March 24, 1931. C. F. FITTER 1,797,228

HEAT INSULATION

Filed Nov. 20, 1928 2 Sheets-Sheet 1

Fig. 2.

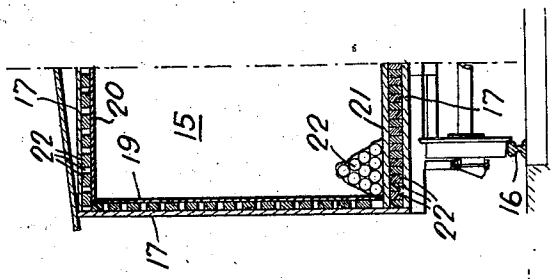


Fig. 1.

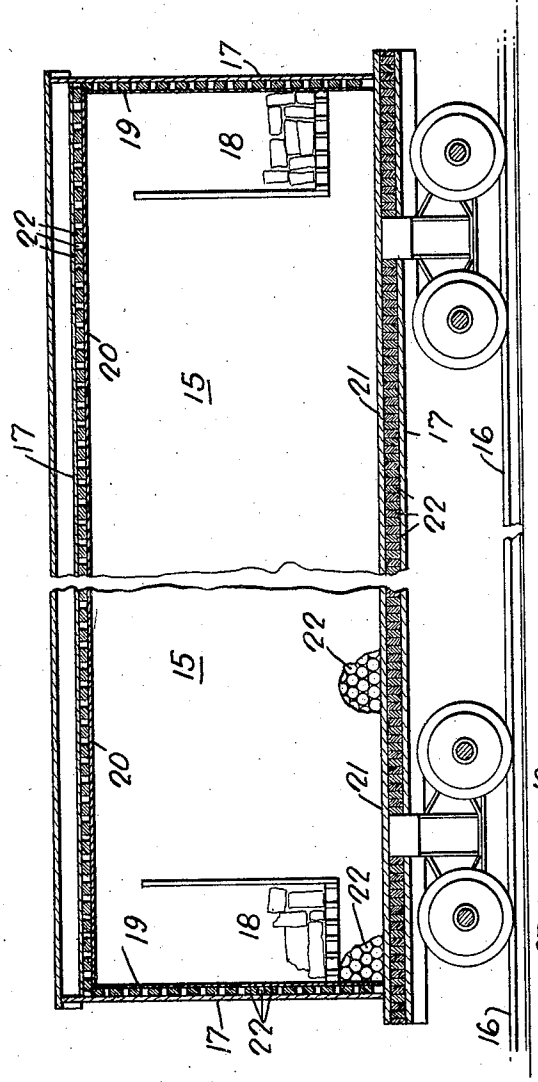


Fig. 4.

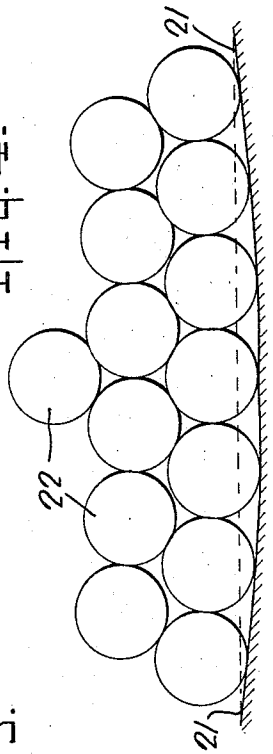
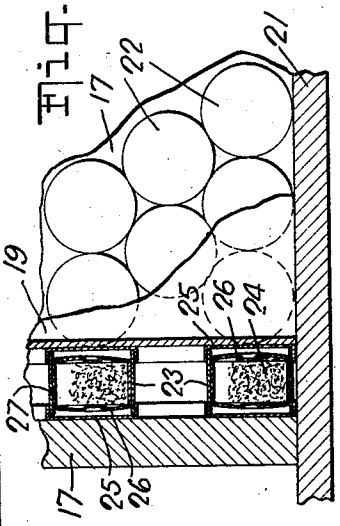


Fig. 3.



