May 30, 1933. D. H. CORLETTE 1,911,605

INSULATION CONSTRUCTION

Filed Sept. 10, 1930

Fig. 1

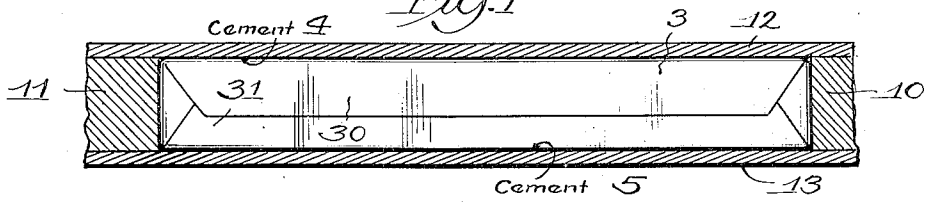



Fig. 2

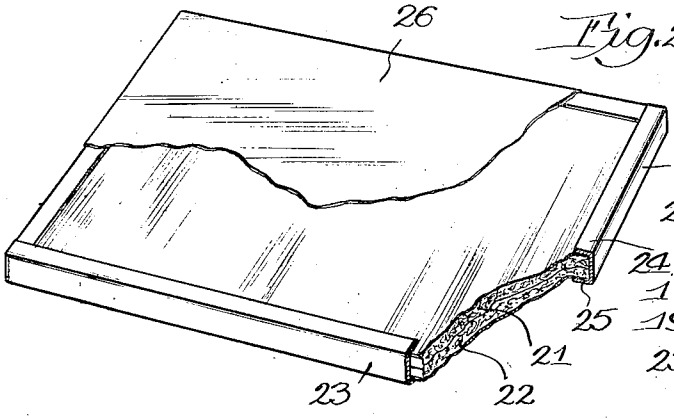



Fig. 3

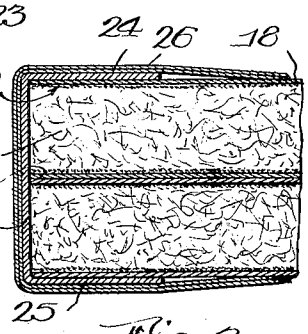



Fig. 4

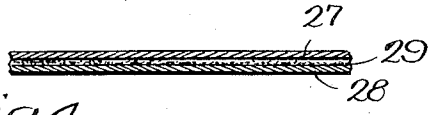



Fig. 5

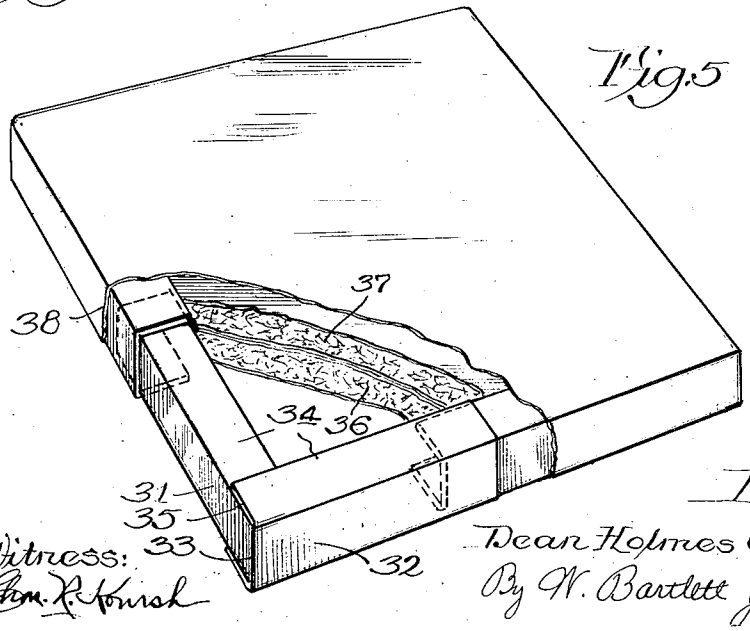
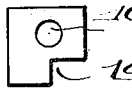



Fig. 6



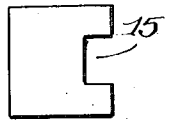




Fig. 7

Witness:
Chm. F. Kovish

Inventor,
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By W. Bartlett Jones, Atty

Patented May 30, 1933 1,911,605

# UNITED STATES PATENT OFFICE

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## INSULATION CONSTRUCTION

Application filed September 10, 1930. Serial No. 480,967.

