Aug. 10, 1943. K. E. ZEIDLER 2,326,717

REFRIGERATOR CAR CONSTRUCTION

Filed Aug. 2, 1940 3 Sheets-Sheet 1

Fig. 1

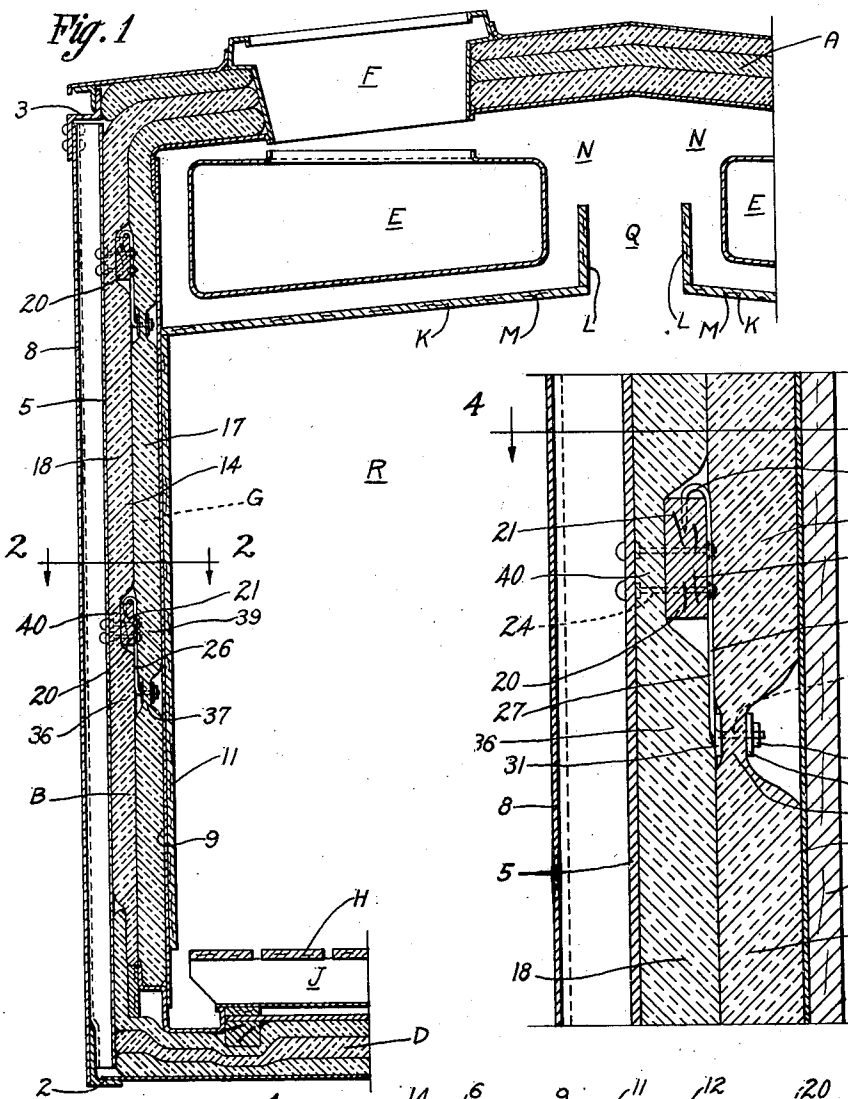


Fig. 2

Fig. 3

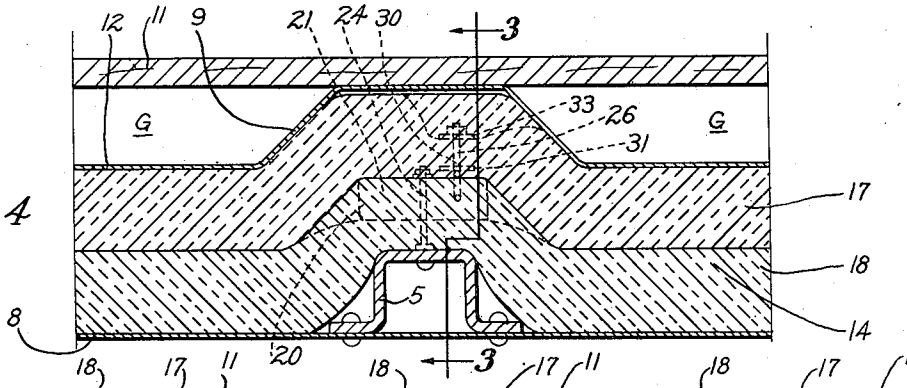
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Fig. 4



