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2,652,601

REFRIGERATOR DOOR CONSTRUCTION

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Fig. 1.

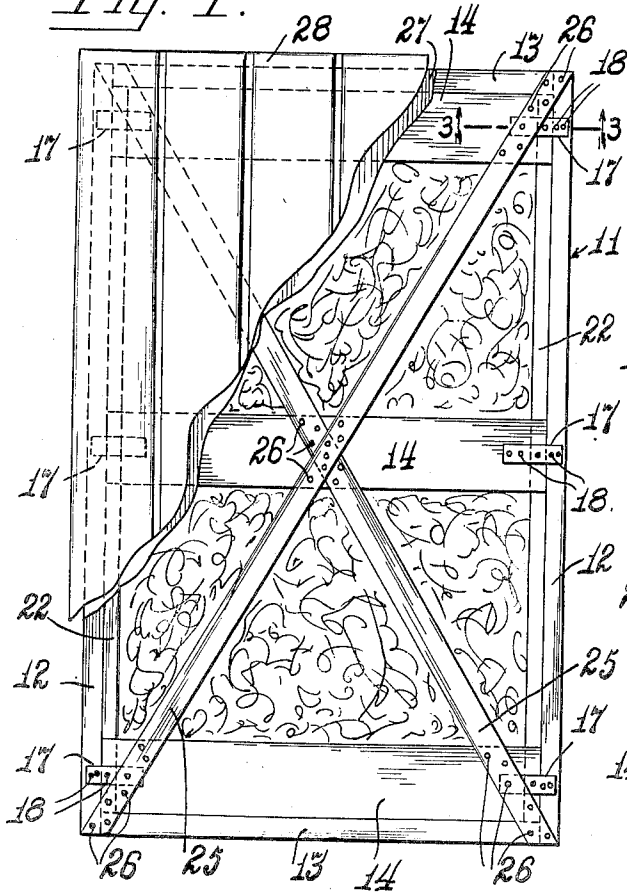


Fig. 2.

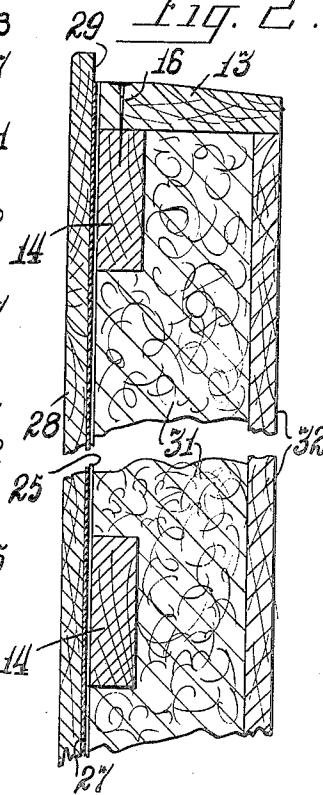


Fig. 3.

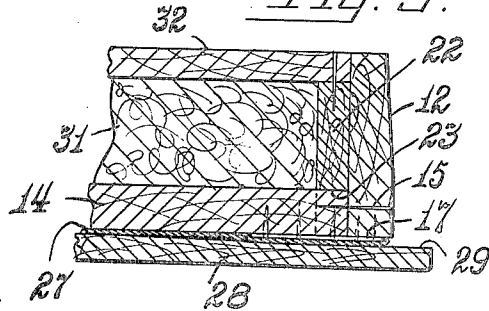
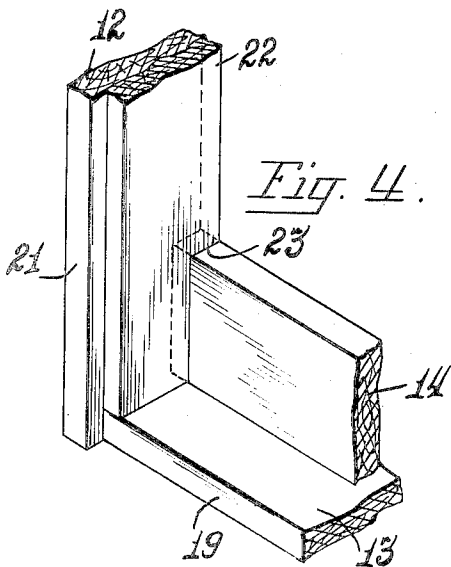


Fig. 4.



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REFRIGERATOR DOOR CONSTRUCTION

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5 Claims. (Cl. 20—35)

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The invention relates to improvements in the construction of doors for cold storage rooms and more particularly to a rugged door embodying novel structural features and novel means of reinforcement.

Doors for cold storage rooms are heavily constructed to withstand much abuse and are provided with hollow interiors which are filled with thermal insulation material. Conventional doors of this character include a frame structure made of wood, including heavy cross braces intermediate its ends and diagonal bracing of heavy timbers to prevent sagging. All of these members are located within the interior space intended to receive the thermal insulation material. Quite obviously, the presence of heavy timber diagonal bracing not only adds considerably to the cost of constructing the door but reduces the insulation qualities of the door.

