

Dec. 13, 1932.

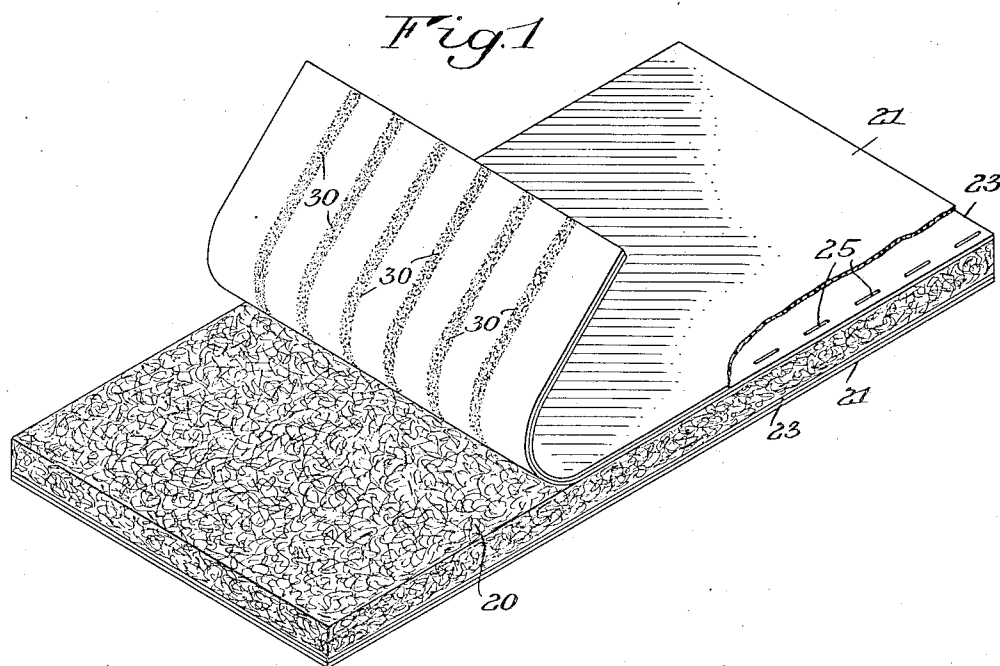
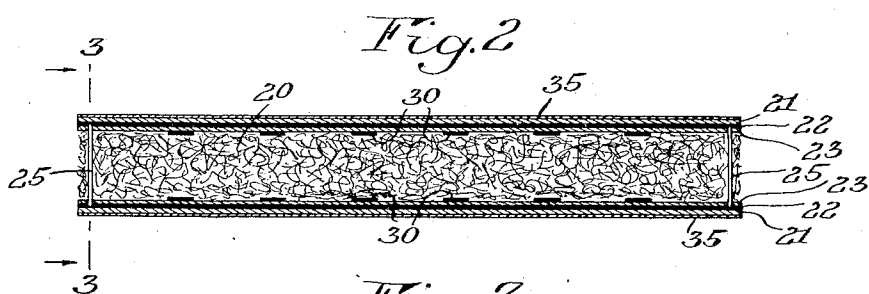
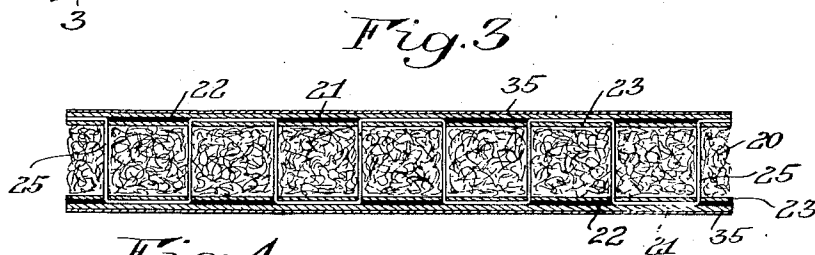
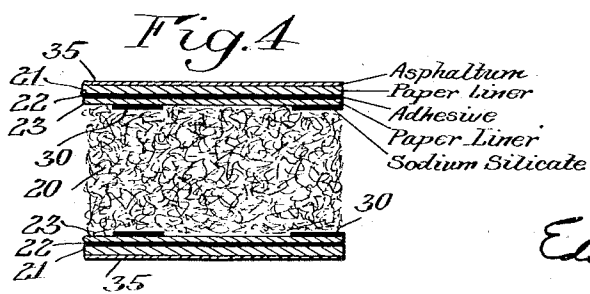
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1,890,906