The present invention relates to insulation units, such as panels, or blocks, of regular or irregular shape which may be inserted in recesses in certain structures.

The present invention has particular reference to units for use in the walls, doors and other parts of refrigerators, being capable of manufacture in specified shapes and dimensions to match individual recesses in frames or other structures, and to fit easily and snugly therein.

In constructions like refrigerators frame members are provided over which coverings, such as enamelled metal, provide a sanitary, durable strong surface, on both the interior and exterior of the refrigerator. The space between the coverings is usually filled with insulation material. The nature and character of the insulation material is important. The metal surfaces of this space may be somewhat irregular and rigid forms of insulation will not fit tightly against such surfaces, forming what is known as air pockets, such pockets promoting condensation as the air in these pockets contains moisture which is condensed on the metal surface whenever the temperature is below the dew point.

The dew point temperatures of the air contained in the air pockets become existent as soon as the temperature of the metal surface is lowered to a condition necessary for proper refrigeration inside the metal container. I have discovered that moisture accumulation in air pockets between the insulating material and metal surface is detrimental both to the metal as well as the insulation. Condensation will continue as long as the air pockets exist due to the partial vacuum formed by the condensation of the moisture in the air. The use of a flexible form of insulation will minimize the difference in vapor pressures that can exist between the moisture laden air on the warm side of the box and the cold moist air which is confined in the pockets between the insulating material and cold metal surfaces. I have further discovered that the flexible surface of the insulating material will adapt itself to the irregular surface of the metal more permanently through the use of an adhesive material cementing the unit to the metal. An alternative method of holding the flexible material against the metal lining is the use of a semi-rigid sheathing between the outside surface of the insulating material and the outside metal covering to retain, under pressure, the insulating material in place.

Although the unit is best described by reference to its use in refrigerators, it may be used elsewhere, as between studs and rafters in house constructions.

One object of the present invention is to provide an insulation unit for insertion into an insulated structure.

Another object of the invention is to provide a sealed insulation unit.

Still another object of the invention is to provide a substantially waterproof and moisture proof insulation unit and a construction embodying said unit.

Still another object of the invention is the provision of an insulation unit of fixed dimensions which is capable of yielding under compression in one or more of its dimensions.

A particular object of the invention is the provision of a novel structure of insulation unit.

Various other and ancillary objects and advantages of the invention will become apparent from the following description of the invention as set forth in the accompanying drawing in which:

Fig. 1 is a cross-sectional view of a structure containing an insulating unit shown in elevation.

Fig. 2 is a fragmentary perspective view of a unit with a fragmentary portion of the wrapping illustrated.

Fig. 3 is a detailed enlarged cross-sectional view of the structure of Fig. 2.

Fig. 4 is a detailed cross-section of the wrapping material.

Fig. 5 is a view of a modified form having a channel structure permitting compressibility of the unit.

Figs. 6 and 7 represent irregular shaped units embodying the invention.

It is to be understood that the invention is by no means limited to the structures par-

ticularly shown in the drawing and herein described. Various modifications and changes may be made as conditions may require, and it is therefore to be understood that the invention contemplates such changes and such other constructions as may fall within the scope of the invention as expressed in the appended claims.

The invention is herein illustrated as it may be employed for insulation in refrigerator units. In Fig. 1, members 10 and 11 are illustrative of frame members, bars, and the like, which form a recess between them for receiving the insulation unit. Coverings, such as enamelled metal sheeting 12 and 13 are illustrated, carried by the frame, and enclosing a unit 3, which may be cemented to the sheets 12 and 13 as shown at 4 and 5.

The character of recess to be filled determines the shape and size of the insulation unit 13. It may be rectangular as shown in Fig. 2, or it may have recesses as shown at 14 in Fig. 6 and at 15 in Fig. 7; or it may have an opening 16 as shown in Fig. 6.

