June 2, 1931. W. R. GILLIES 1,807,785

SHEET INSULATION

Original Filed Jan. 12, 1927

Fig. 1

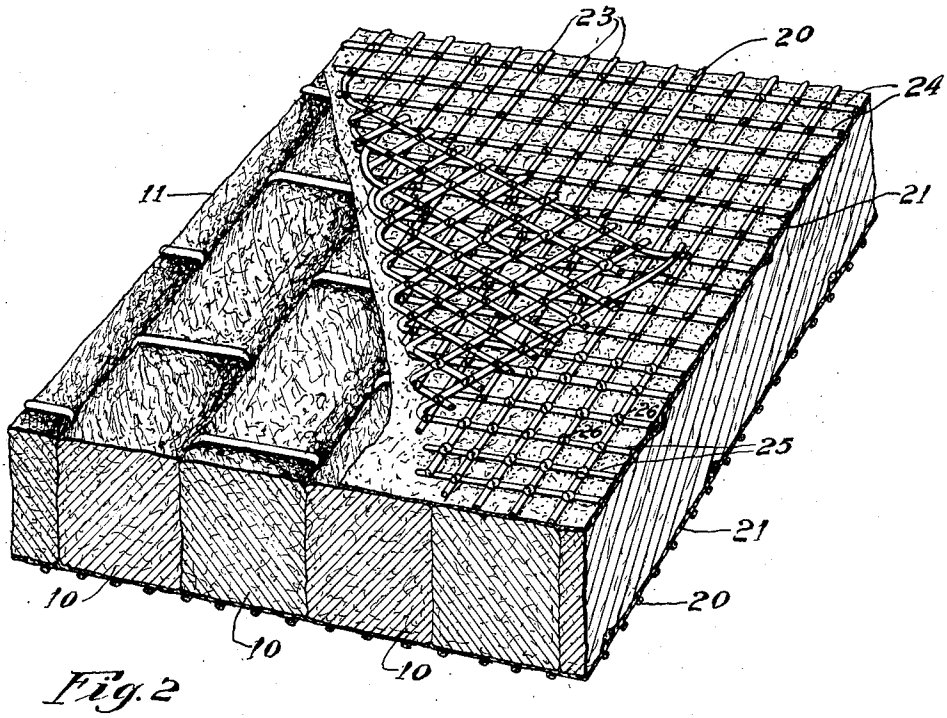
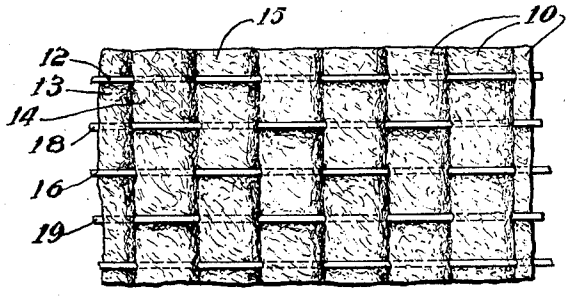


Fig. 2



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UNITED STATES PATENT OFFICE

WILLIAM R. GILLIES, OF CHICAGO, ILLINOIS, ASSIGNOR TO UNION ASBESTOS AND RUBBER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

SHEET INSULATION

Application filed January 12, 1927, Serial No. 160,697. Renewed July 20, 1929.

My invention relates to improvements in sheet insulation, and more particularly to a type of insulating material which is especially adapted to be used in insulating the walls of railway passenger cars. Under the conditions existing where sheet insulation is used in railway cars, the constant vibration of the walls and impact of the wall members between which insulation is held, soon results in the compacting of the fibers of the insulation of the prior art reducing the desired heat and sound insulating qualities to a small fraction of their original value.

One of the objects of my invention is to provide a sheet insulation which possesses inherent resiliency so that it will not become compacted under violent and continuous vibration, and so that the insulation is capable of retaining its normal expanded shape after long periods of compression.

