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LAMINATED BOARD

Filed May 5, 1942

Fig. 1.

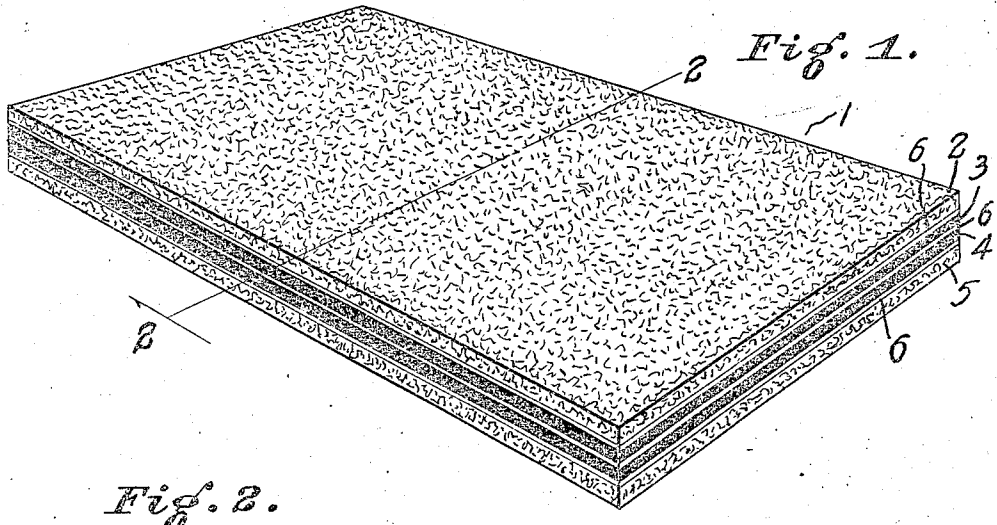


Fig. 2.

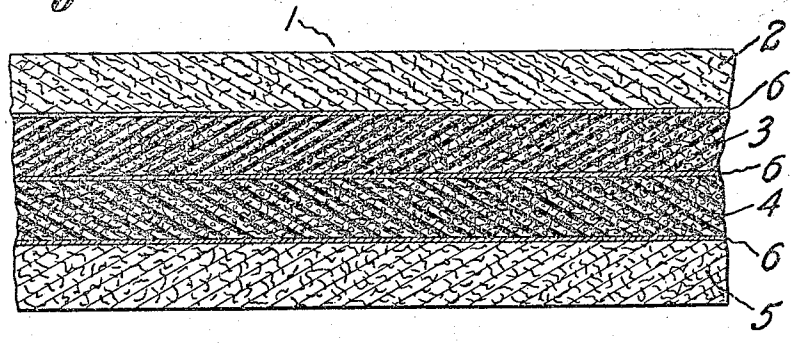
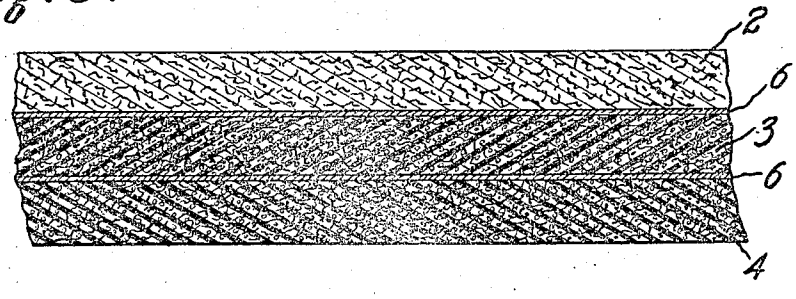


Fig. 3.



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2,414,533

LAMINATED BOARD

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Application May 5, 1942, Serial No. 441,305

5 Claims. (Cl. 154—45.9)

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This invention relates to a panel or board of laminated structure comprising layers of felt or paper, preferably impregnated with a water-proofing bituminous material, bonded together with adhesive material which sets in a substantially hard rigid character to give the laminated structure a board-like rigidity and render it fire and moisture resistant. The fibrous sheets comprising the core are of organic fibers, whereas, the surfacing sheets are preferably of inorganic fibrous material. One of the surfacing sheets of inorganic material may be eliminated from one face of the composite structure in order to provide exposed sides of different color and character and permit it to be selectively used with the organic sheet or the inorganic sheet on the side to be exposed to view.