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March 24, 1931. C. F. FITTER 1,797,228

HEAT INSULATION

Filed Nov. 20, 1928 2 Sheets-Sheet 2

Fig. 5.

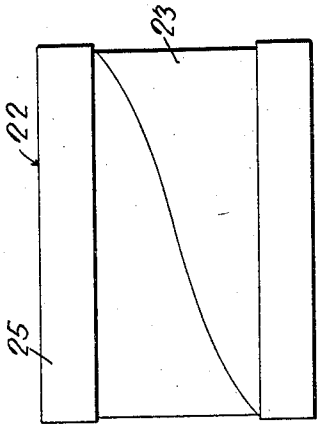


Fig. 7.

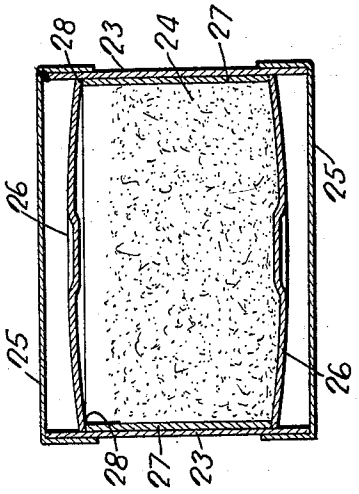


Fig. 9.

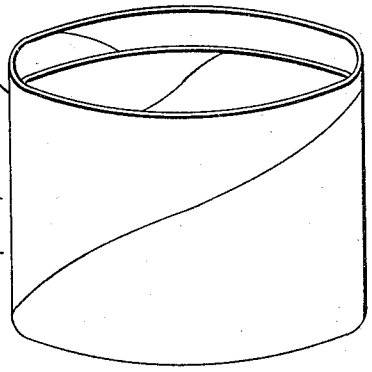


Fig. 10.

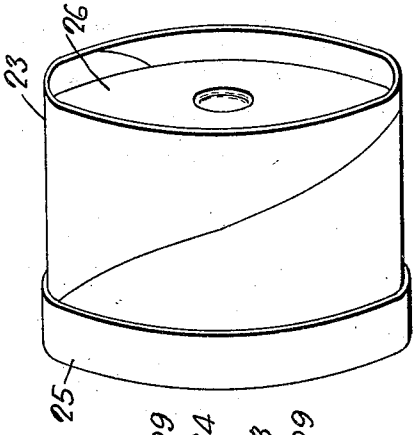


Fig. 6.

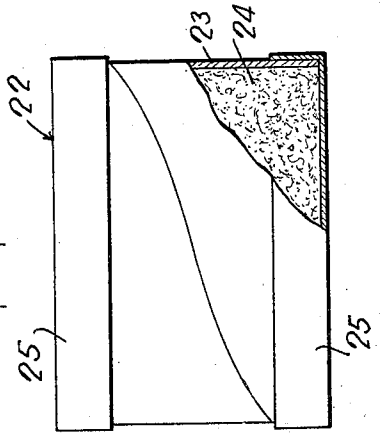
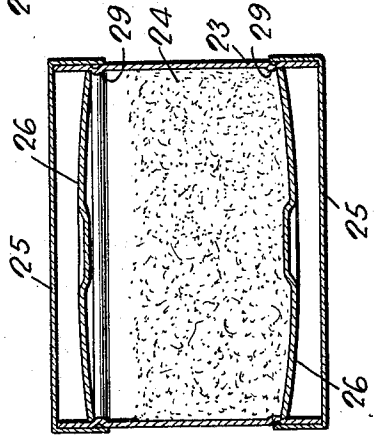


Fig. 8.



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UNITED STATES PATENT OFFICE

CHARLES F. FITTER, OF GREENWICH, CONNECTICUT

HEAT INSULATION

Application filed November 20, 1928. Serial No. 320,668.

This invention relates to the art of heat insulation and to a novel construction of heat-insulating walls particularly adapted for use in refrigeration, and, especially, in refrigerator cars and the like.

