A. A. KLEIN.

LARDER.

APPLICATION FILED JUNE 20, 1917.

1,433,894. Patented Oct. 31, 1922.

Fig. 1.

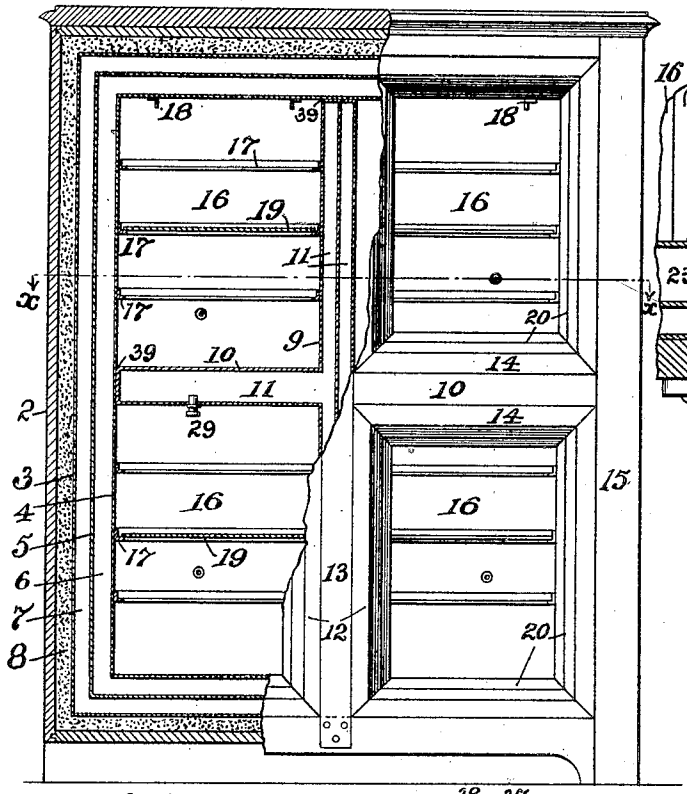


Fig. 3.

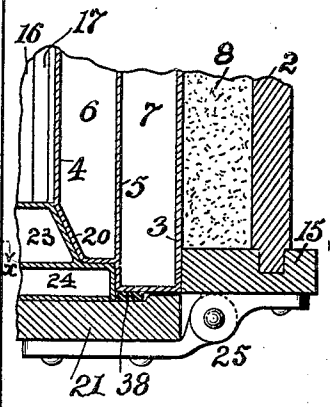


Fig. 4.

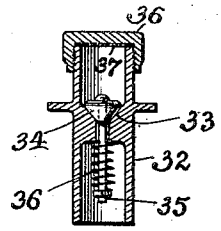
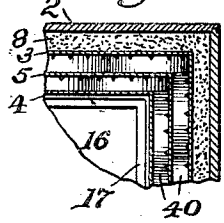


Fig. 5.





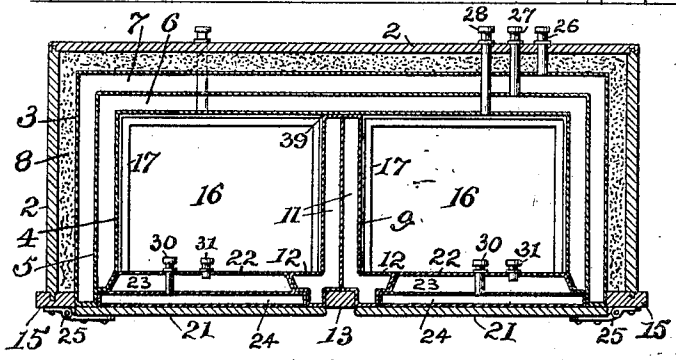


Fig. 2.

Fig. 6.

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UNITED STATES PATENT OFFICE.

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LARDER.

Application filed June 20, 1917. Serial No. 175,741.

To all whom it may concern:

Be it known that I, ADOLPH A. KLEIN, a citizen of the United States, and resident of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Larders, of which the following is a specification.

The object of my invention is to provide an improved construction of larder for the preservation of food, which embodies features, such that the preservation of food for longer periods than with the refrigerators of the usual character employed for household purposes, is possible; and whereby my improvement may be utilized with or without cooling, as desired.

In refrigerators as commonly employed for household use in the preservation of foods, dependence is made upon the refrigerating effect of a medium such as ice and thereby subjects the food to a moist atmosphere, which facilitates decomposition, that is only in a minor measure stayed by the refrigerating action, which in a measure arrests fermentation and decomposition by lessening the chemical action.

More particularly, the object of my invention is to provide a construction of larder, which wholly or in part may dispense with the use of ice or other refrigerants and which, moreover, is so constructed that a substantial vacuum is provided in the walls of the larder and in the doors thereof, and in addition thereto, provision is made for exhausting the air contents of the interchambers or compartments wherein the food is placed so that not only is the food maintained in a relatively dry state but is surrounded with a very low tension atmosphere which, because of the lack of moisture, prevents decomposition and which, moreover, is maintained in a normal condition by the surrounding vacuous envelope formed by the walls and doors of the larder.

