April 28, 1925. 1,535,220

A. H. GALLAGHER

HEAT INSULATION

Filed Sept. 22, 1924

Fig. 1.

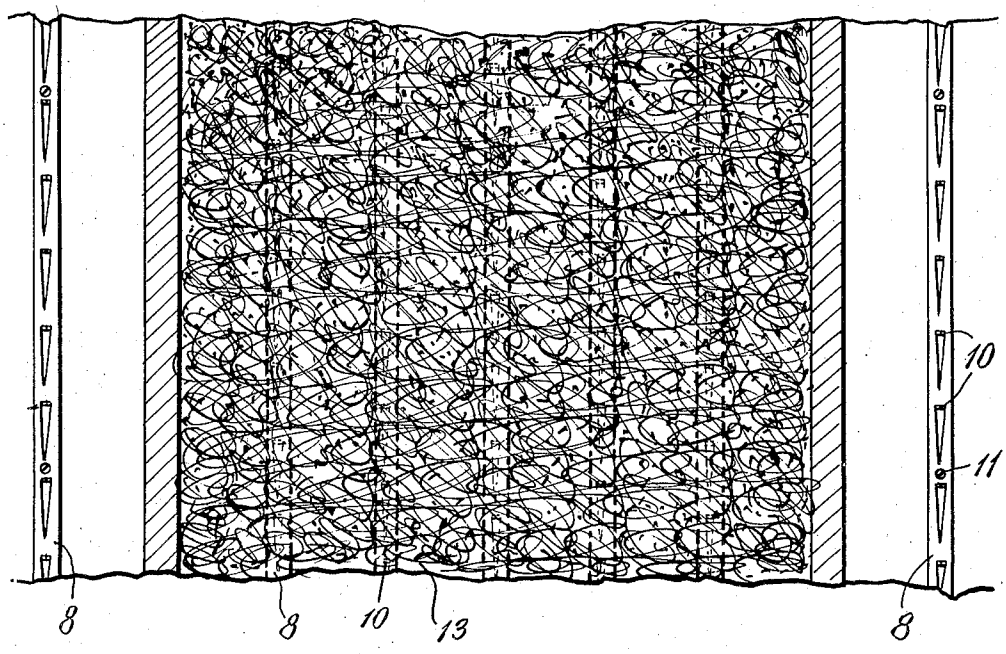


Fig. 2.

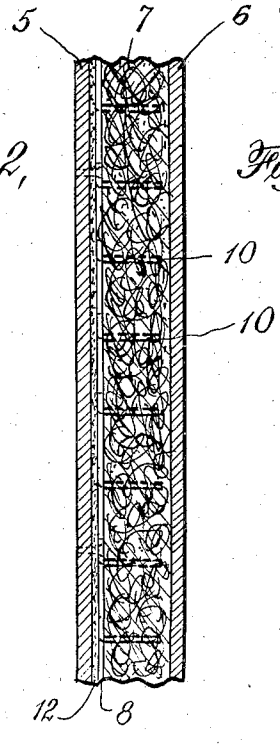


Fig. 3

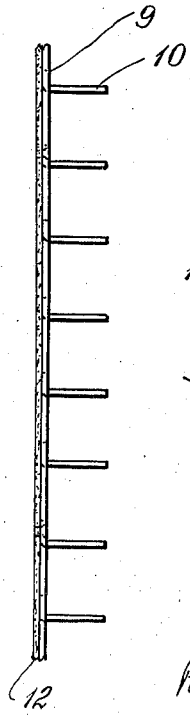


Fig. 4.

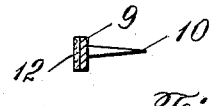
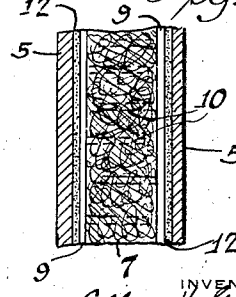


Fig. 5.



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UNITED STATES PATENT OFFICE.

ALFRED HUGH GALLAGHER, OF CHICAGO, ILLINOIS.

HEAT INSULATION.

Application filed September 22, 1924. Serial No. 739,074.

