans having marginal flanges and arranged in parallelism and suspended by said flanges from said bars and by the sides and ends of said lower section and partially submerged in refrigerating medium contained in the lower section and in conjunction with said bars and said sides and ends of the lower section providing in effect a partition between said lower and upper sections such as to maintain a substantially even temperature in said upper section and within the pans irrespective of opening and closing movements of said movable closure means.

9. A refrigerating display case comprising a rectangular box shaped lower section divided into separate compartments to receive refrigerating medium, an upper longitudinally extending display section, a plurality of removable pans arranged between said sections and partially submerged in the refrigerating medium in said compartments so as to directly conduct the cooling effect of the refrigerating medium to the air within the pans, and means whereby to vary the degree of temperature in said compartments, said lower section having a transverse supporting bar between adjacent pans for assisting in holding the latter in place.

10. A refrigerator display case comprising a lower section divided into separate compartments to receive refrigerating medium, an upper display section, a plurality of removable pans arranged between said sections and partially submerged in the refrigerating medium in said compartments so as to transmit the cooling effect from the refrigerating medium to the air within the pans, and means for providing for a different temperature in one compartment as compared with the degree of temperature in the other compartment, said lower section having a transverse supporting bar between adjacent pans for assisting in holding the latter in place.

11. A refrigerator display case comprising a lower section containing a refrigerating medium, an upper display section, transversely extending spaced bars arranged at the upper portion of said lower section and having lateral projections thereon, the inner faces of the walls of the lower section also having projections thereon disposed in alignment with the projections of said bars, a series of pans arranged in parallelism and supported by said projections of the bars and lower section and partially submerged in the refrigerating medium in the lower section and in conjunction with said bars and the walls of the lower section providing in effect a partition between said lower and upper sections such as to maintain a substantially even temperature in said upper section and within the pans.

12. A refrigerator display case comprising a lower section to contain a refrigerating medium, an upper display section, transversely extending bars extending entirely across the lower section at the upper portion thereof, a series of longitudinally arranged pans each of which is removably supported in the lower section and partially submerged in refrigerating medium contained in the lower section, there being one of said bars between adjacent pans, said pans being supported as aforesaid by engagement of the flanges of the pans with the respective bars and with the sides of the top of the lower section and with the outer side flanges of the end pans disposed adjacent the upper ends of the lower section, said pans and bars forming in effect a partition between the lower and upper sections such as to maintain a substantially even temperature in said upper section and within the pans, and means supported on each bar between the ends thereof for engaging side flanges of adjacent pans so as to bind the pans with relation to the respective bars and thereby maintain the pans against floating movement incident to a rise of the refrigerating medium above a predetermined level in the lower section.

13. A refrigerator display case comprising a lower section having spaced pans, a partition extending upwardly and into the space between adjacent pans and dividing the lower section into a plurality of compartments to receive refrigerating medium, the partition having an overflow opening located above the bottom of the pans and thereby establishing communication between the compartments if and when refrigerating liquid rises in one compartment above a predetermined level which is above the bottom of the pans but below the top of the pans, the liquid will flow through said overflow opening to the other compartment, and an overflow pipe leading from one of the compartments, the entrance end of which overflow pipe extends above the bottom of the pans but terminates below the top of the pans.

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CERTIFICATE OF CORRECTION.

Patent No. 1,932,694. October 31, 1933.

LEONARD G. GRAY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 27, after "juices" insert the word and; and line 37, for "arrangemet" read arrangement; page 4, lines 86-87, claim 4, for "parttion" read partition; and line 136, claim 6, after "medium" insert a comma; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of November, A. D. 1933.

(Seal)

F. M. Hopkins
Acting Commissioner of Patents.