With the above and other objects in view, the nature of which will be more fully understood from the descrpition hereinafter, my invention further consists in a novel construction of larder, as hereinafter more fully described and defined in the claims.

For the purpose of illustrating my invention, I have shown in the accompanying drawings, the form thereof, which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, but it is to be understood that the several instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities, as herein shown and described.

Referring to the drawings, Fig. 1 is a front elevation of a larder embodying my improvements with a portion broken away and the doors removed; Fig. 2 is a sectional plan view thereof taken on line x—x of Fig. 1; Fig. 3 is an enlarged view at one corner of Fig. 2; Fig. 4 is a sectional view illustrating one of the vacuum valves; Fig. 5 is a sectional plan view corresponding to a portion of Fig. 2 but showing the spacing metal strips in the vacuum wall spaces; and Fig. 6 is a perspective view of a portion of the metal filling thereof.

2 is the outside wooden cabinet of the larder and has the front frames 13 and 15 for more conveniently providing support for the doors 21, which may be hinged in position in the usual way by hinges 25. These doors are omitted from Fig. 1 so as to show the interior construction of the larder to better advantage. Within the wooden cabinet and separated therefrom by a non-conducting packing or filling 8 is a metallic box-shaped structure formed of walls one within the other to provide compartments or spaces between them. As shown, there are three of these walls indicated at 3, 4 and 5, and forming between them, the chambers 6 and 7. This boxlike structure is open at the front where it is covered by the door structures described hereinafter. Where it is desired to provide a plurality of compartments 16 in which to place the food, the interior of the boxlike structure may be divided by a cross shape frame of metal snugly fitting its side walls on the interior. This cross shape frame is indicated at 9 and 10 and is formed of sheet metal and provides the inner hollow compartment 11. In this manner each of the compartments 16 is surrounded on the back, top, bottom, and sides with hollow compartments and metallic walls. At the front where the doors are arranged, the boxlike structure has its top, bottom and side walls shaped as indicated at 20 so as to be adapted to make a relatively tight joint with properly shaped doors as will be understood by reference to Figs. 2 and 3. The cross shape inner frame 9 and 10 has at its front portion

laterally projecting parts 12 and 14 similarly shaped to the portions 20 of the boxlike structure so that when the two frames are put together as indicated, the entrance to the compartment 16 provides surrounding boundaries 12, 14 and 20, which are snugly fitted by the doors as indicated. The frame 13 at the front of the cabinet holds the cross shape frame 9 and 10 snugly in position within the boxlike structure and provides an outside finish.

The inner walls 4 of the boxlike structure and walls 9 of the cross shape frame may be strengthened by angle irons as indicated at 17 and 18, and moreover, the angle iron 17 on the sides may be utilized to support trays or shelves 19.

26 and 27 are vacuum valves which communicate with the compartments 7 and 6, respectively, of the boxlike structure and through which the air from said compartments may be exhausted to provide a substantial vacuum within said compartments, the effect of which is to materially prevent the conduction of heat from the outside atmosphere to the inner compartment 16. This non-conduction of heat is further prevented by the presence of the non-conducting packing 8 between the wooden outer shell 2 of the cabinet and the inner metallic boxlike structure. The constructing of these valves may be of the character illustrated in Fig. 4, in which is shown a tubular body 32 having a valve seat 33, to which is fitted a rubber valve 34, having a stem 35 around which is placed a spring 36 to normally hold the valve upon its seat. This valve 33 opens outward so that when the vacuum is maintained, it tends to draw the valve tightly upon its seat and prevent inflow of air. The body part 32 is soldered tightly to the metallic casing so as to communicate with the proper compartment therein. The outer end of the body extends beyond the wooden cabinet 2 and is screw threaded for the reception of a cap 36, having on its interior a rubber packing 37 so that when the cap is screwed tightly in place, it hermetically seals the valve device against any inflow of air and thereby doubly secures the maintenance of the partial vacuum within the compartment. When it is desired to exhaust the air from the compartments 6 and 7, the caps 36 are removed from the valve devices 26 and 27 and a suitable vacuum pump is successively screwed upon the bodies of the valves and when the proper extent of vacuum is secured, the vacuum pump is removed and the cap in each instance is screwed back in place.

The air may be exhausted from the compartments 11 in the cross shape frame 9 and 10 by the use of a vacuum pump and similar vacuum valves 29, one of which is indicated in Fig. 1. In this case, I have shown the valve as opening into one of the compartments, but I do not restrict myself as to the location of this valve as it may be placed in any convenient position.

The doors 21 may have wooden outer portions to which the hinges 25 are attached, but on their inner portions they are provided with metal bodies in which the sheet metal is so shaped as to provide double compartments or chambers 23 and 24 with bounding walls shaped to snugly fit the entrance walls 20 before referred to, as will be readily understood by reference to Figs. 2 and 3. The particular shape of the coacting parts of the doors and the boxlike structure and cross shape frame is not material so long as these parts provide reasonably snug joints. To insure a hermetically sealing of the doors so that a partial vacuum may be maintained in the compartments 16, these doors may be provided with rubber packing 38 (Fig. 3). The doors may each be provided with vacuum valves 30 and 31 through which the air from the compartments 24 and 23, respectively, may be exhausted so that the doors may provide non-conducting walls against the passage of heat as well as the main body of the larder.