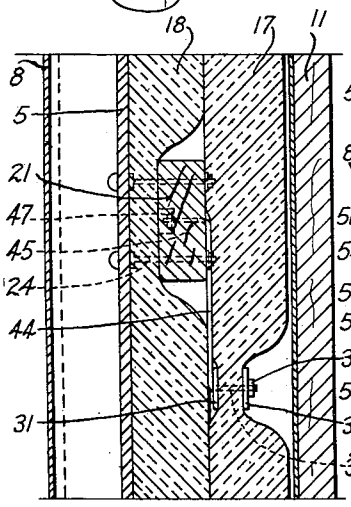


Fig. 5

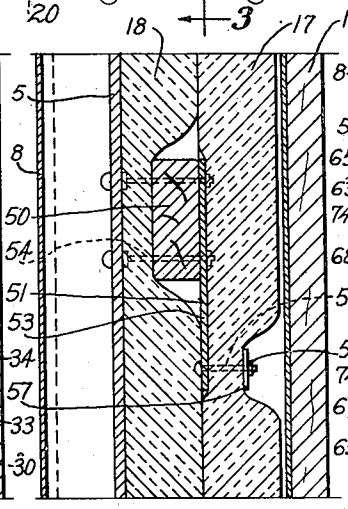


Fig. 6

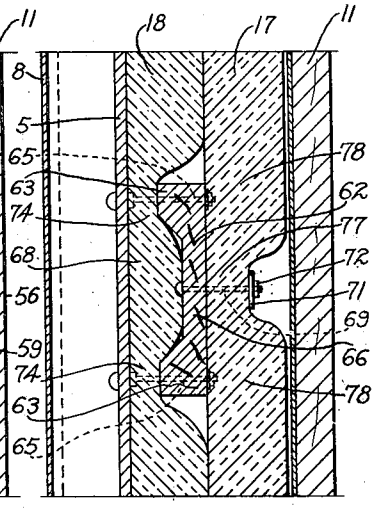


Fig. 7

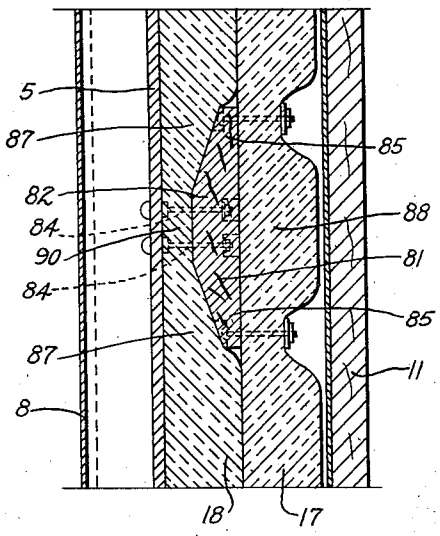


Fig. 8

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REFRIGERATOR CAR CONSTRUCTION

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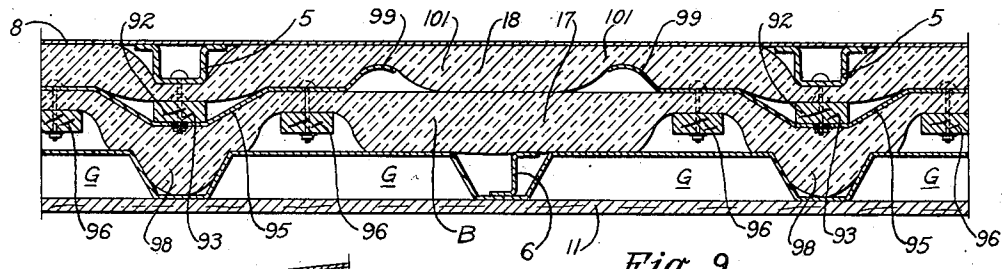