Another object of my invention is the provision of a sheet insulation, having both heat insulating and sound insulating qualities, which may be severed at any point without unraveling or disintegration of the sheet structure.

Another object of my invention is the provision of such a sheet insulation which is noncombustible, flexible, capable of being penetrated by nails or other fastening means, durable, efficient and capable of being economically manufactured.

Other objects and advantages of my invention will appear more fully from the following description and from the accompanying drawings in which similar characters of reference indicate similar parts throughout the several views.

Referring to the accompanying drawings illustrating my invention:

Figure 1 is a perspective view of a preferred form of my improved sheet insulation, having a portion of the cover turned back to show the internal structure.

Figure 2 is a plan view of a portion of my sheet insulation with the external layers removed, showing the method of segregating and binding the portions of the sheet together.

The sheet insulation comprises a structure which is built up of a plurality of strands of roving 10, formed preferably of heat insulating and heat resisting material, such, for instance, as asbestos fibre. In order to give the roving 10 a natural and inherent elasticity which causes them to resist compacting under vibration and to expand after compression, I prefer to spiral each of the said strands of roving 10, and I provide means for binding the said strands together and at the same time maintaining their individuality within the sheet.

The strands of roving 10 are laid side by side, thereby forming a sheet like structure 11 composed of a plurality of spiralled roving. In order to bind the several strands in the sheet together, and maintain their individuality, I provide a plurality of cords, also preferably formed of heat insulating and heat resisting material, such as twisted asbestos fibre, which are loosely looped in alternate arrangement about the strands of roving composing the sheet.

Thus it will be observed in Figure 2 that the cord 12 passes over the roving 10, down between the strands 13 and 14, under the roving strand 14, up between the strands 14 and 15, over the strand 15, and so on transversely across the whole sheet, being loosely looped about each strand composing the sheet insulation. In order that cords may loop on both sides of every strand of roving, adjacent cords are looped upon opposite sides of the same strand. Thus the cord 18 passes under the strand 13, up between strands 13 and 14, over the strand 14 and down between strands 14 and 15, and the sheet insulation is bound together by a plurality of spaced cords extending parallel to each other, the alternate cords looping upon opposite sides of the same strand of roving.

The spacing between the separate cords 12, 18, 16 and 19 may be varied considerably, but in order to secure good results the cords should be spaced approximately a distance somewhat less than the width of the separate strands 10 in the sheet, and it should be noted that the separate cords 12, 18, 16 and 19 are not drawn tightly, but are loosely looped about the roving 10 in the fully ex-

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panded position of the roving strands, maintaining the individuality of the spiralled roving but not preventing their spreading to form a continuous sheet.

In order to further bind the separate components of my sheet insulation together, I provide a covering, preferably upon both sides of the sheet formed of heat insulating and heat resisting material, such as a loosely woven textile fabric 20, having spaced woof and warp threads 23 and 24 of twisted cords of asbestos, and the fabric 20 may be secured to the sheet formed of the separate roving strands 10 by means of a layer of heat resistive cement 21 between the fabric 20 and the strands 10, the cement 21 penetrating into the interstices between separate fibres of the strands 10 and those of cords 23 and 24, thereby binding the whole together.

While the cement 21 may be sufficient to hold the fabric 20 from unraveling when the sheet insulation is cut at any point, I prefer to form the fabric 20 by a process which knots the intersections of the woof and warp 23 and 24, as shown at 25 in Figure 1, and the knots 26 should preferably be formed at every intersection. It will thus be observed that when the sheet insulation is cut at any point, the fabric coverings 20 are prevented from unraveling by the knots 26, and the disintegration of the sheet insulation is thus prevented.

