April 28, 1931. C. A. UPSON 1,802,543

INSULATING MATERIAL AND METHOD OF MAKING THE SAME

Filed Feb. 23 1928 2 Sheets-Sheet 1

Fig. 2

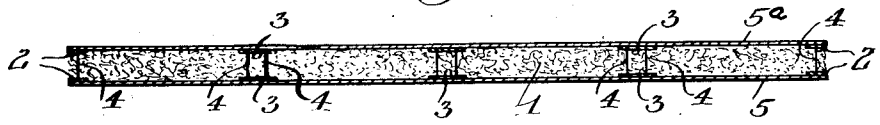


Fig. 3

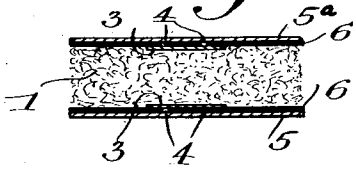


Fig. 1

Fig. 4

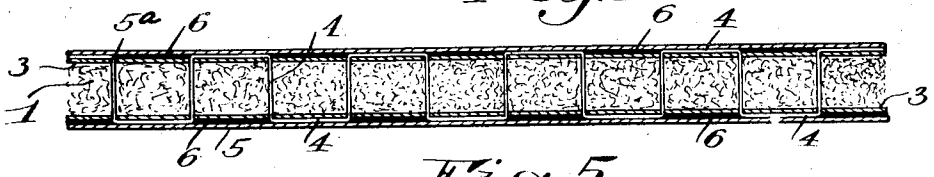


Fig. 5



INVENTOR
Charles A. Upson
BY
Crumpton & Luffetti
his ATTORNEYS

April 28, 1931. C. A. UPSON 1,802,543

INSULATING MATERIAL AND METHOD OF MAKING THE SAME

Filed Feb. 23 1928 2 Sheets-Sheet 2

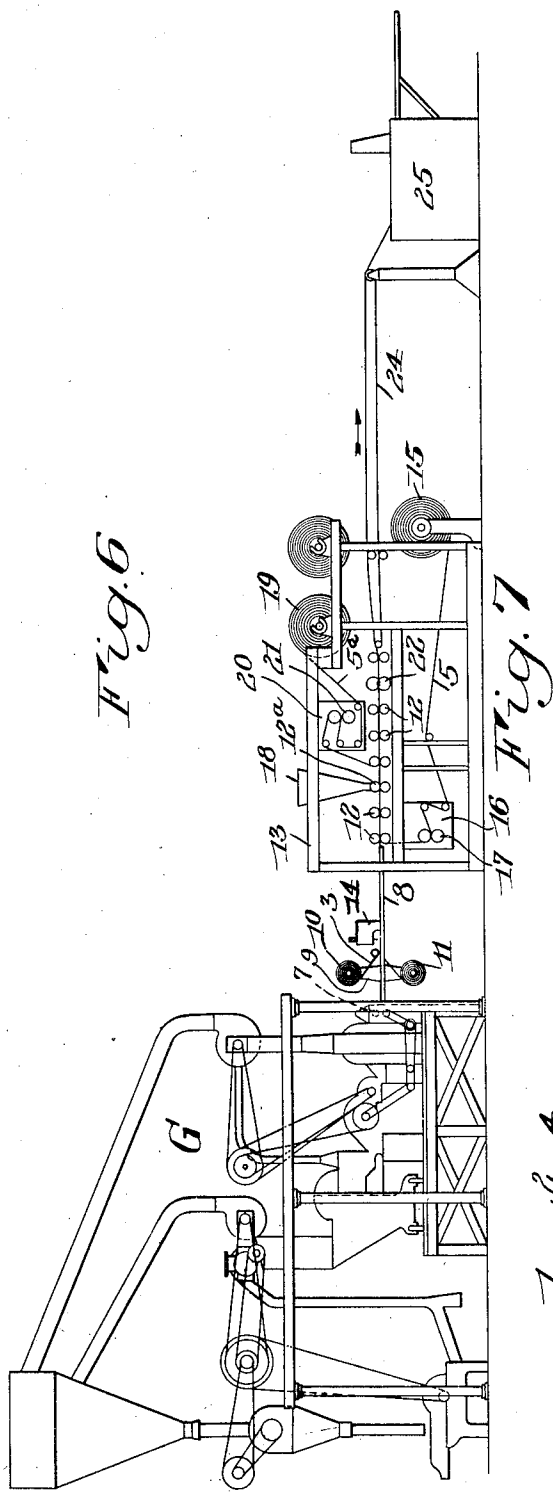


Fig. 6

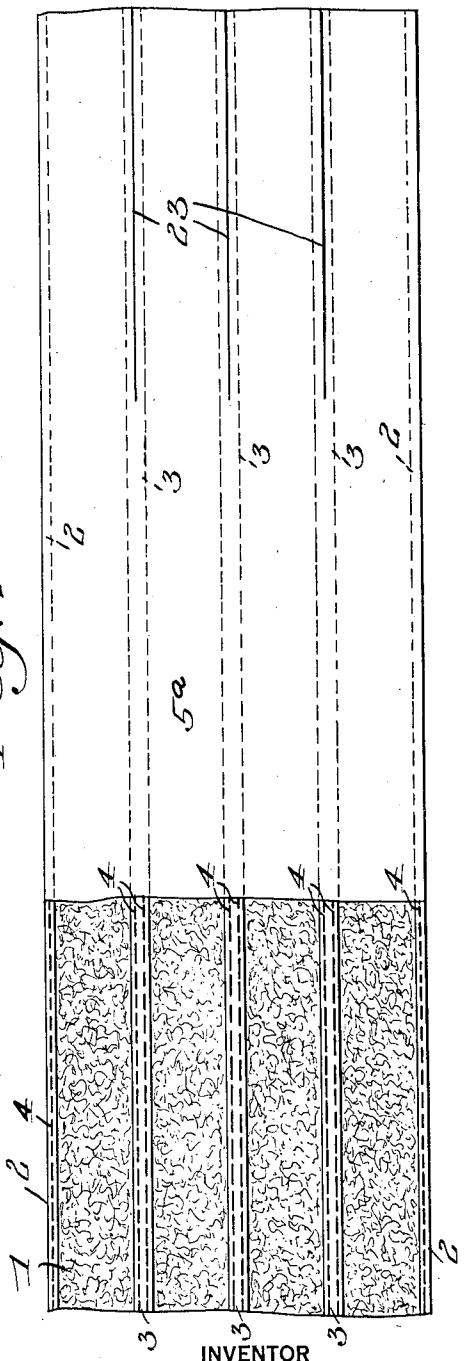


Fig. 7

INVENTOR
Charles A. Upson
BY
Cumpston & Shuttleworth
his ATTORNEYS

Patented Apr. 28, 1931 1,802,543

UNITED STATES PATENT OFFICE

CHARLES A. UPSON, OF LOCKPORT, NEW YORK, ASSIGNOR TO THE UPSON COMPANY, OF LOCKPORT, NEW YORK, A CORPORATION OF NEW YORK

INSULATING MATERIAL AND METHOD OF MAKING THE SAME

Application filed February 23, 1928. Serial No. 256,349.

My present invention relates to the manufacture of heat and sound insulating material and padding such as is used in building construction as a lining for walls and floors, and has for its object to provide an improved article of this character, and an improved method of making the same. The improvements are directed in part toward furnishing a light and flexible but strong sheet of material having a felted fibre center and one or more lining sheets attached thereto in such manner as to hold the heterogeneously formed mass firmly in place in the structure. The invention also contemplates treating the interior body with fire and water resisting substances during its course of manufacture. 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 fragment of insulating material constructed in accordance with and illustrating one embodiment of my invention, portions of the liner sheets being cut away to reveal interior elements;

Fig. 2 is a transverse section therethrough;

Fig. 3 is an enlargement of a portion of the showing of Fig. 2;

Fig. 4 is an enlarged longitudinal section taken on the line 4—4 of Fig. 1 along one of the lines of stitching;

Fig. 5 is a similar view showing the use of a different kind of stitch;

Fig. 6 is a side elevation of the forming machine through the medium of which my improved method can be carried out, and

Fig. 7 is a top view of a fragment shown in Fig. 1 showing the manner in which it may be slitted.