It is, therefore, an object of the present invention to provide a novel heavy duty door for cold storage rooms, the construction of which obviates the need for heavy diagonal bracing and increases the space in which insulation material may be arranged.

Another object of the invention is to provide a door structure with novel means of reinforcement particularly at the joints between the uprights and cross braces.

Another object is to provide novel diagonal bracing for the frame of a heavy insulated refrigerator door.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel features of construction, arrangement and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

For the purpose of facilitating an understanding of our invention, we have illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, our invention, its mode of construction, assembly and operation, and many of its advantages should be readily understood and appreciated.

Referring to the drawings in which the same characters of reference are employed to indicate

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corresponding or similar parts throughout the several figures of the drawings:

Fig. 1 is a front elevational view of a door for cold storage rooms embodying features of the present invention and showing the front sheathing partially broken away to expose the interior construction thereof.

Fig. 2 is a fragmentary vertical sectional view through the top and medial portions of the door.

Fig. 3 is a fragmentary horizontal sectional detail view, taken substantially on line 3—3 of Fig. 1.

Fig. 4 is a fragmentary perspective view of the door frame showing its corner construction.

Referring particularly to the accompanying drawings, the door illustrated and embodying the features of the present invention is of the character known as a walk-in cold storage door. The construction embodied therein is, of course, susceptible of being incorporated in related types of refrigerator doors.

As illustrated, the door structure includes a frame, generally indicated at 11, which frame consists of uprights 12 and connecting end members 13. The uprights and end members are connected together at their points of abutment preferably by nails or similar securing devices, although it is evident that other means may be employed.

A plurality of cross braces 14 extend transversely of and constitute a part of the door frame. These braces are formed of heavy timber and, of the three illustrated, one is located closely adjacent to each end of the door frame with an edge thereof in firm abutment with the opposed inside face of the associated end member 13. The other cross brace 14 may be located centrally of the door frame. If desired several intermediate cross braces 14 may be provided inwardly of the frame ends depending upon the size of the door. These cross braces 14 are anchored in place, as by nails 15, driven into their ends through the uprights 12 and by nails 16, driven into their side margins through the end members 13. All of the cross braces are located so as to dispose one of their faces flush with one face of the frame structure.

In order to minimize the possibility of opening of the joints between the cross braces 14 and the uprights 12, anchor plates 17 are arranged one to bridge each joint. These anchor plates are fashioned from light weight sheet metal stock such as, for example, 24 or 26 gauge, and each is firmly secured to the upright and its associated cross brace 14, as by nails 18.

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Upon referring to Fig. 4, it will be noted that the back edge 19 of the end member 13 is offset inwardly from the back edge 21 of the upright 12. The purpose of this will be explained presently. The frame 11 also includes means to additionally reinforce the mounting of the cross braces 14. To this end, a strip of wood stock 22, having a width corresponding to the width of the end members 13, is laid against the inside face of each upright 12 and is suitably secured thereto as by means of nails or other anchoring devices, not shown. Each strip 22 is cut away, notched, or recessed, as is illustrated, for example, at 23, to fit snugly about the cross braces 14. In this manner, each cross brace 14 is firmly seated in a recess in addition to its being secured by the nails 15 or the nails 15 and 16 and by the anchor plates 17. The frame structure is thereby made very rigid and it is accordingly capable of withstanding considerable abuse normal in the industry in which it is used.

Doors of the kind disclosed herein are hung along one of their vertical edges by means of suitable hinges not shown. This means that the entire weight of the door is carried by the portions thereof connected to its mounting by such hinges. A door constructed of heavy timbers, such as the instant door, and which additionally contains thermal insulation material and facings to be described presently, will sag after a short period of use unless adequately braced. Heretofore such bracing consisted of the arranging of diagonal braces of heavy timbers between the cross braces 14. The presence of such heavy diagonal bracing within the interior of the door structure greatly reduced the available space within which insulation material could be arranged. As a result, doors constructed along prior lines are inadequately insulated.

In the present disclosure, the required diagonal bracing is afforded by providing at least one diagonal brace 25 which is formed from light weight sheet metal strap stock such as, for example, 24 to 26 gauge steel. The diagonal brace 25 is laid over the flush face of the door frame and it extends from an upper corner thereof diagonally down to the opposite lower corner. It is suitably secured in place by nails 26 which are driven therethrough at selected points of intersection between the brace 25 and underlying portions of the frame 11. In the present disclosure, two diagonal braces 25 have been illustrated and they are arranged in cross formation. Although a single diagonal brace will function efficiently to carry the weight of the door when it is hung vertically by means of hinges secured to one edge thereof, the presence of two diagonal braces adopts the door structure for hanging along either of its vertical edges without modification.