Heretofore, bituminized felt sheets have been adhered in superposed relation by such materials as Portland cement or the like, but inasmuch as this cementing material is non-adhesive to the bituminized sheets, it has been necessary to associate with the sides of the sheets to be cemented some material to which the cement would adhere. One expedient has been to partially embed mineral granules in a coating of asphalt applied to adjacent sides of the sheets to be interposed. This, of course, requires an asphalt coating on the sheets as well as the mineral surfacings embedded therein, and increases the thickness of the board.

The aim of the present invention is to obtain a panel structure which is as light in weight and as thin in thickness as possible, but is nevertheless board-like. Another object is to have a cement that is fire and water-resistant, and will aid in so characterizing the board.

For a better understanding of the invention reference may be made to the accompanying drawing, in which:

Fig. 1 is a perspective view of a panel or board embodying the invention;

Fig. 2 is a cross section view on line 2—2 of Fig. 1; and

Fig. 3 is a cross sectional view of another embodiment.

Referring to the drawing, in which like numerals are used to designate like parts, numeral 1 designates generally a panel board composed of felt or paper layers 2, 3, 4, and 5, adhered together in laminated structure by adhesive material 6 which is of a character to set to a water-insoluble condition and is resistant to moisture entering between the adhered plies. It also gives a water-resistant character to the sheet to which it is applied if the sheet is not of that character. Another feature of the adhesive is that it is flame resistant and also gives a flame resistance to the sheet to which it is applied if said sheet is not already of that character.

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Paper or felt sheets 3 and 4 are felted from any type of fibrous pulp stock, such as rag, wood, or the like. They are also impregnated with asphalt or other suitable water-proofing composition. Some mineral filling material may advantageously be incorporated in the pulp stock and distributed therethrough so as to be interspersed throughout the felt sheet with the waterproofing material. This gives increased weight and rigidity to the felt and also serves to open up the interstices between the felt fibers and make the felt more porous for reception of the waterproofing material. The mixed filling material also increases the melting point of the waterproofing material and its stiffness.

The felt sheet may advantageously be reconstituted from bituminized fibrous roofing. Bituminized fibrous roofing comprises a fabric foundation of felted or woven material which is saturated and coated on one or both sides with bituminous adhesives of higher melting point and harder consistency than the saturated material. Mineral granules, slag, ceramic, slate or the like, are applied to the surface of the weather exposed side of the roofing and the opposite or non-weather side is dusted with any mineral dust, such as talc, mica or such that are suitable to render the under side non-adherent when sheets of the roofing are rolled or shingles cut therefrom are stacked in bundles.

In the manufacture of such prepared asphalt roofing, there is a large accumulation of waste from defects, trimming, cut out in form of strips or individual shingles, and this may be reconstituted into a furnish pulp by disintegrating same to a feltable condition in the presence of water. The reconstituted felt is highly water resistant because of the large quantity of water-proofing material distributed therethrough. A reconstituted felt may be further saturated with asphalt if desired to increase its water resistance, although this is unnecessary for the ordinary use of boards in which it is used. If the sheets 3 or 4 are ordinary roofing felt, paper, or the like, and not reconstituted felt, they may be saturated in any desired manner.

The facing sheets 2 and 5 are of felted asbestos material. They are gray or off-white in color, which is the color of the asbestos fiber from which they are felted.