In order to simplify the description, a rectangular unit will be described. Each unit involves a mat of insulation such as "Balsam wool". This is a flexible mat of wood fibers made according to the Weiss Patent No. 1,336,402. Balsam wool is obtained on the market in standard thicknesses of definite construction, and this material may be cut to size for constructing the units of this invention. Several layers may be piled to build up a unit. In Fig. 3, two layers are shown in detail, each comprising a body of matted fibers 17, secured to liners of paper 18 and 19, each cemented to the mat with an adhesive, such as a waterproof adhesive of asphalt 20.

In Fig. 2 these two layers are designated 21 and 22. The raw edges of the mats 17 in compression are subject to displacement of the fibers, and possible injury and loss thereof. The layers have a normal thickness, but are easily compressible. In order to preserve a given, and preferably the normal thickness, to protect the edges, and to facilitate installation, reinforcing means is placed around the edges of the built-up unit, I use preferably a strip of chip-board, a cheap cardboard wood pulp product, which has a width equal to the normal thickness of the unit, as designated at 23. This lies facewards against the edges of the insulation. In inserting the unit pressure must be exerted at one face of it. The mere strip 23 would require rather exacting care from the workmen to exert pressure on the periphery of the unit and at the edge of the strip 23. To prevent this, and further improve the protective character and to increase the advantages of the reinforcement I provide the strip 23 as a part of a channel form having the channel sides 24 and 25 which lie over the faces of the insulation material.

In Fig. 2 channels are shown having lengths equal to the four sides of the unit. They merely overlap at the corners. About the edge-protected layers, I wrap a covering 26, preferably a waterproof sheet, such as that shown in Fig. 4. Two layers of kraft paper 27 and 28 are cemented together with a waterproof adhesive such as asphalt 29. The covering 26 may be any coated sheet, an impregnated sheet, or it may be a duplex sheet of coated or impregnated material such as paper, in each instance a waterproof character being preferred. The sheet may be wrapped about the unit as any package would be wrapped, this being illustrated by the flaps 30 and 31 in Fig. 1. Asphalt cement may be used to seal the package, making it entirely waterproof and sealed.

The structure above described has substantially fixed dimensions determined by specified requirements. However, in practice, the recess may be scant to receive it, or the unit may be slightly oversize. Such conditions will cause considerable loss of time and material in the process of installing these units. In order to prevent such loss, and to provide for such irregularities, I may make the unit slightly compressible in one or more dimensions. In Fig. 5 a modified form is shown in which the four channel sides have a telescoping relation. Corner pieces of channel form are provided which extend along two adjacent sides sufficiently far to lap over other corner pieces. In Fig. 5 one corner is described. The portions designated 31 and 32 constitute one strip folded at 33. The attached channel sides such as 34 are originally continuous sides of a channel strip but have been severed at 35 to permit the fold 33. Each corner is similarly constructed. The interior has a structure like that of Fig. 2, comprising two layers 36 and 37, and the whole is wrapped and sealed by a waterproof covering 38.

The invention is of course not limited to the use of Balsam wool. Any fibrous or other form of compressible insulation material may be employed in the package in one or more layers without departing from the invention. In using the term "reinforce" with respect to the edge I intend to convey the idea that the means for that purpose imparts strength greater than the insulation normally and of itself provides. In using the term "substantially non-compressible" I mean of course such property as tested by the ordinary forces to which the unit is subjected in normal usage, as for example, that usage described hereinabove, and the normal forces encountered in commercial manufacture, handling, shipping, piling and storing of a plurality of units. Other changes and modifications are also permitted without departure from the spirit and scope

of the invention as it is expressed in the appended claims.

I claim:

1. An insulation unit comprising in combination a compressible thick sheet-like filler body of insulation material having a normal thickness, and strip stiffening means having a width substantially equal to said thickness lying facewards against the edges of said body, said means serving to define the thickness of the unit and to prevent compression of the filler and of the unit faceways of the unit.

2. An insulation unit comprising in combination a compressible thick sheet-like filler body of insulation material having a normal thickness, strip stiffening means having a width substantially equal to said thickness lying facewards against the edges of said body, and a covering wrapper about said strip means and insulation body, said means serving to define the thickness of the unit and to prevent compression of the filler and of the unit face-ways of the unit.