INSULATING BAT

Filed April 3, 1930

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 5



Fig. 6

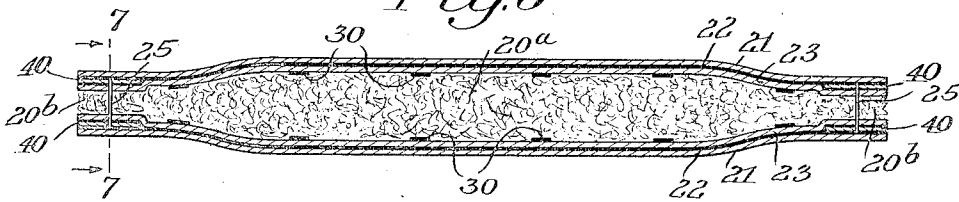


Fig. 7

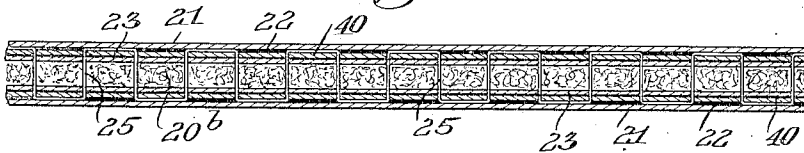


Fig. 8

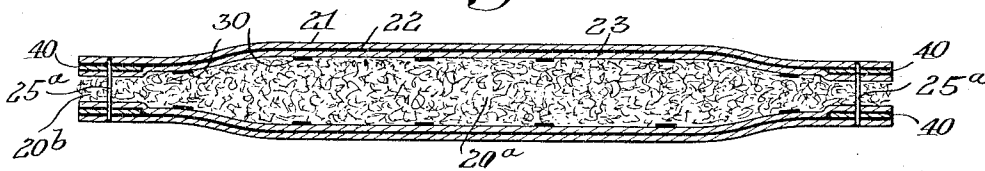
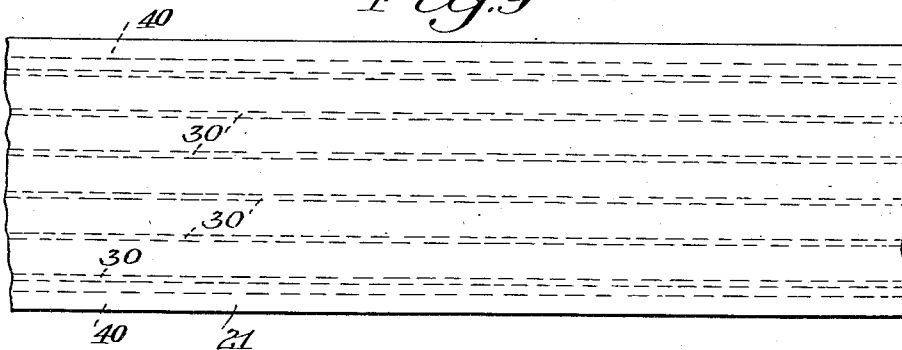


Fig. 9



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INSULATING BAT

Application filed April 3, 1930. Serial No. 441,369.

This invention relates to insulating material such as is used for insulating the walls of buildings against passage of heat there-through. The object of the invention is to provide a generally improved and more satisfactory insulating bat than those heretofore known.

Another object is the provision of a fire-proof or highly fire resistant insulating bat of satisfactory construction.

A further object is the provision of improved liners or facings for an insulating bat.