Fig. 9

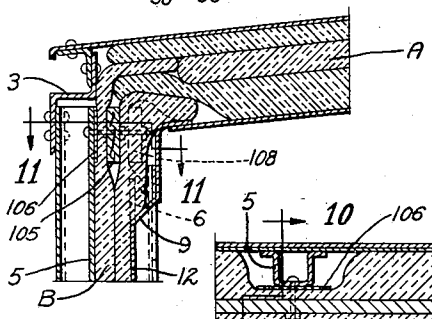


Fig. 10

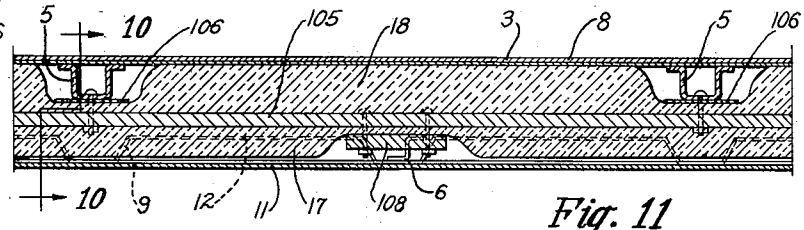


Fig. 11

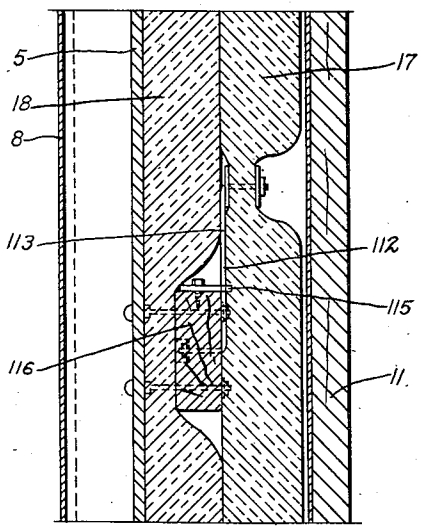


Fig. 12

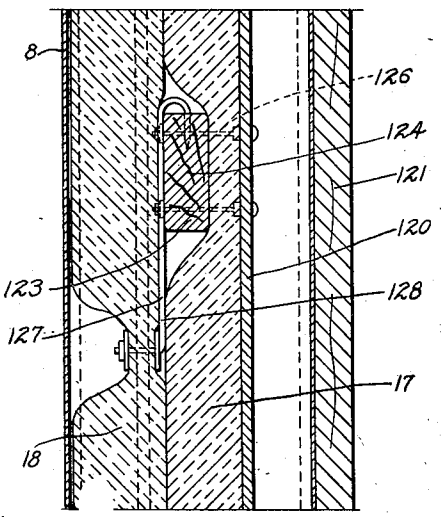


Fig. 13

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Patented Aug. 10, 1943

2,326,717

UNITED STATES PATENT OFFICE

2,326,717

REFRIGERATOR CAR CONSTRUCTION

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Application August 2, 1940, Serial No. 349,727

15 Claims. (Cl. 20—4)

This invention relates to refrigerator cars used to transport perishable commodities at a predetermined temperature. The essential features of a refrigerator car are an insulated body to prevent or retard ingress of heat during warm weather and egress of heat during cold weather, and a cooling means and a heating means to be used during warm and cold weather respectively.

The insulation commonly used in a refrigerator car is usually made in blanket form, which blanket may be a sack of large area and relatively small thickness filled with a loose material, or the insulation may have inherent qualities which in themselves form a blanket of the insulation. The essential characteristic of all types of such insulation is its porosity; in other words, the insulation forms a very large number of minute air spaces which are separated from each other by the fibres of the insulation. In the attachment of such insulation to the car structure, it is usually squeezed or compressed between two rigid members to form a solid mass, thereby collapsing the air spaces and destroying, to a very great extent, the insulating qualities of the material. Such materials as kapok, which is sold under the trade name of Dry Zero; hair felt, which is a form of animal hair woven into a blanket form; or spun glass, sometimes called glass wool, are common materials used in insulating refrigerator cars.

The walls of refrigerator cars usually have insulation of a thickness which varies from 2" to 6", the insulation often being provided in two or more blankets disposed in flatwise relation to each other and in intimate contact. The usual and common construction involves framing members of the refrigerator car and cleats secured to the framing members and arranged to compress the insulation blanket or blankets between the framing members and the cleats. Where two or more blankets are used, it is common to attach all the blankets with the same cleat, thereby destroying the insulating qualities of the blankets and providing a path for heat flow from one side of the wall to the other.

