Jan. 1, 1946. P. M. SNYDER 2,392,272

BUILDING MATERIAL

Filed Aug. 23, 1941

Fig. 1

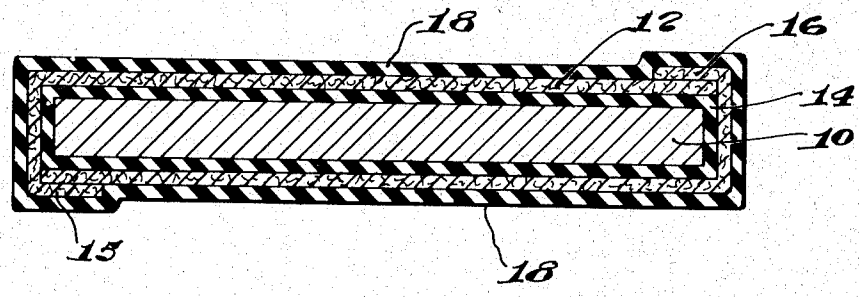
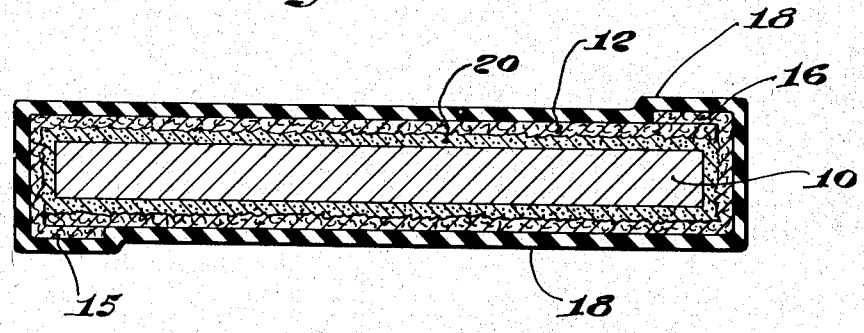


Fig. 2



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UNITED STATES PATENT OFFICE

2,392,272

BUILDING MATERIAL

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Application August 23, 1941, Serial No. 408,137

8 Claims. (Cl. 154—45.9)

This invention relates to a protected metal article for building purposes and to a method of making the same.

The object of the invention is to provide a novel and superior protected metal article of the type wherein the metal article is protected by one or more bituminous coatings and impregnated fibrous layers, wherein the bituminous coatings and impregnants are compounded to impart to the protected metal article the ability to prevent the rapid propagation of flame when the article is subjected to the direct action of a fire.

With this object in view, and such others as may hereinafter appear, the invention consists in the protected metal article and in the method of making the same hereinafter described and particularly defined in the claims at the end of this specification.

In the drawing, Fig. 1 is a cross-sectional view of a protected metal article embodying the invention; and Fig. 2 is a similar view of a modified form of protected metal article also embodying the invention.

Referring now to Fig. 1, the protected metal article disclosed therein comprises a metal article 10, preferably a metal sheet such as an iron or steel sheet. The metal sheet 10 has secured to the opposite surfaces thereof layers 12 of fibrous material, preferably by an interposed body of bituminous material 14. In practice the metal sheet 10 is passed through a molten bath of the bituminous material 14 and the fibrous layers applied before the bituminous material of the enveloping coat has solidified to thereby adhesively affix the fibrous layers to the metal sheet. The fibrous layers 12 may be applied in offset relation to permit the opposite marginal portions 15, 16 of the opposed fibrous layers to be wrapped around the side edges of the metal sheet in the manner illustrated in Fig. 1, and adhesively affixed to the opposite surfaces of the fibrous layers. To further weather-proof the protected metal article, an outer protective coating 18 of bituminous material may be provided forming a weather-proofing envelop for the protected metal article.

The protected metal article thus far described may, except as hereinafter pointed out, comprise the protected metal article forming the subject matter of United States patent to Robertson No. 1,277,755, to which reference is made.