A still further object is the provision, in an insulating bat, of improved reinforcement for the edges of the bat.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a perspective view of a piece of insulating bat constructed in accordance with one embodiment of the invention, with parts broken away and with parts separated to illustrate the construction more clearly;

Fig. 2 is a section taken transversely across the bat shown in Fig. 1;

Fig. 3 is a section taken longitudinally of the bat, substantially on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged view of a portion of Fig. 2 in order to illustrate the construction more clearly;

Fig. 5 is a section taken transversely through a bat filling of slightly different shape, before the liners are applied thereto;

Fig. 6 is a view similar to Fig. 5 showing the liners applied to the filling to make a complete bat;

Fig. 7 is a longitudinal section through the bat shown in Fig. 6, the section being taken substantially on line 7—7 of Fig. 6;

Fig. 8 is a view similar to Fig. 6 showing a slightly modified form of liner; and

Fig. 9 is a plan of the bat illustrated in Fig. 6.

Similar reference numerals throughout the several views indicate the same parts.

Referring now to Figs. 1 to 4, inclusive, the main body or filling of the bat is indicated at 20 and comprises a flocculent mass of loosely associated fibrous material, such as jute or cotton fibres or the like. It is this filling which principally furnishes the desired insulating qualities of the bat. In order to hold this loose fibrous material in place and to prevent or retard entrance of moisture and dirt thereinto, the fibrous filling is enclosed between two facings or liners. These liners are preferably made of one or more sheets of cellulosic material, such for example as kraft paper, although cloth or other materials may be used if desired.

Both the fibrous filling and the cellulosic liners are ordinarily highly inflammable in their natural state. It is undesirable to use such highly inflammable materials in the construction of buildings, since this greatly increases the fire hazard. Hence it has been proposed to render both the filling and the liners fire resistant to a high degree, or what is commonly known as "fireproof".

The fibrous filling 20 is preferably fireproofed by any suitable chemical, such as an ammonia compound, which will generate non-inflammable gases when heated. For example, ammonium sulphate, ammonium phosphate, or ammonium carbonate may be used, and the fibrous filling may be fireproofed either by sprinkling dry, pulverized chemical into it, or by immersing the filling in or spraying it with a liquid solution of the chemical.

It has heretofore been proposed to fireproof the cellulosic liners by the use of sodium silicate or some similar chemical which will act as an adhesive as well as a fireproofing agent. A layer of sodium silicate has heretofore been applied as a coating to the inner surface of the liner, thus affixing the liner adhesively to the filling, as well as fireproofing the liner. It has been found in actual practice, however, that this arrangement is not satisfactory, because the sodium silicate reacts chemically with the fireproofing chemical in the filling, and this causes a decomposition of one or both of the chemicals, which results not only in a loss of the fire resistant qualities, but also in

the production of an aqueous solution of the reactive chemicals which seeps outwardly through the liners and appears on the outside of the liners in the form of disfiguring and undesirable spots.

One of the important objects of the present invention is to overcome these undesirable features, while at the same time preserving the fireproof features of both the liner and the filling. In order to accomplish this, the present invention contemplates interposing a layer of sheet material between the filling and the fireproofing chemical associated with the liner. This interposed sheet keeps the fireproofing chemical in the filling out of contact with the fireproofing chemical on the liner, so that the reaction between these two chemicals is greatly reduced or substantially stopped. According to the present invention, each liner comprises a sheet 21 of cellulosic material and a layer 22 of fireproofing chemical preferably covering substantially the entire under surface of the sheet 21. This chemical 22 is preferably sodium silicate, since such material acts also as an adhesive, although other fireproofing chemicals might be employed if desirable under any special circumstances.

As above explained, if the layer 22 of sodium silicate were in direct contact with the filling 20, in accordance with the usual prior practice, a reaction would occur between the sodium silicate and the fireproofing chemical in the filling 20. Such reaction is substantially prevented or greatly reduced in the present instance by the use of a layer of sheet material 23 interposed between the chemical 22 and the filling 20. This sheet material 23 may be of any suitable character, either the same as or different than the sheet 21. Preferably both sheets 23 and 21 are of kraft paper. The adhesive character of the silicate 22 serves to affix the sheets 21 and 23 firmly together throughout their entire area.