To all whom it may concern:

Be it known that I, ALFRED H. GALLAGHER, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Heat Insulation; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to heat insulating structures and more particularly heat insulating walls, partitions, and the like, such as are used in refrigerating compartments, refrigerator cars, and for other general purposes in which it is desirable to prevent the transmission of heat through the wall structure.

In structures of this character the walls which enclose the space which is to be insulated are ordinarily double in construction. The two facings of each wall are separated a considerable distance, and the space between them may be left as dead air space, since confined air is not a good conductor of heat, or else, if a more efficient insulating effect is required, a heat insulating material may be used. For this purpose various materials are employed, such, for instance, as kapok, hair, hair felt, mineral wool, and other similar loose materials through which heat is transmitted only with great difficulty.

It has been found that when a wall construction such as has just been described is employed in structures which are subject to agitation, as, for instance, refrigerator cars which are continually subject to jolting and jarring when in use, the loose heat insulating material which fills the space between the double walls frequently mats or packs together so as to leave air holes. This packing together reduces the heat insulating efficiency of the material, and in addition air holes may result and similarly cut down the efficiency of the structure. In order to prevent this loss of efficiency it is desirable to provide some means for anchoring the loose material and holding it in place so that no such settling effect will result, even though the structure in which the wall is employed is subject to repeated jars. It is further desirable that any anchoring means used for the purpose should be so formed as not to transmit heat between the walls with rapidity, and preferably the anchoring means, which is usually fixed on one wall or the other, should be insulated from that wall.

The present invention is intended to provide a heat insulating structure in which the loose heat insulating material employed between the usual double walls is firmly held in place and prevented from settling by means which do not transmit the heat with rapidity and which are cheap to manufacture and easy to install.

In the accompanying drawings there is shown that embodiment of the invention which is now preferred, and in these drawings,

Fig. 1 shows a face view of a fragmentary portion of a heat insulating structure, showing one of the facing walls removed,

Fig. 2 is a vertical cross sectional view through a complete double wall structure, and

Fig. 3 is a side view, and

Fig. 4 is a transverse sectional view through one of the anchoring devices,

Fig. 5 is a vertical, sectional view through a double wall structure in which the anchoring devices are on opposite walls.

Referring now to these drawings, the structure consists of a pair of walls 5 and 6 which are spaced apart a considerable distance. These walls may be made of any desired material, but are preferably made of wood, since wood transmits heat more slowly than metal. Between the walls is a loosely packed mass 7 of heat insulating material, which may be of various kinds. I have found kapok to be especially desirable for the purpose, although many other substances having physical characteristics and heat insulating qualities similar to kapok, are also useful. The kapok or other insulating material is placed inside the double wall in a loosely matted mass, and in order to prevent its settling and packing together, particularly in places where the walls stand vertically, I provide anchoring means, one of which is indicated at 8. This anchoring means may be made in various forms, but it is preferably in the form of a flat strip 9 of metal, such as aluminum, the latter being light in weight, comparatively inexpensive, and easily worked. Struck from the strip of metal at frequent intervals, are pointed tongues or barbs 10. With anchoring devices of this sort, it will be observed that the material is engaged at a plurality of

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spaced points and such a strip, therefore, provides a group or series of anchoring means, each of which takes the form of a tongue or barb.

In using these anchoring devices I prefer to mount the strip vertically in position at frequent intervals along one of the facings of the double wall, and the strip employed should be so formed that the tongues will not extend completely across the space between the two facings, but will terminate at some distance from the facing opposite to the one on which the strip is mounted. With this arrangement there can be no direct transmission of heat from wall to wall through the strips and tongues. For mounting the strip, screws such as 11 may be used, and it is desirable to insulate the strips by means of a thin layer 12 of a heat insulating material, such as hair felt, which is interposed between the strip and the wall on which it is mounted. The pointed tongues, as shown in Fig. 2, will then extend a considerable distance into the loose heat insulating material, and these tongues, by their engagement with the material, will prevent any movement which would result in the material matting together.