After the diagonal brace or braces have been secured firmly in place one or more layers of sheet insulation material 27, such as building felt, are laid over the flush face of the door and sheathing 28 is then laid thereover. The sheathing 28 is secured to the door frame in a conventional manner not specifically disclosed herein. It might be noted, however, that if desired, the sheathing 28 may extend beyond some or all of the edges of the door frame 11 so as to provide a marginal abutment flange 29. The entire interior of the door frame is then filled with thermal insulation material 31 and sheathing 32 is secured over the back of the door frame to completely enclose the structure. The sheathing 32 does not overlie the uprights 12 but instead is seated upon and secured

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to the back edges of the strips 22 so as to lie flush with the back edges 21 of the uprights 12.

It should be evident at this time that a door structure has been provided which is constructed very rigidly and is adequately braced to prevent sagging without in any way utilizing any of the space required for the reception of insulation material so as to thereby afford a door structure having maximum insulation qualities and capable of withstanding much abuse without warping or sagging.

It is believed that our invention, its mode of construction and assembly, and many of its advantages should be readily understood from the foregoing without further description, and it should also be manifest that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are nevertheless capable of wide variation within the purview of our invention as defined in the appended claims.

What we claim and desire to secure by Letters Patent of the United States is:

1. A construction for doors having a frame including uprights and connecting end members, cross braces extending between the uprights with one in edge abutment with the inside face of a related end member, said cross braces having one of their faces flush with one face of the frame, inner strips one overlying and secured to the inside face of each upright, said strips each having notches on one edge to fit snugly around the cross braces, the other edge of said strips lying inwardly of the other face of said frame, a facing overlying the flush face of the frame, said facing extending beyond the perimeter of the frame to define abutment of surfaces, a facing on the other side of said frame, said last named facing being secured to the inwardly offset edges of the inner strips, and insulation material filling the space within the frame and between said facings.

2. A construction for doors having a frame including uprights and connecting end members, cross braces extending between the uprights with one in edge abutment with the inside face of a related end member, said cross braces having one of their faces flush with one face of the frame, inner strips one overlying and secured to the inside face of each upright, said strips each having notches on one edge to fit snugly around the cross braces, the other edge of said strips lying inwardly of the other face of said frame, sheathing overlying the flush face of the frame, at least one thickness of sheet insulation material underlying said sheathing, a facing on the other side of said frame, said facing being secured to the inwardly offset edges of the inner strips, and insulation material filling the space within the frame and between the sheathing and facing.

3. A construction for doors having a frame including uprights and connecting end members, cross braces extending between the uprights with one in edge abutment with the inside face of a related end member, said cross braces having one of their faces flush with one face of the frame, nails securing the cross braces to the uprights and to the end members, inner strips one overlying the inside face of each upright, said strips each having notches on one edge to fit snugly around the cross braces when said edge is positioned substantially flush with the flush face of the frame, the other edge of said strips lying inwardly of the other face of said frame, sheathing overlying the flush face of the frame, at least one thickness

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of sheet insulation material underlying said sheathing, a facing on the other side of said frame, said facing being secured to the inwardly offset edges of the inner strips, and insulation material filling the space within the frame and between the sheathing and facing.

4. A construction for doors having a frame including uprights and connecting end members, cross braces extending between the uprights with one in abutment with each end member, said cross braces having one of their faces flush with one face of the frame, a plurality of anchor straps consisting of light gauge strap metal one bridging the joint between each end of each cross brace and overlying the edge of the related upright, nails securing the anchor straps in place, inner strips one overlying the inside face of each upright, said strips having recesses on one edge to receive the cross braces therein so that said edge may lie substantially flush with the aforementioned face of the frame, a diagonal brace overlying the said face of the frame and extending from one corner to an opposite corner, said diagonal brace consisting of light gauge strap metal, nails securing said diagonal brace to the frame and to the cross braces where they intersect, insulation material filling the spaces within the frame, and a facing on each face of the frame, the facing on the side of the frame carrying the anchor straps and diagonal brace overlying said straps and braces to effectively conceal the same.

5. A construction for doors having a frame including uprights and connecting end members, cross braces extending between the uprights with one in abutment with each end member, said cross braces having one of their faces flush with

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one face of the frame, inner strips one overlying the inside face of each upright, said strips having notches on one edge to receive the cross braces therein so that said edge may lie substantially flush with the aforementioned face of the frame, diagonal braces overlying the flush face of the frame and extending from corner to corner, said diagonal braces consisting of light gauge strap metal, nails securing said diagonal braces to the frame and to the cross braces where they intersect, insulation material filling the spaces within the frame, and a facing on each face of the frame, the facing on the frame face having the diagonal braces thereon overlying said braces.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,808,218	Griffin	June 2, 1931
1,866,146	Yurkovitch	Jan. 5, 1932
1,944,618	Sweeley et al.	Jan. 23, 1934
1,987,512	Leonard	Jan. 8, 1935
2,247,949	Kucher	July 1, 1941
2,339,566	Goulouze	Jan. 18, 1944

FOREIGN PATENTS

Number	Country	Date
50,263	Denmark	Mar. 20, 1935

OTHER REFERENCES

Publication, "Cold Storage Doors and Windows," by Jones Door Mfg. Co., February 1911, pages 13 through 20.