

(No Model.)

S. CABOT.
PACKING FOR BUILDERS' USE.

No. 488,869.

Patented Dec. 27, 1892.

Fig. 1.

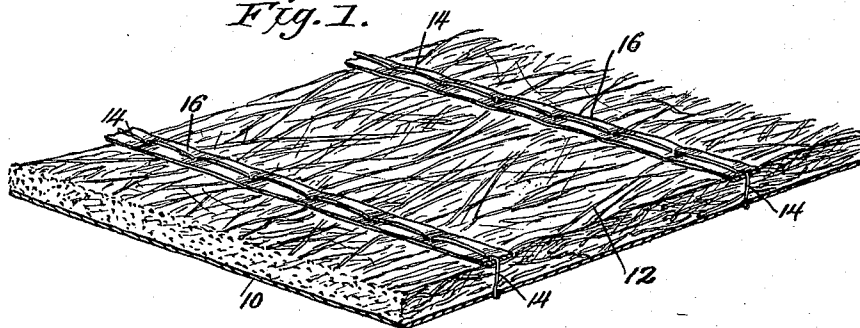


Fig. 2.



Fig. 3.

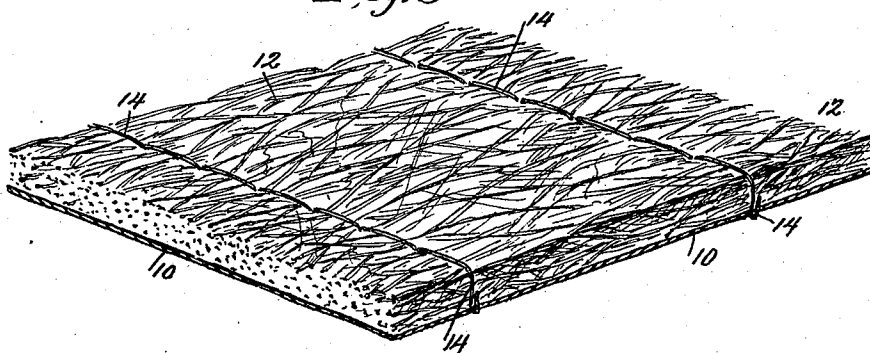
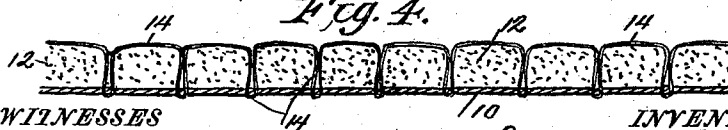


Fig. 4.



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PACKING FOR BUILDERS' USE.

SPECIFICATION forming part of Letters Patent No. 488,869, dated December 27, 1892.

Application filed September 15, 1892. Serial No. 445,969. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL CABOT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Packing for Builders' Use, of which the following is a specification.

This invention is related to a class of devices designed for lining, felting, or packing the walls, floors, or roofs of houses, so as to lessen the transmission of heat and sound through the same; and it is adapted to facilitate the accomplishment of these objects in an especially convenient, thorough and safe manner, and to do so at a less cost than has hitherto been possible. I gain these ends by constructing as a manufactured article, a compound sheet of packing consisting of stout paper, thin strawboard, cloth, or other thin and flexible base to which is attached a stratum of hay, straw, or eel-grass, or like fibrous material; the whole being fireproofed before or after it is made by the application of mineral matter in solution and suspension, the nature of which will be fully set forth hereinafter.

In the drawings forming part of this specification, Figure 1, represents in perspective the upper surface of a sheet of my packing material. Fig. 2, is an edge elevation of the same, the two materials therein being held together by rows of coarse stitching several inches apart. Fig. 3, is a perspective view similar to Fig. 1, in which the stitching is done without tapes on the upper surface showing the sheet packing in its simplest form. Fig. 4, is a section of Fig. 3, along a line of stitching.