My invention also comprises sheet insulation consisting of the insulating sheet of spiralled roving shown in Figure 2, together with outer covering of asbestos felt, asbestos paper, ordinary cloth, or tightly woven asbestos cloth, in place of the loosely woven fabric 20 shown in Figure 1. In such case the outer covering may be cemented to the insulating sheet composed of the spiral roving 10 in the manner previously described, thereby providing different types of insulation having substantially the same characteristic of inherent resiliency which resist compacting under violent vibration, and which are capable of many different uses.

If it is desired to waterproof my sheet insulation, there may be included a lamination of oiled paper, either exterior to the fabric 20 or between the fabric 20 and the roving strands 10, with layers of cement 21 on both sides of the paper.

When the sheet insulation thus provided is used in the walls of railway cars where it is subjected to continuous vibration which compacts the fibres of the insulation of the prior art, my sheet insulation will retain its normal expanded thickness for long periods of time and does not lose its heat and sound insulating qualities.

It will thus be observed that I have invented sheet insulation which is fire resistive, heat insulating and sound insulating, and which possesses such natural resiliency that the sheet retains its original thickness under severe vibration, maintaining the air spaces between the strands which increase the heat and sound insulating qualities of the sheet.

While I have illustrated and described a specific embodiment of my invention, I do not desire to be limited to the specific details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus illustrated and described my invention, what I claim as new is:

1. An insulating material comprising a plurality of bulky longitudinally spiraled asbestos rovings disposed side by side and constituting the woof strands of a loosely woven fabric, a plurality of relatively slender asbestos fabric cords disposed transversely of the bulky rovings and loosely looped around the same as warp strands, said slender cords preserving the individuality of the rovings without preventing them from nesting together to form a body of substantially uniform heat insulating quality throughout, and a sheath in the form of a textile fabric of asbestos overlying the several rovings and maintaining them in the same plane.

2. An insulating material comprising a plurality of longitudinally spiraled asbestos rovings disposed side by side and constituting the woof strands of a loosely woven fabric, a plurality of asbestos cords disposed transversely of said rovings and looped about the same as warp strands, said cords preserving the individuality of said rovings, but said rovings lying against each other to form a layer of substantially uniform heat insulating quality, and an outer layer comprising a sheet of loosely woven asbestos fabric having intersections of its woof and warp knotted.

3. An insulating material, composed of a series of longitudinally extending large, loose, soft rovings of heat insulating material disposed side by side and in close contact with one another, protecting and confining layers of coarse-textured loosely woven fabric above and below the said series composed of yarns or threads of asbestos, and yarns or threads intervening between the rovings so as to confine the respective rovings from lateral displacement and from overriding one another, the said material having consistency and pliability permitting slight longitudinal shift of the rovings relative to one another.

4. An insulating material, composed of a series of large, loose, soft longitudinally extending rovings disposed side by side and in close contact with one another, protecting and confining layers of fabric above and below the said series composed of yarns or threads of asbestos, and yarns or threads extending transversely of the series, interwoven

with and intervening between the rovings, whereby the respective rovings are restrained from lateral displacement relative to one another and thereby from overriding one another.

5. An insulating material, composed of a series of large, loose, soft members of heat insulating material disposed side by side and in close contact with one another to form a material of substantially uniform heat insulating characteristics throughout its body, a series of threads intervening between the respective insulating members so as to confine the respective insulating members against lateral displacement and from overriding one another, and a layer of loosely woven asbestos fabric secured to one side of said insulating material to support and protect said large, loose, soft insulating members.

6. An insulating material, composed of a series of large, loose, soft members of heat insulating material disposed side by side and in close contact with one another to form a material of substantially uniform heat insulating characteristics throughout its body, a series of threads intervening between the respective insulating members so as to confine the respective insulating members against lateral displacement and from overriding one another, a layer of cement on one side of said insulating material for causing adjacent fibers to cling together to form a supporting body, and a layer of loosely woven asbestos fabric secured to one side of said insulating material to support and protect said large, loose, soft insulating members.

In witness whereof, I hereunto subscribe my name this 8th day of January, 1927.

WILLIAM R. GILLIES.

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