The composite liners thus built up of the layers 21, 22, and 23 are affixed to the bat filling 20 by a row of stitching 25 extending longitudinally of the bat near each edge. Preferably, as shown in the drawings, this stitching extends through the inner sheets 23 and through the interposed filling 20, but not through the outer sheets 21. Such an arrangement is particularly advantageous because each stitch has a considerable part thereof imbedded in the adhesive 22, so that in case one stitch should accidentally break, the adjacent stitches will be held firmly by the adhesive and the stitching will not unravel. The representation of the stitching 25 in Fig. 3 is intended to be purely diagrammatic.

If the insulating bat is unusually wide, intermediate rows of stitching similar to the stitching 25 may be employed, but for ordinary widths it is usually sufficient to provide

stitching only along the longitudinal edges of the bat, as illustrated in Fig. 2. Whether or not intermediate stitching is employed, the portions of the liners between the rows of stitching are preferably affixed to the bat filling 20 by adhesive, which is preferably not applied to the entire inner surface of the liner, but is applied discontinuously at a plurality of spaced points, such as the strips 30 of adhesive shown in Figs. 1 and 2.

The use of adhesive in the form of strips or in any other discontinuous manner, rather than a continuous coating over the entire surface, has several special advantages. In the first place, it is desired to have the insulating bat relatively flexible so that it may be bent comparatively easily in order to be tucked in between the studding of a wall. Many adhesives when in the form of layers are relatively rigid and stiff, and impart considerable additional stiffness to a sheet which might otherwise be quite flexible. The use of the adhesive at discontinuous spaced points, such as the strips 30, results in reducing to a large extent the stiffening effect of the adhesive, so that the entire product is more flexible than if a continuous layer of adhesive were used.

Secondly, whether or not the fireproofing layer 22 is formed of sodium silicate, it may be desired to use sodium silicate as the adhesive affixing the liners to the filling. It has been explained above, however, that the use of sodium silicate in contact with the filling causes a chemical reaction, and it is principally for the purpose of avoiding such a reaction that the sheet material 23 is employed between the layer 22 and the filling 20. Hence the use of a layer of sodium silicate over the entire surface of the liner, to affix it to the filling, would be extremely unsatisfactory and would to a large extent undo the beneficial effect of the sheet 23. It is found in practice, however, that if only relatively small areas of sodium silicate, such as the strips 30, are in contact with the bat filling 20, then the chemical reaction between these relatively small areas of silicate and the fireproofing chemical in the filling is so slight that it does little if any harm. Whatever aqueous solution is formed by the reaction does not reach and discolor the outer surface of the liner, partly because of the relatively small quantity of such solution, and partly because of the thickness of the composite liner built up as above described. Hence when the adhesive is applied in the form of discontinuous relatively small areas, such as the strips 30, this adhesive may satisfactorily consist of silicate of soda, which would be entirely unsuitable in the form of a continuous layer over a relatively large area.

If it is desired to render the insulating bat waterproof as well as fireproof, this may be done in any suitable way, as by providing a coating 35 of water repellant or water im-

pervious material on the outer surface of each liner. Such a coating 35 may conveniently be formed of asphaltum.

In the manufacture of this insulating material, the fibrous filling 20 is first formed into the proper shape, and preferably as a continuous strip. The filling may be formed on condensing or forming rolls, or any similar mechanism. Then the inner layers 23 of the liners are applied to the filling 20, the strips 30 of adhesive having first been applied to the inner surfaces of the layers 23 so that the latter will be adhesively affixed to the filling. Then the stitching 25 is put in place by a sewing machine or the like. Following the stitching, either the inner surfaces of the layers 21 or the outer surfaces of the layers 23, or both, are coated with the adhesive 22, and the layers 21 are applied to the layers 23 to form the completed insulating bat. The layers 21 thus cover the stitching 25 and provide a continuous unperforated outer coating covering the entire area of the bat, so that dirt or vermin cannot easily get into or out of the bat when it is in place in a wall. The entire manufacturing operation may be carried on continuously to form a bat of indefinite or unlimited length, which is later cut up into appropriate lengths.