A primary object of my invention is to provide a means for mounting the insulation blankets, which means is arranged to compress each blanket at a location remote from the compressed part of the adjacent blanket. I thereby eliminate compressing both blankets at the same point, and consequently greatly reduce heat flow through the wall.

Another object is to arrange the above described mounting means so that each blanket may be conveniently and easily mounted within the car.

The accompanying drawings show my invention adapted for use in a refrigerator car wherein the refrigerant containers are disposed below the roof and above the lading compartment of the car. It is to be understood that I do not limit my invention to such a car, but intend that it may be used in the roof, floor, doors, walls, etc., of any type of structure in which it is desirable to retard flow of heat through the walls.

In the drawings:

Fig. 1 is a partial transverse section of a refrigerator car embodying my invention.

Fig. 2 is a plan section taken on line 2—2 of Fig. 1.

Fig. 3 is an enlarged view of a portion of Fig. 1.

Fig. 4 is an enlarged view of a portion of Fig. 2.

Figs. 5, 6, 7 and 8 are views similar to Fig. 3 showing modified forms of the invention.

Fig. 9 is a plan section through the wall of a refrigerator car showing a modified form of my invention.

Fig. 10 is a transverse section through a car adjacent the side plate showing a modified means to mount the insulation.

Fig. 11 is a plan section on line 11—11 of Fig. 10.

Figs. 12 and 13 are views similar to Fig. 3 showing modified forms of the invention.

The general parts of the refrigerator car shown are insulated roof A; side wall B; floor D; refrigerant containers E; hatch F for loading refrigerant into a container E; side wall flue G; foraminous floor rack H and space J between the rack H and the floor D. A refrigerant container E is positioned directly below the roof A and adjacent a side wall B. A drip pan K is provided below the container E and a partition L is disposed in an upstanding position at the edge of the drip pan K. The drip pan K and the partition L cooperate with the roof A and the upper part of the side wall B to form an enclosure M around the container E, an air inlet opening N to the enclosure M being provided by spacing the partition L from the roof A. An air discharge opening leads from the enclosure M to the flue G at a lower elevation than the air inlet opening N. Cars of this type commonly have a row of refrigerant containers E near each side wall B, which containers are spaced apart at the center of the car. The partitions L are also spaced apart to form a duct Q which communicates between the lading compartment R and openings N.

Air circulation is as follows: Air in the lading compartment R is warmed by contact with the lading and rises through the duct Q to enter the enclosing structures M through the air inlet openings N. The air is then cooled by contact with the cold refrigerant containers E and falls by reason of its lower temperature and therefore greater density through the flues G to the space J whence it rises through the rack H to the lading compartment R. The above described cycle is thereafter continuously repeated.

In the car shown in Fig. 1, the wall B is comprised of an outer side sill 2, an outer side plate 3 and outer posts 5 extending therebetween and secured thereto. I preferably provide inner posts 6 spaced inwardly from the outer posts 5 and supported adjacent the upper and lower parts of the car, preferably by the means disclosed in my co-pending application filed April 6, 1940, Serial No. 328,203. The outer sheathing 8, which in the form shown is metallic, extends between and is secured to the outer sill 2, plate 3 and posts 5. Metallic sheets 9 are secured to the inner posts 6 and lining 11, preferably wood, is also secured to the inner posts 6 in flatwise relation with the sheets 9. The sheets 9 preferably have outwardly projecting panels 12 which form, in combination with the lining 11, the flues G for air circulation. Insulation 14 is disposed between the sheathing 8 and the sheets 9.