The process of making my packing consists of a series of simple operations. The paper or other base marked 10, is laid flat upon a suitable support and covered with the fibrous stratum of hay or analogous substance 12. It is then fed under the needle bars of a number of single thread sewing machines, and stitched in parallel rows, using very long stitches, 14. The thread for this purpose passes up and down through the hole, also through the tapes, [of paper or woven cloth] 16, when the product is to be provided with that addition. During this operation the fibrous stratum is held down with more or less pressure,

and compacted for the time being by suitable rollers or other devices, as the sheet of paper and fibrous material is fed forward in the way usual in sewing machines; and tapes, when used, are fed from reels as braid &c., is fed in ordinary sewing. The paper or cloth for this purpose may be in separate sheets, or it may come from a web of considerable length and be cut up afterward. The fire-proofing of the compound sheet so constructed may be accomplished after it has been made, or the base and fibrous material composing it may each be fireproofed separately and then joined together.

Many substances have been used to protect wood surfaces, and woven or felted fabrics &c., from the destructive action of fire; such as tungstate of soda, borax, alum and like salts; but for the ends I have in view and the peculiar nature of the material to be rendered fireproof, I prefer to apply a new and special mixture, consisting of about equal parts by weight of a fifty per cent solution of water-glass, [silicate of soda] and silicate of magnesia in the form of a short fibrous powder which occurs as a mineral, known under the name agalite. After dilution with water to a proper and convenient consistency for application, this viscid solution holding the agalite in suspension is ready for the preparation of the fiber and base by immersion or otherwise. The mineral material I employ with the water-glass and which gives body and substance to the fire-proofing mixture, is much used in paper making. Chemically it is a very pure silicate of magnesia allied somewhat to asbestos and other minerals of that class, but distinguished from them by the fact that it is free from lime, alumina and iron. The short fibrous character of the agalite powder and the large surface the filaments present, fit it especially for suspension in the water-glass solution. Moreover the strongly alkaline nature of the silicate of soda, gives rise to superficial chemical action, the solid mineral being to some extent attacked and gelatinous silica proportionately thrown out, whereby the perfect uniformity and distributableness of the mixture is easily maintained, and, at the same time the chemical reactions are not sufficiently active to interfere with the mechanical use of the mixture,

or to make it necessary to hurry the application of the same.

It is of course impossible to make organic matter fireproof in the sense that a high temperature will not decompose it; but it is possible to retard such decomposition very greatly and to hinder the rapid spreading of flame through otherwise combustible material, and finally to prevent the immediate collapse of fibrous organic matter after its exposure to fire. These advantages are gained by the fireproofing liquid I have described, for its action, when applied to disintegrate vegetable fiber such as hay, is to thoroughly wet the exposed surface of the individual fibers and then, in drying upon them to deposit around each separate fiber a coating of mineral matter which protects each from the free access of air, and therefore hinders its ready ignition and destruction by fire. Fibrous matter so occluded cannot communicate fire or flame rapidly from one part of its mass to another, even though it remain in a loose and open condition. And, after suffering the inevitable decomposition due to continued heat, the fibers still retain their form and position, because the carbonaceous and silicious residue is supported by the coating of agalite and silicate of soda which suffers partial fusion, so as to form a slag-like crust when exposed to a high temperature. This fire-proofed filling for the use of architects and builders, is especially well adapted for its purpose by reason of the sheet-form given it, which admits of its being readily nailed under clapboards and shingles to keep the house warm in winter and cool in summer. That it acts well as a non-conductor of heat, is due chiefly to the many air spaces within its mass which the elastic character of the hay or eel-grass keep open, and the relatively large volume of air stagnated by it within the cavities which this packing fills. As a consequence the material I have invented offers much resistance to the propagation of fire throughout a building, when it is placed within its floors, partitions and other walls; and for reasons already given such protection does not cease after the volatile constituents of the hay, or other analogous fiber, has been dissipated by fierce heat, inasmuch as the fixed calcined coating which covered the individual fibers still remains as an excellent non-conductor, and stagnates the air in the cavities, while the base, in form at least, remains intact after charring and cuts off the direct impact of flame from the wood work it lies against.

As a sound deadener this packing is very effective; for, besides acting like any soft filling material, its compressible and elastic character causes it to fill fully the places where it is interposed and into which it is crushed and compressed, and to so connect the resonant surfaces elastically, as to break and neutralize the sound waves which strike upon them.