A general object of the present invention is to provide a novel and economical wall construction having high heat-insulating efficiency and adapted to withstand the wear and tear incident to use in refrigerator cars.

A more particular object of the invention is to provide a wall construction for refrigerator cars which adapts itself to the flexing of the car structure during use and under varying conditions of load whereby the heat-insulating efficiency of the wall is at all times maintained at a high level.

A further object of the invention is to provide a novel and simple construction of heat-insulating cell unit of high efficiency for use in the construction of the walls aforesaid.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a longitudinal, vertical sectional view of a refrigerator car having an improved form of wall structure and body therein;

Fig. 2 is a partial, transverse, vertical sectional view of Fig. 1;

Fig. 3 is a slightly enlarged detail view of the structure shown in Fig. 1 at the lower left-hand corner of the car body;

Fig. 4 is a diagrammatic view illustrative of the manner in which the novel heat-insulating wall construction adapts itself to the flexing variations in the car structure;

Fig. 5 is a side elevational view of one exemplification of the heat-insulating cell unit;

Fig. 6 is a similar view, partly broken away;

Fig. 7 is a vertical sectional view thereof;

Fig. 8 is a vertical sectional view of another construction of heat-insulating cell;

Fig. 9 is a side elevational view, slightly in perspective, of one portion of the cell shown in Fig. 7; and

Fig. 10 is a similar view, showing a cell in a further stage of assembly.

Referring more particularly to the drawings, in the exemplification comprising Figs. 1 to 4 inclusive, there is shown a refrigerator car 15 mounted on trucks 16 and having outer, side, end, top and bottom walls 17. Interiorly the car is also shown provided with ice compartments 18 and inner side and end walls 19, top wall 20 and a bottom wall 21.

The inner walls aforesaid are spaced from the outer walls and are substantially parallel thereto, and disposed therebetween are one or more layers of cellular heat-insulating cells 22 in the form of substantially cylindrical tubes 23, which are preferably at least partially filled with heat-insulating material 24, such as dry sawdust, powdered cork, Spanish moss or the like. The heat-insulating cell units 22 are stacked laterally upon each other, as is shown in Figs. 1 to 4 inclusive, and substantially fill the space between the inner and outer walls of the car, thereby providing an efficient heat insulation of the interior of the car. Also, as will be seen by particular reference to Fig. 4, the stacking of the cell units 22 in this manner permits the individual cell units and the heat-insulating wall as a whole readily to conform to the flexing of the walls of the car with respect to each other, and, particularly, the bottom wall 21 with respect to the side walls 19, during use without impairment of the insulating effect.

The tubular walls 23 of the heat-insulating units 22 may be formed from any convenient non-frangible material and need be only generally cylindrical in form. As is shown particularly on Figs. 5 to 10 of the drawings, they may be conveniently made of the usual type of spirally-wound pasteboard carton,

and the heat-insulating material 24 substantially fills each unit in a transverse plane.

By reference to Figs. 5 to 10, it will also be seen that the heat-insulating material 24 preferably is confined in the cells by means of a plug or cap or both. More particularly in Figs. 5 and 6, the ends of the cell are closed by a cap 25, whereas in the form of cells shown in Figs. 7, 9 and 10, the heat-insulating material is confined by a pair of plugs 26, which are held in place by frictional contact with the inner side of the walls 23. In order to insure proper seating of these plugs, it is preferable to provide the cell unit with an interiorly-disposed sleeve 27 forming the seats 28, as is shown in Fig. 7, or to crease the walls 23 to form beads 29, as is shown in Fig. 10.

Furthermore, in the form of heat-insulating unit shown in Figs. 7, 9 and 10, the utilization of both the plug 26 and the cap 25 provides a dead-air space at each end of the cell, which adds to the insulating effect of the confined heat-insulating material. It will be readily understood, of course, that, if desired, the cap 25 may be omitted, in which case, by proper positioning of the external and internal walls of the unit to be refrigerated, said walls will act as a cap and form, with the plugs 26, the dead-air spaces aforesaid.