In Fig. 1 there is shown a face view of a portion of a wall, showing the strips and the heat insulating material in place. The wall illustrated is made up of vertically extending compartments, such as 13, although the subdivision of the space within the double walls into compartments is not essential. In the central compartment 13, illustrated, there are five anchoring strips 8, placed in spaced relation. These anchoring strips are preferably put in place on the inside of one of the facings before the other facing is in place. Then the loosely matted mass of heat insulating material is put in place and the other facing secured in position. In securing the strips to the wall, the strip is insulated by the use of the hair felt insulating layer described, and for the most effective construction it is desirable to place the adjacent strips so that the tongues struck from them are in staggered relation. Thus the insulating material is held in place by anchoring means which enter the material at a plurality of spaced points, and since the anchoring devices are insulated from the wall on which they are mounted, and do not extend across from that wall to the opposite wall, they do not transmit heat to any extent.

Instead of placing all of the anchoring devices on one of the walls, I contemplate that it may be desirable, under certain conditions, to place alternate devices on the opposite walls, again placing the strips so that the tongues of adjacent strips are staggered with relation to each other. Such an arrangement is illustrated in Fig. 5. It may be desirable, also, in some instances, to place the strips horizontally, or in angular relation with respect to the walls, but the mounting of these anchoring devices will be, to a large extent, determined by the contour of the particular wall in which they are to be used. It may also be desirable to make use of anchoring devices having tongues of different lengths, in order that these tongues will extend nearly across the space between the two facings of the wall. The size and dimensions of the anchoring strips, however, will be determined by the particular location in which they are to be employed, and since they are cheaply and easily made, and tongues of varying lengths may be formed in them, the anchoring devices are suitable for walls of many different dimensions, and that type of device will be selected which is best suited for the particular conditions in which it is to be employed.

By the use of anchoring devices by which the loose heat insulating material is engaged at a large number of spaced points, the maximum anchoring effect is obtained, and since these tongues are all formed as part of single strips, the labor involved in mounting them in place is a minimum. Also they are inexpensive to manufacture and do not add materially to the weight of the structure, especially if aluminum is the metal used.

I claim:

1. A heat insulating structure comprising the combination of a pair of spaced walls, a heat insulating material lying between the walls, and means mounted on the wall for preventing the shifting of the material, this means including a row of spaced projections entering the material, each of which engages the material at a single point.

2. A heat insulating structure comprising the combination of a pair of spaced walls, a heat insulating material lying between the walls, and means mounted on one of the walls for anchoring the material, the said means including a plurality of projections entering the material at spaced points, these projections being arranged in rows, with the projections of one row staggered relative to those of the adjacent row.

3. A heat insulating structure comprising the combination of a pair of spaced walls, a heat insulating material lying between the walls, and means on a wall for anchoring the material and preventing its shifting, this means including a plurality of rows of projections entering the material and terminating within the material at a distance from the second wall.

4. A heat insulating structure comprising the combination of a pair of spaced walls, a heat insulating material lying between the walls, and means mounted on one of the walls and insulated therefrom for

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preventing the shifting of the material, the said means including a plurality of projections entering the material at spaced points.

5. A heat insulating structure comprising the combination of a pair of spaced walls, a heat insulating material lying between the walls, and a plurality of series of projections mounted on one of the walls and insulated therefrom, these projections entering the material at spaced points for preventing its shifting and being arranged with the projections of one series staggered with relation to those of the adjacent series.

6. A heat insulating structure comprising the combination of a pair of spaced walls, a heat insulating material lying between the walls, and a plurality of groups of projections secured to one of the walls, the said projections entering the material and preventing its shifting.

7. A heat insulating structure comprising the combination of a pair of spaced walls, a heat insulating material lying between the walls, and a plurality of metallic strips secured to one of the walls, each strip having a series of projections for entering the material to prevent its shifting.

8. A heat insulating structure comprising the combination of a pair of spaced walls, a heat insulating material lying between the walls, and a plurality of insulated metallic strips secured to one of the walls, each strip having a series of tongues struck from it to enter the material to prevent its shifting.

9. A heat insulating structure comprising the combination of a pair of spaced walls, a heat insulating material lying between the walls, and a plurality of metallic strips secured to the walls in alternating series, each strip having a plurality of tongues struck from it and entering the material to prevent its shifting.

10. A heat insulating structure comprising the combination of a pair of spaced walls, a heat insulating material lying between the walls, and a plurality of strips secured to one of the walls and mounted thereon in spaced relation, each strip having a series of projections for entering the material to prevent its shifting, and the projections on adjacent strips being placed in staggered relation.

In testimony whereof I affix my signature.

ALFRED HUGH GALLAGHER.

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