Referring to Fig. 2 which illustrates a different embodiment of the invention, the protected metal article illustrated therein comprises a metal sheet 10 having one or more layers of fibrous material 12 affixed to the opposite surfaces of the metal sheet 10 by an interposed layer 20 of metal adhesive. The fibrous layers may and preferably will be secured to the metal sheet 10 in accordance with the disclosures of the United States patents to Coffman Nos. 1,862,332 and 2,073,334, to which reference is made. The fibrous layers may and preferably will be impregnated with a bituminous material, and in order to impart further weather-resisting characteristics to the protected metal article, the impregnated fibrous layers may be enveloped within the outer coating 18 of protective bituminous material as above described in connection with the protected metal article shown in Fig. 1.

In order to impart to the protected metal articles illustrated in Figs. 1 and 2 the ability to prevent rapid propagation of flame when the protected metal article is subjected to the direct action of a fire, it has been found that the bituminous materials employed as the impregnants of the fibrous layers 12 in such structures and as the coating 14 in the structure shown in Fig. 1 are rendered flame retarding by the incorporation in such bituminous materials of at least one and preferably of several of the metallic soaps selected from the group consisting of the soaps of the metals manganese, iron, zinc, chromium, cobalt, aluminum, magnesium and barium. The bituminous materials for the production of such coatings and impregnants may and preferably will comprise those now commercially used for such purposes in the production of the protected metal articles under the Robertson and Coffman patents above referred to, and it is recommended that an amount of soap be incorporated varying from three to fifteen per cent.

Of the metallic soaps above referred to it has been found that the soaps of iron, zinc, aluminum and barium impart to the bituminous compositions the maximum degree of flame retardance.

The barium soaps have been found to be particularly effective from a flame retarding standpoint. However, the barium soaps are not readily dispersed in asphalts by simple mixing and fluxing together. In an effort to find a method whereby this could be accomplished, it was found that the barium soaps could first be mixed with other soaps which were readily dispersed by simple mixing and fluxing, and then in such combination could readily be dispersed in asphalts.

It was found that 50 parts of a barium soap and 50 parts of a zinc soap when mixed together, and then added to an asphalt or a bituminous combination, that fire retarding properties approximating the effectiveness of a manganese soap could be

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obtained, when added in approximately the same proportions. Percentages required to produce materials of commercial value fall within the range of 4 to 12%. In practice we have found that 6 to 12% is adequate.

If it is desirable to incorporate in the bituminous compounds, for purposes of compounding technique, any waxes, resins or mixtures thereof, it is recommended that such materials be utilized in proportions not to exceed 35% of the entire base as a satisfactory degree of flame retardance has not been experienced utilizing metallic soaps in bituminous materials embodying more than 35% of waxes, resins or mixtures thereof.

For some purposes I have found that combinations of several soaps may be used with advantage, particularly to obtain maximum effectiveness with respect to flame retardance. For example, it has been found that the addition of 3% iron stearate to an asphalt saturant or finisher for the production of code wire and embodying 8% of a barium zinc soap combination produces a bituminous composition which possesses very efficient flame retarding characteristics. Other soaps may be included as above described, such for example, as minor proportions of aluminum soaps, with barium and zinc soap combinations.

This application is a continuation in part of my application, Serial No. 183,160, filed on January 3, 1938.

Having thus described the invention, what is claimed is:

1. A protected metal article comprising a metal article provided with a laminated protective coating having a fibrous layer affixed to the metal article by an interposed adhesive layer, and an outer bituminous layer covering the fibrous layer, said outer bituminous layer having incorporated therein at least one metallic soap insoluble in water and comprising a soap selected from the soaps of the group of metals consisting of iron, zinc, aluminum, and barium, in an amount in the range of three to fifteen per cent by weight of the bituminous composition, said flame retarding bituminous composition being further characterized by its ability to maintain substantial predetermined physical characteristics upon cooling after having been subjected to heating to elevated temperatures.

2. A protected metal article comprising a metal article provided with a laminated protective coating having a fibrous layer affixed to the metal article by an interposed adhesive layer, and an outer bituminous layer covering the fibrous layer, said outer bituminous layer having incorporated therein at least one metallic soap insoluble in water and comprising a soap selected from the soaps of the group of metals consisting of manganese, iron, zinc, chromium, cobalt, aluminum, magnesium, and barium, in an amount in the range of three to fifteen per cent by weight of the bituminous composition, said flame retarding bituminous composition being further characterized by its ability to maintain substantial predetermined physical characteristics upon cooling after having been subjected to heating to elevated temperatures.