The insulation 14 for the wall B of the car shown in Figs. 1–4 is provided by inner (17) and outer (18) blankets. The supporting member 20 for mounting the blankets has a cleating part 21, which in the form shown is a wooden block 23, disposed between the blankets 17, 18 and secured to an outer post 5 by bolts 24, thereby compressing the outer blanket 18 between the cleating part 21 and the outer post 5 and providing a support for the blanket 18. The supporting member 20 also comprises a supporting part 26, which in the form shown is a rod 27, arranged to depend a substantial distance below the cleating part 21 and to be supported by a pointed hook 29 formed on the upper end thereof and inserted into the cleating part 21. The lower end of the rod 27 is bent (30) inwardly and inserted through the inner insulation blanket 17. The bent part 30 of the rod 27 may be threaded; washers 31, 33 and a nut 34 may be fitted upon the rod and adapted to compress the inner blanket 17 therebetween, thereby providing a support therefor. The end of the bent part 30 of the rod 27 may be pointed for the purpose of piercing the blanket 17, after which the point may be cut off.

It is evident from Figs. 1 and 3 that an uncompressed part 36 of the outer blanket 18 is in alignment with the compressed part 37 of the inner blanket 17 and that an uncompressed part 39 of the inner blanket 17 is aligned with the compressed part 40 of the outer blanket 18, thereby eliminating an area wherein both blankets are compressed together, such as is commonly found in refrigerator cars.

Figs. 1–4 show an insulation blanket compressed between the post 5 and the cleating part 21. It is evident that the invention is equally applicable if any rigid wall member be used in place of the post wherein the wall member might be a structural member, a nailing strip or even the sheathing in certain types of cars.

The rod 27 is shown and described as being in a depending position relative to the cleating part 21. The rod 27 may be described as being disposed laterally of the cleating part whether extending downwardly, upwardly or in a horizontal direction.

Fig. 5 is similar to Fig. 3 except that the rod 44 is mounted upon the wooden cleating part 21 in a somewhat different manner. The upper end of the rod 44 is bent (45) outwardly and inserted through a hole in the cleating part 21, being held in position by a nut 47.

In Fig. 6, the cleating part 50 is a wooden block similar to that heretofore described and the supporting part 51 is an arm 53 depending from the cleating part 50 and preferably secured thereto by the bolts 54 which also secure the cleating part 50 to the post 5. The arm 53 may be made of wood, metal or some type of insulating composition board, such as that known by the trade name Masonite. The outer blanket 18 is compressed by the cleating part 50 as hereinabove described and the inner blanket 17 may be secured to the depending arm 53 by a bolt 56 inserted through the arm 53, a washer 57, and a nut 59 secured to the bolt 56 and arranged to compress the inner blanket 17.

In the modification shown in Fig. 7, the supporting member 62, which is preferably made of wood, has spaced apart cleating parts 63, 63 secured to the outer post 5 by the bolts 65 and arranged to compress the outer insulation blanket 18 between both cleating parts 63, 63 and the post 5. The supporting member 62 also comprises a supporting part 66 extending between and connecting the cleating parts 63, 63 and spaced from the post 5 a distance sufficient to leave a substantially uncompressed part 68 of the outer insulation blanket 18 therebetween. The inner blanket 17 is secured to the supporting part 66 preferably by a bolt 69 (or bolts) upon which are mounted a washer 71 and nut 72 for the purpose of compressing the insulation. It is evident in this modification that the outer blanket 18 is compressed at two parts 74, 74 thereof and has a substantially uncompressed part 68 therebetween and that the inner blanket 17 has a compressed part 77 aligned with the uncompressed part 68 of the outer blanket 18 and has uncompressed parts 78, 78 aligned with the compressed parts of the outer blanket 74.

In the modification shown in Fig. 8, the supporting member 81, preferably made of wood, is comprised of a cleating part 82 disposed adjacent the center thereof and secured to the outer post 5 by the bolts 84, thereby compressing the outer blanket 18 between the cleating part 82 and the post 5 to form a mounting means for the outer blanket 18. The member 81 also comprises supporting parts 85, 85, both above and below the cleating part 82 and integrally formed therewith; the supporting parts 85, 85 are spaced from the outer post 5 a sufficient distance to allow substantially uncompressed parts 87, 87 of the outer insulation blanket 18 to be disposed therebetween. The inner blanket 17 is attached, preferably by bolts, washers and nuts as heretofore described, to both supporting parts 85, 85, thereby leaving an uncompressed part 88 of the inner blanket 17 aligned with the compressed part 90 of the outer blanket 18.

Fig. 9 is a plan view through a wall substantially similar to that shown in Fig. 2. A cleating part 92, which in the form shown is a wooden block 93, is secured to an outer post 5 and arranged to compress the outer insulation blanket 18 therebetween, thereby supporting said blanket.