In Figs. 5, 6, 7, and 9 there is shown a slightly different form of insulating bat. Here the filling 20a, which is fireproofed as before, has marginal portions 20b which are materially thinner than the main central portion of the filling, and which have less fibers per unit of surface area than the main portion of the bat, in order to provide an insulating material having relatively thin edges which may be bent easily to be tucked between studding. This thin edge effect may be obtained by forming the bat filling on a machine of the kind disclosed in the copending application of Francis W. Harney, Serial No. 427,029, filed February 8, 1930, for machine for making insulating bats.

The liners, in this form of the invention, may be similar to the liners described in connection with Figs. 1 to 4 inclusive, and may comprise layers 21 and 23 of sheet material such as kraft paper, with a layer 22 of sodium silicate or other fireproofing agent between them. As in the previous embodiment, the liners may be affixed to the filling by discontinuous adhesive in the form of strips 30, and this adhesive may consist of sodium silicate.

The present embodiment of the invention provides a novel arrangement of reinforcement for the edges of the bat, which reinforcement reduces the possibility of tearing or otherwise damaging the edges during transportation or handling, and which holds the edges securely when they are nailed in place so that the material is not liable to tear loose from the nails.

To this end, reinforcing strips 40 are pro-

vided, a pair of strips being employed on each liner, one extending along each edge thereof. These strips, as clearly apparent in Fig. 6, are interposed between the layers 21 and 23 of the liners, and are adhesively secured to both sheets 21 and 23. The reinforcing strips 40 may be of tough paper, cloth or textile fabric, cardboard, or other suitable material.

Stitching 25 is employed, as before, along the edges of the bat. In the present embodiment, this stitching passes through both of the reinforcing strips 40 adjacent the same edge of the bat, through the inner layers 23 of the liners, and through the interposed filling 20b, but not through the outer sheets 21 of the liners. Hence these outer liner sheets provide a continuous unperforated covering extending over the entire area of the bat. The adhesive between the strips 40 and the layers 21 holds the stitching 25 in place and prevents it from ravelling in case one or more stitches should become broken.

In constructing the insulating bat of this form illustrated in Figs. 5, 6, 7, and 9, the inner layers 23 of the liners are first applied to the bat filling 20a and affixed thereto by the adhesive 30, the reinforcing strips 40 being placed on the layers 23 either before or after the latter are applied to the filling. Then the sewing operation takes place, the stitches 25 being put in place, and finally the layers 21 are affixed, either the inner surfaces of the layers 21 or the outer surfaces of the layers 23, or both, being coated with the adhesive 22 before the layers 21 are applied.

In Fig. 8 of the drawings there is shown an insulating bat which may be identical with that illustrated in Fig. 6 except that the stitching 25a extends through the outer layers 21 of the liners as well as through the layers 23 and the reinforcing strips 40. This form of construction is in some respects somewhat easier to make than the previous form, since the sewing can be done after all of the layers of the liner are in place, and the liners may therefore be entirely built up in composite form, including the reinforcing strips, before they are applied to the filling. Then after the composite liners have been applied the stitching 25a is done. Although this form of the invention may be preferred in some instances, as when an inexpensive product is desired, yet it is generally not so satisfactory as the form illustrated in Fig. 6, because the stitching is exposed at the surface and is thus more liable to break, while at the same time the stitching is not imbedded in a layer of adhesive and when it does break at one point the adjacent stitches may unravel.

While certain embodiments of the invention have been disclosed, it is to be understood that the inventive idea may be carried out in a number of ways. This application

is therefore not to be limited to the precise details described, but is intended to cover all variations and modifications thereof falling within the spirit of the invention or the scope of the appended claims.

I claim as my invention:

1. In an insulating bat, the combination with a bat filling having a chemical associated therewith, of a liner for said filling, said liner comprising a material capable of reacting with said chemical, and a layer of sheet material interposed between said material and said filling to reduce the reaction between said material and said chemical.

2. In an insulating bat, the combination with a bat filling having an ammonia compound therein, of a liner for said filling, said liner comprising a material capable of reacting with said ammonia compound, and a layer of sheet material interposed between said material and said filling to reduce the reaction between said material and said ammonia compound.

3. In an insulating bat, the combination with a bat filling having an ammonia compound therein, of a liner for said filling, said liner comprising a layer of sodium silicate capable of reacting with said ammonia compound, and a layer of sheet material interposed between said sodium silicate and said filling to reduce the reaction between said sodium silicate and said ammonia compound.