3. An insulation unit comprising in combination a compressible thick sheet-like filler body of insulation material having a normal thickness, strip stiffening means having a width substantially equal to said thickness lying facewards against the edges of said body, said means serving to define the thickness of the unit and to prevent compression of the filler and of the unit face-ways of the unit, and a sealed water-proof wrapper entirely enclosing said strip means and said insulation body in the form of a package.

4. An insulation unit comprising in combination a compressible thick sheet-like filler body of insulation material, and reinforcing channel-form means enclosing the edges of said body, said means being substantially non-compressible across the channel at the channel base, whereby to define the thickness of the unit and to resist compression of the filler and of the unit.

5. An insulation unit comprising in combination a compressible thick sheet-like filler body of insulation material having a normal thickness, and reinforcing channel-form means of opening substantially equal to said thickness enclosing the edges of said body, said means being substantially non-compressible across the channel at the channel base, whereby to define the thickness of the unit and to resist compression of the filler and of the unit.

6. An insulation unit comprising in combination a compressible thick sheet-like filler body of insulation material, reinforcing channel-form means enclosing the edges of said body, said means being substantially non-compressible across the channel at the channel base, whereby to define the thickness of the unit and to resist compression of the filler and of the unit, and a covering about said edge-protected body.

7. An insulation unit comprising in combination a compressible thick sheet-like filler body of insulation material, reinforcing channel-form means enclosing the edges of said body, said means being substantially non-compressible across the channel at the channel base, whereby to define the thickness of the unit and to resist compression of the filler and of the unit, and a sealed waterproof covering about said edge-protected body in the form of a package.

8 An insulation unit comprising in combination a compressible sheet-like filler body of insulation material having a normal thickness, reinforcing channel-form means of channel opening substantially equal to said thickness enclosing the edges of said body, said means being substantially non-compressible across the channel at the channel base, whereby to define the thickness of the unit and to resist compression of the filler and of the unit, and a water-proof wrapper entirely enclosing said reinforced body in the form of a package.

9. An insulation unit comprising in combination a compressible thick sheet-like body of insulation material, strip reinforcing means in telescopic relation lying facewards against the edges of said body, said strip means having a width substantially equal to the normal thickness of the body, and a wrapper for said means and said body.

10. An insulation unit comprising in combination a compressible thick sheet-like body of insulation material having a normal thickness, channel-form protecting means enclosing the edges of said body, each straight edge having telescoping channel-form means, and a wrapper for the said means and said body.

11. An insulation unit comprising in combination a rectangular compressible thick sheet-like body of insulation material, strip reinforcing means about the edges of said body, said means having a width substantially equal to the normal thickness of the body and being telescopically compressible along one of the other dimensions of the body, and a wrapper for said means and said body.

12. An insulation unit comprising in combination a rectangular thick sheet-like body of insulation material, corner pieces of channel-form enclosing the corners and edges of said body in overlapping telescopic relation along the edges, and a wrapper for said edge protected body.

13. An insulation unit in panel-like package form containing a filler of compressible insulating material, means in said unit at an edge thereof for imparting to said edge substantial non-compressibility in the plane of the edge in a direction perpendicular to the plane of the panel-form unit, said means be-

ing compressible in said plane in its second rectilinear dimension.

14. An insulation unit in panel-like package form containing a filler of compressible insulating material, means in said unit at the periphery thereof for imparting to said periphery substantial non-compressibility in a direction perpendicular to the plane of the panel-form unit, said means being compressible in the plane of the edge lengthwise of said edge.

15. An insulation unit in panel-like package form containing a filler of compressible insulating material, means in said unit at an edge thereof for imparting to said edge substantial non-compressibility in the plane of the edge in a direction perpendicular to the plane of the panel-form unit.

16. An insulation unit comprising a frame which is substantially rigid face-ways thereof for defining the thickness and periphery of the unit, a bulky compressible insulating filler normally filling the interior of said frame and highly compressible relative to the face-wise rigidity of the frame in the direction of said thickness, and a cover enclosing said frame and filler.

17. An insulation unit comprising a frame which is substantially rigid face-ways thereof for defining the thickness and periphery of the unit, a bulky compressible insulating filler normally filling the interior of said frame and highly compressible relative to the face-wise rigidity of the frame in the direction of said thickness, and a sealed waterproof cover enclosing said frame and filler.

In testimony whereof I have hereunto affixed my signature.

DEAN HOLMES CORLETTE.