The supporting part 95, preferably a strap, extends in a substantially horizontal direction and has a part thereof disposed on each side of the cleating part 92. The supporting part 95 is preferably secured to the cleating part 92 by bolts other than the bolts which secure the cleating part 92 to the post 5 so as to prevent direct flow of heat between the supporting part 95 and the post 5. Cleats 96 disposed remote from the cleating part 92 are provided for the purpose of mounting the inner blanket 17 upon the supporting part 95. A part 98 of the inner blanket 17 is uncompressed adjacent the cleating part 92 and preferably projects inwardly between adjacent flues G so as to maintain the uncompressed thickness of the blanket. The opposite ends 99 of the supporting part 95 are bent outwardly so as to compress other parts 101 of the outer blanket 18 between the end portions 99 of the supporting part 95 and the outer sheathing 8. The structure shown in Fig. 9 is considered an improvement over those heretofore described in that the insulation blankets 17, 18 are supported at a number of points in a horizontal plane through the wall B whereas, in the modification shown in Fig. 1, the blankets 17, 18 are supported only adjacent the posts 5.

In the modification shown in Figs. 10 and 11, a piece 105 extends between and is secured to the adjacent outer posts 5 so as to compress the outer insulation blanket 18 therebetween and provide a support for said blanket. Backing members 106 may be employed adjacent the posts 5 to increase the bearing area in contact with the insulation blanket 18. Cleats 108, preferably disposed substantially midway between the posts 5, are provided for the purpose of compressing the inner insulation blanket 17 and providing a support therefor. It is pointed out that in this construction also, as in Fig. 9, the blankets 17, 18 may be supported at a number of points in a horizontal plane and also that the compressed parts of each blanket are aligned with uncompressed parts of the other blanket.

Fig. 12 is similar to Fig. 5 except that the rod 112 which comprises the supporting part 113 is upstanding instead of depending. In this position some means, such as the forked member 115 attached to the top of the cleating part 116 and arranged to straddle the rod 112, is used to prevent the rod 112 from swinging downwardly from the position shown. Such a forked member may also be used in a construction as in Figs. 3 and 5 to add stability to the insulation supporting means.

Fig. 13 shows an adaptation of my invention to a refrigerator car wherein the main framing members of the car are disposed adjacent the interior of the car. Such a car is shown in Winship Patent No. 2,182,652 of December 5, 1939. In Fig. 13, the numeral 120 indicates the main frame member or post of the car and the lining 121 is secured thereto. The supporting member 123 comprises a cleating part 124 secured by the bolts 126 to the main framing member 120 and arranged to compress the inner insulation blanket 17 therebetween. The supporting part 127 comprises a rod 128 similar to that described in reference to Fig. 3 which depends from the cleating part 124 and has secured thereto by the usual means the outer insulation blanket 18.

While I have shown and described the insulation supporting means as a single supporting member, it is to be understood that I contemplate the use of a plurality of such members conveniently located and arranged in a manner depending upon the particular design of car and type of insulation used.

The accompanying drawings illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof, within the scope of the claims, will occur to persons skilled in the art.

I claim:

1. In an insulated wall, a wall element forming part of the wall, an insulation blanket adjacent thereto, a cleating member secured to said wall element and arranged to compress said blanket therebetween; a second insulation blanket disposed in flatwise relation with the first mentioned blanket, a rod depending from said member, and means to attach said second blanket to the lower end of said rod.

2. In an insulated wall, a wall element forming part of the wall, a pair of flatwise interrelated insulation blankets and means to support said blanket, said means comprising a member having a cleating part and a supporting part disposed in unaligned relation, one of said blankets being compressed between said cleating part and said wall element, and the other of said blankets being compressed and attached to said supporting part in unalignment with the compressed part of said first mentioned blanket.

3. In an insulated wall, spaced apart wall elements forming part of the wall, a pair of flatwise interrelated insulation blankets and means to support said blankets, said means comprising a piece extending between and secured to said wall elements, one of said blankets being compressed between said piece and said wall elements, and the other of said blankets being attached to said piece in unalignment with the compressed parts of the first mentioned blanket.