4. In an insulating bat, the combination with a bat filling having a chemical associated therewith, of a liner for said filling, and adhesive for affixing said liner to said filling, said adhesive being capable of reacting with said chemical and being applied discontinuously to a relatively small area of said liner to reduce the reaction between said adhesive and said chemical.

5. In an insulating bat, the combination with a bat filling having an ammonia compound therein, of a liner for said filling, and adhesive for affixing said liner to said filling, said adhesive comprising sodium silicate capable of reacting with said ammonia compound and being applied discontinuously to a relatively small area of said liner to reduce the reaction between said sodium silicate and said ammonia compound.

6. In an insulating bat, the combination with a bat filling containing a fireproofing chemical, of a liner for said filling, said liner comprising a sheet of cellulosic material, a layer of a different fireproofing chemical between said sheet and said filling, said different chemical being capable of reacting with the chemical in said filling, and a layer of sheet material interposed between said different chemical and said filling to reduce the reaction between said different chemical and the chemical in said filling.

7. In an insulating bat, the combination with a bat filling containing a fireproofing

chemical, of a liner for said filling, said liner comprising a sheet of cellulosic material, a layer of a different fireproofing chemical between said sheet and said filling, said different chemical being capable of reacting with the chemical in said filling, a layer of sheet material interposed between said different chemical and said filling to reduce the reaction between said different chemical and the chemical in said filling, and a relatively small quantity of adhesive, applied discontinuously to a relatively small area of said interposed sheet material, for affixing such sheet material to said filling.

8. A fire resistant insulating bat comprising, in combination, a fire resistant bat filling of fibrous material, and a liner on each of two opposite sides of said filling, each of said liners comprising a plurality of layers of cellulosic sheet material held together by a layer of fireproofing adhesive.

9. A fire resistant insulating bat comprising, in combination, a fire resistant bat filling of fibrous material, and a liner on each of two opposite sides of said filling, each of said liners comprising a plurality of layers of cellulosic sheet material held together by a layer of sodium silicate effective to render said cellulosic material fire resistant.

10. An insulating bat comprising a filling of loosely associated fibrous material, a sheet of cellulosic material on each of two opposite sides of said filling, each of said sheets covering substantially the entire area of said filling, stitching extending through both of said sheets and through the interposed filling, a sheet superimposed on each of said first mentioned sheets and substantially coextensive therewith, said superimposed sheets overlying and covering said stitching, and a layer of sodium silicate interposed between each of said superimposed sheets and the adjacent sheet of cellulosic material, said sodium silicate serving to render said sheets fire resistant and to affix them adhesively to each other.

11. An insulating bat comprising a filling of loosely associated fibrous material, a sheet of cellulosic material on each of two opposite sides of said filling, each of said sheets covering substantially the entire area of said filling, spaced strips of adhesive connecting each of said sheets to said filling, stitching extending through both of said sheets and through the interposed filling, a sheet superimposed on each of said first mentioned sheets and substantially coextensive therewith, said superimposed sheets overlying and covering said stitching, and a layer of fireproofing adhesive interposed between each of said superimposed sheets and the adjacent sheet of cellulosic material, said adhesive serving to render said sheets fire resistant and to affix them to each other and to hold said stitching in case of breakage.

12. An insulating bat comprising a filling of loosely associated fibrous material, and a liner on each of two opposite sides of said filling, each of said liners comprising
5 a plurality of layers of sheet material substantially coextensive with each other and covering substantially the entire area of said filling, and a strip of reinforcing material interposed between the layers of sheet material of one of said liners.

13. An insulating bat comprising a filling of loosely associated fibrous material, and a liner on each of two opposite sides of said filling, each of said liners comprising a plurality of layers of sheet material substantially coextensive with each other and covering substantially the entire area of said filling, a pair of strips of reinforcing material interposed between the layers of sheet material of each of said liners at opposite edges
20 of the bat and extending substantially along such edges, and stitching extending through two reinforcing strips adjacent the same edge of the bat and through the interposed filling and at least part of said layers of sheet material.

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