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

The substance that I use for the body of the material as indicated at 1 may be any flocculent fibrous material that may be felted down to a soft spongy heterogeneous mass that was porous and resilient and yet is capable of maintaining its flat form during the manipulations of manufacture. In other words, the central body 1 is a bat that may be composed of animal, mineral or vegetable matter, such as cotton, animal hair, wood fibre, et cetera. At the present time I find it both convenient and economical to use a low grade of cotton, such as damaged or waste cotton, which produces a superior article. Whatever the substance, it is formed into a flat bat in any suitable bat making machine. I next apply to one or both surfaces thereof a plurality of narrow thin flexible strips 2 and 3 that are laid in parallelism longitudinally of the bat strip, and spaced laterally from each other as shown in Fig. 1. Ordinarily I use paper for this purpose, and where the strips are applied to both sides of the bat the units on one side are respectively placed opposite corresponding units on the other side. I then sew the bat and strips together with longitudinal rows of stitching 4. In some cases I use double rows of stitching on some of the interior strips as shown for a purpose hereinafter explained. Finally there is applied to one or both sides of the resulting structure a flexible liner sheet 5 of paper or other material, previously coating the under side of the liner with an adhesive body 6, such as a solution of silicate of soda, asphaltum, glue or other appropriate substances known to the paper making art. This adhesive may be applied to the entire face of the liner, so that it adheres directly to the bat 1, or it may be applied along lines corresponding to the strips 2 and 3, or it may be applied to the strips instead of to the liner. In any event, its function is to firmly attach the liner to the sewn strips, as shown in sections in Figs. 4 and 5, and not only this but to cement and lock the exposed ends of the stitches 4 in place, they being imbedded in the adhesive body, so that they do not give and enlarge the holes in the strips through which they pass.

In this way a firmly constructed yet flexible composite insulating material is produced having a body of uniform texture, which both before and during use, is free from both wads and thin spots. The stitched strips while thus supporting the fibrous

structure of the interior nevertheless do not impair the flexibility, particularly laterally, which is useful in laying and fitting during building construction as when rounding corners, or covering the sharp turn of pillars and posts.

Any convenient form of stitch may be used so long as the ends of the thread after passing through the bat are exposed to the adhesive on the outer faces of the strips. In Fig. 4 I have shown a plain running stitch, though a plain stitch may be used with double effect. In Fig. 5 I show the thread indicated at 4*a* clipped after each stitch so that a plurality of detached threads pass through the bat and have their ends turned over and cemented upon the strips and against the liners.

In view of the large quantities in which material of this kind is produced, it is preferable to make it as a continuous running process. In Fig. 6 I have shown in a general way a large machine suitable for this purpose, the details and mechanical subject matter of which I am claiming in a companion application filed concurrently herewith. Referring to this figure, G indicates generally a Garnett picker, or familiar type of bat making machine, the details of which are of no consequence to this invention and application. It is sufficient to say that the flat fibrous bat 1 issues therefrom in a continuous strip between discharge rollers 7 onto a table 8. Next adjacent thereto are a pair of supports 9 carrying axles 10 upon which are supported above and below the table rolls 11 of strip paper suitably spaced to lay the strips 3 at the proper interval in a continuous manner upon the traveling bat. These elements together with the liners about to be described are drawn through the machine by means of a plurality of feed and pressure rolls 12 carried by a frame work 13, which rolls are suitably driven and may be heated or not according to the adhesive and other material used.

As the bat with the strips thereon passes across the table 8 toward the feed roll, it travels through a multiple needle sewing machine 14, which applies the stitching 4. After the sewing operation a lower liner strip 5 is drawn from a supply roll 15 over suitable guide rollers and through a dope box 16, where the adhesive is applied to the upper face thereof by a roll 17. From thence the liner passes up and through the feed rolls 12 and becomes attached and pressed firmly to the under side of the bat, and the under strips 3 thereon.

In case it is desired to impregnate the bat or inner fabric body with a fire resisting or a water resisting material, I prefer to introduce this in a powdered form from a hopper 18 supported in the frame 13. Any suitable substance may be used, and it is sifted down upon the exposed surface of the bat from one of the feed rolls 12*a*, which as shown cooperates with the mouth of the hopper. During the further travel of the structure through the machine this powder is automatically shaken through to impregnate the interstices of the fibrous mass.