3. A protected metal article comprising a metal article provided with a laminated protective coating having a fibrous layer affixed to the metal article by an interposed adhesive layer, said fibrous layer being impregnated with a bituminous composition having incorporated therein at least one metallic soap insoluble in water and comprising a soap selected from the soaps of the group of metals consisting of iron, zinc, aluminum, and barium, in an amount in the range of three to fifteen per cent by weight of the bituminous composition, said flame retarding bituminous composition being further characterized by its ability to maintain substantial predetermined physical characteristics upon cooling after having been subjected to heating to elevated temperatures.

4. A protected metal article comprising a metal article provided with a laminated protective coating having a fibrous layer affixed to the metal article by an interposed adhesive layer, said fibrous layer being impregnated with a bituminous composition having incorporated therein at least one metallic soap insoluble in water and comprising a soap selected from the soaps of the group of metals consisting of manganese, iron, zinc, chromium, cobalt, aluminum, magnesium, and barium, in an amount in the range of three to fifteen per cent by weight of the bituminous composition, said flame retarding bituminous composition being further characterized by its ability to maintain substantial predetermined physical characteristics upon cooling after having been subjected to heating to elevated temperatures.

5. A protected metal article comprising a metal article provided with a laminated protective coating having a fibrous layer affixed to the metal article by an interposed adhesive layer, said fibrous layer being impregnated with a bituminous material, and an outer bituminous coating on said fibrous layer, said impregnant and said outer coating being each rendered flame retardant by the incorporation in each of at least one metallic soap insoluble in water and comprising a soap selected from the soaps of the group of metals consisting of iron, zinc, aluminum, and barium, in an amount in the range of three to fifteen per cent by weight of the bituminous composition, said flame retarding bituminous composition being further characterized by its ability to maintain substantial predetermined physical characteristics upon cooling after having been subjected to heating to elevated temperatures.

6. A protected metal article comprising a metal article provided with a laminated protective coating having a fibrous layer affixed to the metal article by an interposed adhesive layer, and an outer bituminous coating on said fibrous layer, said fibrous layer being impregnated with a bituminous material, said impregnant and said outer coating being each rendered flame retardant by the incorporation in each of at least one metallic soap insoluble in water and comprising a soap selected from the soaps of the group of metals consisting of manganese, iron, zinc, chromium, cobalt, aluminum, magnesium, and barium, in an amount in the range of three to fifteen per cent by weight of the bituminous composition, said flame retarding bituminous composition being further characterized by its ability to maintain substantial predetermined physicial characteristics upon cooling after having been subjected to heating to elevated temperatures.

7. A protected metal article comprising a metal article provided with a laminated protective coating having a fibrous layer impregnated with a bituminous material and being affixed to the metal article by a layer of bituminous adhesive, and an outer bituminous layer covering the impregnated fibrous layer, said bituminous adhesive, impregnant and outer coating each being rendered flame retardant by the incorporation therein of at least one metallic soap insoluble in

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water and comprising a soap selected from the soaps of the group of metals consisting of iron, zinc, aluminum, and barium, in an amount in the range of three to fifteen per cent by weight of the bituminous composition, said flame retarding bituminous composition being further characterized by its ability to maintain substantial predetermined physical characteristics upon cooling after having been subjected to heating to elevated temperatures.

8. A protected metal article comprising a metal article provided with a laminated protective coating having a fibrous layer impregnated with a bituminous material and being affixed to the metal article by a layer of bituminous adhesive, and an outer bituminous layer covering the impregnated fibrous layer, said bituminous adhesive, impregnant and outer coating each being rendered flame retardant by the incorporation therein of at least one metallic soap insoluble in water and comprising a soap selected from the soaps of the group of metals consisting of manganese, iron, zinc, chromium, cobalt, aluminum, magnesium, and barium, in an amount in the range of three to fifteen per cent by weight of the bituminous composition, said flame retarding bituminous composition being further characterized by its ability to maintain substantial predetermined physical characteristics upon cooling after having been subjected to heating to elevated temperatures.

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