It is evident that the precise construction of the packing I have described may be de-

viated from without affecting the character of my invention. In the drawings the compound sheet has been shown with and without tapes under the stitches on the upper side, and in place of the tapes a full sheet of paper or cloth could be used with perfect success, except that the cost would thereby be increased. The layer of salt hay or similar fiber may also be attached to the paper or cloth by suitably arranged wire-stapling machines in place of sewing machines, and in other ways.

In fireproofing according to the formula herein given other pure magnesian silicates, as before stated, may be substituted for the agalite, but the substances and methods named and described are the best known to me for fireproofing disintegrate fibrous matter; that is, for protecting from conflagration and occluding by mineral matter [without the formation of a solid mass] flexible fibrous material, the elastic and compressible nature of which shall remain unimpaired by the protective treatment. But I wish it understood that I do not restrict myself to a compound sheet of the kind described, prepared with water-glass and agalite only, to the exclusion of every other preparation, though the same I believe to be the best treatment of organic matter for its protection. Many fireproofing solutions and mixtures will to some extent retard the rapid spread of fire in disintegrate fiber, though imperfectly and accompanied by several drawbacks, such as the causing of offensive dust when handled, and the production of noxious gases when acted on by fire; hence, the value of a mixture of chemical substances which work satisfactorily at the time of manufacture, when the sheet packing protected therewith is applied in building, and when it is subjected to the action of fire.

If it is desired to improve the appearance of this manufacture, my sheet packing may be given a positive color to suit trade requirements. Any of the iron oxides or ochreous colors can be used for this purpose, as, for instance, Venetian red, Spanish brown, &c., which are best applied by mixing them with the fire-proofing composition, whatever its nature may be. Mineral colors of this sort are unaffected by the chemical nature of water-glass, which is, on the contrary, especially effective in suspending such colors, and in causing them to adhere tenaciously to the surface of the elastic fibers employed, which are generally grasses provided externally with a hard, glassy, silicious covering. It is the tendency of the silicate of soda to attack, or intimately wet such surfaces, that gives that soluble silicate the power to cause the tenacious adhesion of the suspended silicate of magnesia to hay and similar fibers; as well as in like manner to distribute and attach earthy colors with the agalite so firmly, as to hinder their perpetual disengagement in handling and the consequent formation of dust. It is plain that an adaptation of the propor-

tion of water-glass to the total quantity of mineral matter to be suspended; as well as to the nature of the fiber which is to be occluded and to the diluting water, is necessary in preparing the mixture for fire-proofing, so as to give the best results.

What I claim is:—

1. As an article of manufacture; an elastic sheet packing for builders' use, consisting of a thin fire-proofed base with a fire-proofed layer of elastic fiber, such as hay, fastened thereto; substantially as described.

2. As an article of manufacture; an elastic sheet packing for builders' use, consisting of a thin flexible and porous base, with a layer of elastic fibrous organic material, such as hay, fastened thereto, both substances fire-proofed with a mixture of water-glass and agalite; substantially as described.

3. As an article of manufacture; an elastic sheet packing for builders' use; consisting of a thin flexible and porous base, with a layer of elastic fibrous organic material stitched thereto, both substances protected from conflagration by fireproofing mineral matter, tenaciously attached to and inclosing the flexible fibers singly; substantially as described.

4. As an article of manufacture; an elastic sheet packing for builders' use; consisting of a thin flexible and porous base, with a layer of elastic fibrous organic material stitched thereto, both substances fire-proofed with a mixture of water-glass and a pure magnesian silicate [such as agalite], tenaciously attached to and inclosing the flexible fibers singly; substantially as described.

5. In sheet packing for builders' use, the combination of a fire-proofed sheet of thin flexible and porous material, with a fire-proofed stratum of disintegrate fibrous matter, and with means for attaching them together; substantially as described.

6. In sheet packing for builders' use, the combination of a sheet of paper fire-proofed by a mixture of water-glass and a pure magnesian silicate in about the quantities stated; with a stratum of disintegrate fibrous matter fire-proofed by the same mixture, and with means for attaching them together; substantially as described.

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Witnesses:

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