The upper liner 5*a* is next applied to the upper surface in the same manner as that described with respect to the lower liner. It is drawn from a supply roll 19 over suitable guides through an upper dope box 20, where the adhesive is applied by roller 21 to its under surface before it passes under the feed roll 12 next beyond the distributing feed roll 12*a* of the proofing device. Beyond this point after passing through several more feed and pressure rolls the structure becomes a finished material. If the machine is a large one and it is desired to cut the material longitudinally to divide it into more convenient widths I arrange upon the frame 13 a plurality of suitably driven upper and lower slitting knives 22. These are so arranged that they engage and cut in between the double lines of stitching on the interior strips 3, as indicated at 23 in Fig. 7. This leaves the edges of the bat well supported on all sides.

From the feed rolls the finished material is carried over an endless conveyor 24 to the desired point of delivery. In the present instance I have shown it delivered to a suitable swatching machine 25 which automatically folds the strips in zig-gaz piles and severs it into desired lengths, but the details of this are of no more concern to this invention than is the particular construction of the machine at the other end, which prepares and feeds the bat.

I prefer to cover the entire inner surfaces of the liners 5 and 5*a* with the adhesive so that they adhere directly to the bat between the strips as well as to the strips themselves. This prevents changes in the positions of the fibres in the sections of the bat between the strips, while the stitches prevent these sections from moving relatively to each other.

Asphaltum is preferably used as the adhesive element where waterproofing of the outer paper liners is desired or other adhesives of a waterproofing character can be used or waterproofing may be effected by a treatment additional to the application of the adhesive.

I claim:

1. The method of making a composite insulating material as a continuous process which comprises progressively preparing a travelling felted bat of loosely associated fibres, applying a plurality of thin flexible strips laterally spaced from each other, in parallelism to a surface of the bat during its travel, sewing said strips to the bat, while travelling together with longitudinal lines of stitches, and cementing a thin flexible liner

sheet to the strips and bat on both sides while travelling in a manner that cements also the ends of the stitches in place.

2. The method of making a composite insulating material which comprises preparing a felted bat of loosely associated fibres, applying a plurality of thin flexible strips laterally spaced from each other in parallelism on both sides of the bat in direct contact therewith, so that units are aligned in pairs on opposite sides thereof, sewing each of said pairs of strips and the bat together with longitudinal lines of stitches so that the stitches are exposed upon the outer faces of the strips, and cementing thin flexible liner sheets to the strips on both sides of the bat in a manner that also cements the stitches in place.

3. The method of making a composite insulating material which comprises preparing a felted bat of loosely associated fibres, applying a plurality of thin flexible strips, laterally spaced from each other in parallelism on both sides of the bat so that units are aligned in pairs on opposite sides thereof, sewing each of said pairs of strips and the bat together with longitudinal lines of stitches so that the stitches are exposed upon the outer faces of the strips, one of the latter being provided with double lines of such stitching, cementing thin, flexible liner sheets to the strips on both sides of the bat in a manner that also cements the stitches in place, and finally slitting the product longitudinally between the aforesaid double lines of stitching on the doubly sewed strip.

4. The method of making a composite insulating material as a continuous operation which comprises preparing a felted bat of loosely associated fibres, conveying the same continuously along a given path of travel, applying a plurality of thin flexible strips, laterally spaced from each other in parallelism, to a surface of the bat by laying it progressively thereon during its travel, sewing said strips to the bat while both are in travel with longitudinal lines of stitches, applying a thin, flexible liner sheet to the strips progressively during their travel and applying an adhesive to one of said last mentioned elements before they come together to cement the liner to the strips in a manner that also cements the stitches in place.

5. An an article of manufacture, a composite insulating material embodying in combination a felted bat of loosely associated fibres, a plurality of parallel laterally spaced strips of paper laid against opposite sides thereof in direct contact therewith so that units are aligned in pairs on opposite sides of the bat, stitches extending through such pairs of strips from side to side and through the bat, an imperforate paper liner sheet superimposed upon the strips on each side of the bat, and an adhesive securing the liners to the strips and also acting to cement the stitches in place.

6. As an article of manufacture, a composite insulating material embodying in combination a felted bat of loosely associated fibres, a plurality of strips of thin flexible material laid oppositely thereon in pairs on both sides, stitches extending through the strips and bat, a thin, flexible imperforate liner sheet superposed upon the strips and bat on each side of the latter, and an adhesive securing each liner to the strips and also acting to cement the stitches in place, one such pair of strips being positioned at each selvage edge of the bat.

CHARLES A. UPSON.