In practice, it has also been found to be desirable to water-proof the units, as, for example, by coating and sealing them with wax or bituminous material in order that the heat-insulating material may be kept dry and its insulating efficiency maintained. Also, if desired, the heat-insulating material may be preformed as a pressed block and held in place by any suitable means, such as friction, or by the sealing material aforesaid.

Since certain changes may be made in the above construction, and different embodiments of the invention could be made, without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which as a matter of language might be said to fall therebetween.

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

1. A heat-insulating unit of the type described, comprising, in combination, a tubular member of non-frangible material, heat-insulating material filling said tubular member in a transverse plane, and means for retaining said heat-insulating material within said member; said retaining means comprising a plug inserted within said tubular member at each end adjacent the insulating material; said unit being treated in a manner adapted to preserve the insulating material in a dry state; said plugs contacting frictionally with the inside of said tubular member, and said tubular member being provided with means cooperating with the edges of said plugs for insuring even seating of the plugs.

2. A heat-insulating unit of the type described, comprising, in combination, a tubular member, of non-frangible material, heat-insulating material filling said tubular member in a transverse plane, and means for retaining said heat-insulating material within said member; said retaining means comprising a plug inserted within said tubular member at each end adjacent the insulating material, and said units being treated in a manner adapted to preserve the insulating material in a dry state; said tubular member being provided with means cooperating with the edges of said plug for insuring even seating of the plugs, said last-mentioned means comprising an internally-disposed circumferential shoulder within the tubular member.

3. A heat-insulating unit of the type described, comprising, in combination, a tubular member of non-frangible material, a heat-insulating material filling said tubular member in a transverse plane, and means for retaining said heat-insulating material within said member; said retaining means comprising a plug inserted within said tubular member at each end adjacent the insulating material; said units being treated in a manner adapted to preserve the insulating material in a dry state; said tubular member being provided with means cooperating with the edges of said plug for insuring even seating of the plugs, said last-mentioned means comprising an internally-disposed circumferential shoulder within the tubular member, and said shoulder being formed by inwardly beading the wall of the tubular member.

4. A heat-insulating unit of the type described, comprising, in combination, a tubular member of non-frangible material and being substantially filled in a transverse plane with heat-insulating material, a plug inserted within said tubular member at each end adjacent the insulating material and frictionally engaging said tubular member, means comprising an internally-disposed circumferential shoulder within the tubular member adapted to insure proper seating of the plugs and a cap on each end of said tubular member; each of said plugs and said caps being spaced to provide a dead-air space at the ends of the unit.

5. A refrigerator car, or the like, including, in combination, vertical walls, each comprising spaced parallel wall members, a plurality of relatively movable laterally-stacked loosely-contacting tubular members disposed be-

tween each pair of said parallel wall members, each of said tubular members being formed of non-frangible material and being substantially filled in a transverse plane with heat-insulating material; said stacked members being disposed to allow the insulating units to conform to the flexing of the walls during use of the car.

6. A heat-insulating wall, comprising, in combination, spaced side portions and a bottom portion arranged to permit flexing, and a plurality of individually movable laterally-stacked tubular members of non-frangible material and adapted for adjustment of their relative postions during the flexing of said wall, each of said tubular members being substantially filled in a transverse plane with heat-insulating material.

7. A heat-insulating wall, comprising, in combination, spaced side portions and a bottom portion arranged to permit flexing, and a plurality of individually movable laterally-stacked tubular members of non-frangible material and adapted for adjustment of their relative positions during the flexing of said wall, each of said tubular members being substantially filled in a transverse plane with heat-insulating material and having an air space on at least one side of said heat-insulating material.

8. A heat-insulating wall, comprising, in combination, spaced side portions and a bottom portion arranged to permit flexing, and a plurality of individually movable laterally-stacked tubular members of none-frangible material and adapted for adjustment of their relative positions during the flexing of said wall, each of said tubular members being substantially filled in a transvers plane with heat-insulating material, and having a dead-air space on both sides of said heat-insulating material.

In testimony whereof I affix my signature.

CHARLES F. FITTER.