4. In an insulated wall, a wall element forming part of the wall, a pair of flatwise interrelated insulation blankets and supporting means for said blankets carried by said element, said supporting means arranged to compress each of said blankets in alignment with an uncompressed part of the other blanket.

5. In an insulated wall including a wall element, a pair of flatwise interrelated insulation blankets forming a part of said wall, a member carried by said element, means to secure, thereby compressing, one of said blankets to said member, and means unaligned with said first mentioned means to secure, thereby compressing, the other of said blankets to said member, the parts of each of said blankets aligned with the compressed part of the other of said blankets being substantially uncompressed.

6. In an insulated wall, a wall element, an insulation blanket adjacent thereto; a supporting member carried by the wall element comprising a cleating part, arranged to compress said blanket between said element and said part, and a supporting part; a second insulation blanket disposed in flatwise relation with the first mentioned blanket; and means unaligned with the compressed portion of said first mentioned blanket for securing said second mentioned blanket to said supporting part.

7. In an insulated wall, a wall element, an insulating blanket adjacent thereto; a supporting member carried by the wall element and comprising spaced apart cleating parts arranged to

compress said blanket between said element and said parts, and a supporting part extending between said cleating parts; a second insulating blanket disposed in flatwise relation with the first mentioned blanket; and means unaligned with the compressed portion of said first mentioned blanket for securing said second mentioned blanket to said supporting part.

8. In an insulated wall, a wall element, an insulating blanket adjacent thereto; a supporting member carried by the wall element and comprising a cleating part arranged to compress said blanket between said element and said part, and supporting parts; a second insulating blanket disposed in flatwise relation with the first mentioned blanket; and means unaligned with the compressed portion of said first mentioned blanket for securing said second mentioned blanket to said supporting parts.

9. In an insulated wall including a wall element; a pair of flatwise interrelated insulating blankets; and structure for supporting said blankets, said structure comprising a member having unaligned cleating and supporting parts carried by said wall element, blanket compressing means arranged to secure one of said blankets to said cleating part, and other blanket compressing means unaligned with the compressed portion of said one of said blankets arranged to secure the other of said blankets to said supporting part.

10. In an insulated wall including a wall element; a pair of flatwise interrelated insulating blankets; and structure for supporting said blankets, said structure comprising an insulating member having unaligned cleating and supporting parts carried by said wall element, blanket compressing means arranged to secure one of said blankets to said cleating part. and other blanket compressing means unaligned with the compressed portion of said one of said blankets arranged to secure the other of said blankets to said supporting part.

11. In an insulated wall including a wall element; a pair of flatwise interrelated insulating blankets; and structure for supporting said blankets, said structure comprising a member having unaligned cleating and supporting parts carried by said wall element and disposed between said blankets, blanket compressing means arranged to secure one of said blankets to said cleating part, and other blanket compressing means unaligned with the compressed portion of said one of said blankets arranged to secure the other of said blankets to said supporting part.

12. In an insulated wall, spaced apart wall elements forming part of the wall, a pair of flatwise interrelated insulating blankets and means to support said blankets, said means comprising a piece extending laterally from one of said wall elements, one of said blankets being compressed between said piece and said last mentioned wall element, and the other of said blankets being attached to said piece in unalignment with the compressed portion of the first mentioned blanket.

13. In an insulated wall, a wall element, an insulating blanket adjacent thereto; a supporting member carried by the wall element and comprising a cleating part arranged to compress said blanket between said element and said part, and a supporting part arranged in spaced relation to said element to provide a substantially uncompressed portion of said blanket therebetween; a second insulating blanket disposed in flatwise relation with the first mentioned blanket; and means for securing said second mentioned blanket to said supporting part.

14. In an insulated wall, a wall element, an insulating blanket adjacent thereto; a supporting member carried by the wall element and comprising a cleating part arranged to compress said blanket between said element and said part, and a supporting part disposed adjacent a substantially uncompressed portion of said blanket; a second insulating blanket disposed in flatwise relation with the first mentioned blanket; and means for securing said second mentioned blanket to said supporting part.

15. In an insulated wall including a wall element; a pair of flatwise interrelated insulating blankets; structure for supporting said blankets, said structure comprising a member carried by said wall element, and blanket compressing means arranged to secure each of said blankets to said member in unaligned relation to the compressed portion of the other of said blankets.

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