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The adhesive 6 represents any suitable adhesive material, inherently water resistant or that has been rendered insoluble to water, and is capable of securely bonding with the asphalt impregnated felt sheets. A suitable adhesive composition of about 150 lbs. of silicate of soda (40° Baumé 1:3 ratio), 65 lbs. of Portland cement (Q-22 Columbia brand), 10 lbs. of tri-sodium phosphate, and 3 lbs. of sodium fluoride typifies the invention. These are intimately commingled by any suitable mixer. The silicate of soda is first mixed with water and then the tri-sodium phosphate is stirred in. Sodium fluoride is preferably first mixed with water to moisten it before being added to the silicate of soda, the initial wetting or moistening preventing the silicate of soda from forming a reversible gel with the stabilizer. The cement or other reactant material used to impart waterproofness to the adhesive composition is then added to the silicate of soda and stirred together sufficiently to disperse the cement powder through the silicate of soda and reduce the mixture to a creamy consistency, smooth and free from lumps. Other alkali phosphates and fluorides (e. g. potassium salts) work equally well as do sodium salts.

The above described cement typifies one requiring no heating. It has a working life in excess of eight hours, after which it sets up or hydrates to a waterproof condition.

The Portland cement does not serve as the adhesive bond but is merely distributed throughout the silicate of soda to render same insoluble when exposed to water after being set. The other ingredients are added for the purpose of retarding the setting of the adhesive and extending its working life before setting up to a water-proof condition.

The adhesive composition covers the saturated felt sheets sufficiently to render them fire resistant and to make them highly water resistant. Exposure of the edges of the board to a flame, with the asbestos lining sheet on opposite faces, will not ignite the core sheets 2 and 3.

In embodiment Fig. 3, one of the asbestos sheets has been eliminated from one surface side of the composite panel. Asbestos sheet 2 is retained. A sheet such as 3 or 4 may, if desired, be added in lieu of the sheet 5. The saturated sheet is black in color, and, thus, there is produced a board which has one face substantially white or gray in color, the color of the asbestos material, and the opposite side substantially black or dark in color, the color of the asphalt saturated felt. The panel may be conveniently used with the asbestos sheet 2 as the exposed side or with the sheet 4 or similar sheet as the exposed side. The panels are thereby rendered particularly useful for blacking out as in windows, skylights, and yet still be useful for other normal purposes where boards of this character are desired. The water and fire resistant character of the boards is such to protect them against normal hostile fires and any water that may be thrown upon the boards to quench fire.

For some purposes it is desirable to have all the plies of asbestos paper and free from any material that would soften and flow at high temperature. Thus, a board composed all of asbestos plies adhered by the adhesive is suitable for jackets on hot water tanks or boilers. While a board of two or more plies of asbestos paper adhered together with the adhesive is board-like in character, it is sufficiently yieldable to be bent about and generally conformed to the object to be wrapped.

While the invention has been described in detail, it will be understood that there may be various changes without departing from the spirit of the invention.

I claim:

1. A laminated board comprising layers of bituminized fabric adhered together by a silicate base adhesive having siliceous cement material therein to render said adhesive water-insoluble and flame resistant and having a retardant therein to delay hydration of the silicate base and cement mixture.

2. A laminated board comprising layers of bituminized fabric adhered together by a silicate base adhesive having Portland cement therein to render said adhesive water-insoluble and flame resistant and having a retardant therein to delay hydration of the silicate base and cement mixture.

3. A laminated board comprising one or more layers felted from a furnish stock of organic fibers, bituminous adhesives and finely ground mineral, a felt layer of mineral fiber surfacing one side of the one or more layers of organic fibers, and a silicate base adhesive with siliceous cement and a hydration retardant therein for bonding the layers together.

4. A laminated structure comprising one or more layers of bituminized fabric, a fabric layer of mineral fibers surfacing one of the sides of the one or more layers of the bituminized fabric, and a water-resistant inorganic adhesive comprising a silicate base, siliceous cement and a hydration retardant, for bonding the layers together.

5. A laminated structure comprising one or more layers of bituminized fabric, a fabric layer of mineral fibers surfacing the opposite sides of the one or more layers of the bituminized fabric and a water-resistant inorganic adhesive comprising siliceous cement and a hydration retardant, for bonding the layers together.

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