Aside from the employment of vacuum valves for the surrounding compartments to the food compartments 16, additional valves of a similar nature may be provided for each of these compartments, one of which is indicated at 28 in Fig. 2. By the employment of a vacuum pump, the air from the compartment 16 may be exhausted through the said vacuum valves 28 when the doors 21 have been tightly closed. In this manner the food may be sealed within a chamber which not only is devoid of moisture but is also non-conducting to heat and consequently such internal moisture as the food itself may contain is not affected by the application of objectionable heat, such as would occur if it were not for the non-conducting walls of the compartment on all sides. By having a number of compartments 16 for receiving food, access may be had to any one without disturbing the vacuum condition of the others. It is manifest, however, that it will suffice that the entire interior of all the compartments 16 may be exhausted at the same time through one vacuum valve and by employing a pump of sufficient capacity, this may be speedily accomplished. Where the larders are of large size, such as in market establishments, butchers' shops and large restaurants, the vacuum creating devices may be power driven, but this forms no part of my present invention.

As there will be a material tendency to cause the walls 3 and 4 as well as the walls of the inner frame 9 and 10 to collapse under the atmospheric pressure when the

vacuum is produced within the compartments 7, 6 and 11, I have found it expedient to prevent this tendency of collapsing by introducing into the compartments spacing strips of the character illustrated in Fig. 6, these comprising corrugated ribbons 40 notched on the edge as at 41 and coiled or otherwise irregularly wound so as to loosely fill the compartments aforesaid. The character of this filling when in place is illustrated in Fig. 5. I have not shown these filling strips in Figs. 1, 2 and 3 because it would have more or less confused the drawing. It will suffice therefore to state that if desired, all of these spaces 6, 7 and 11, and if desired, 23 and 24 on the doors also, may be filled with the strips 40 in the manner illustrated in Fig. 5. Broadly considered, any other suitable means for preventing collapsing of the walls may be employed, if so desired. Such means is in a measure shown by the use of the angle irons 17 and 18.

It will be manifest that, if the different compartments 16 for receiving the food are to be hermetically sealed as it were one from the other, it would be desirable that the abutting surfaces of the cross frame 9 and 10 shall be soldered to the inner wall or lining 4 of the boxlike structure, this being merely a shop practise for securing a tight joint. Such soldered joints would be at 39, for example.

I have found in practise that a larder constructed on the principals hereinbefore described is exceedingly effective in preserving foods and resisting the atmosphereic heat. I have also found that, where desired, ice may be employed for cooling purposes with good results, though in this case a moist atmosphere is more or less present and to that extent objectionable. However, it will be apparent that, one or more of the compartments 16 may be employed as ice receivers and through proximity to the other or adjacent compartments 16 exhausted of the air may tend to keep the same in a cool condition by chilling the metal constituting the walls of the structure. Such compartments as containing the ice may also be utilized, for storage of bottled goods or those things which are not materially affected by moisture, or where the articles are required to be kept cold and preserved for only short periods. It will, therefore, be apparent that my improved larder may be utilized for the preservation of food without any refrigeration, or where desired, it may be used in association with a refrigerant such as ice in one or more of the compartments; and in this latter case, the compartments containing the ice may be exhausted, if so desired, of the air content.

While I have described my improvements in the form which I have found well suited to the requirements of commercial use, nevertheless, I do not confine or restrict myself to the details, as these are susceptible of modification and changes within the scope of mechanical skill without departing from the spirit of the invention.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. An improved larder comprising a boxlike structure having an open front and with hollow walls in which a partial vacuum is maintained, combined with a self contained interior hollow wall structure in the form of a cross dividing the interior compartment of the boxlike structure into several smaller compartments, said interior hollow wall structure having a partial vacuum maintained therein, and a plurality of hinged doors to close the entrances to the respective smaller compartments, said doors also providing hollow walls in which a partial vacuum is maintained.

2. An improved larder comprising a boxlike structure having an open front and with hollow walls in which a partial vacuum is maintained, combined with a self contained interior hollow wall structure having vertical and horizontal portions dividing the interior compartment of the boxlike structure into several smaller compartments and in which a partial vacuum is maintained, a plurality of hinged doors to close the entrances to the respective smaller compartments, said doors providing hollow walls in which a partial vacuum is maintained, means for hermetically sealing the plurality of doors when in closed positions, and vacuum valve devices opening through the walls of the boxlike structure to permit the air to be exhausted from each of the hermetically sealed compartments after the doors are closed.

In testimony of which invention, I hereunto set my hand.

ADOLPH A. KLEIN.

Witnesses:
WM. H. SMITH,
E. W. SMITH.