Feb. 9, 1954 P. W. JENKINS 2,668,781

ANTISTICK COATED, STEEL BUILDING SHEET

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Fig. 1

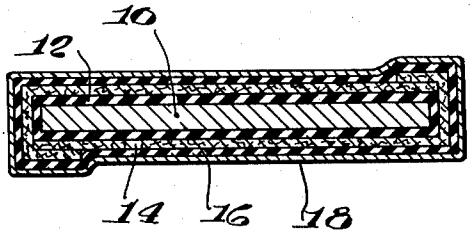
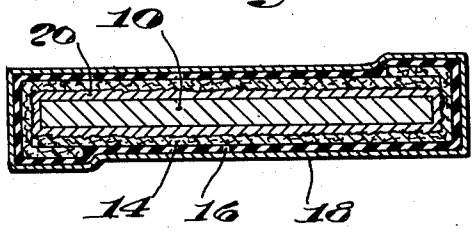


Fig. 2



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ANTISTICK COATED, STEEL BUILDING SHEET

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2 Claims. (Cl. 117—85)

1

This invention relates to building materials and more particularly to a building material having a bituminous or similar surface which is normally characterized by some degree of tackiness and by a tendency to adhere to other surfaces placed in contact therewith.

One object of the invention is to provide a building material of the character specified with a novel and highly efficient antistick layer covering and adhering to a normally tacky surface of the building material.

More specifically, an object of the invention is to provide a protected metal article of the type illustrated in the United States Patents to Robertson and to Coffman Nos. 1,277,755 and 2,073,334, having an antistick coating material possessing novel and superior characteristics which render such protected metal articles more suitable for their intended purposes than prior commercial forms of such articles.

With these general objects in view and such others as may hereinafter appear, the invention consists in the building material, in the protected metal sheets, and in the antistick compositions hereinafter described and particularly defined in the claims at the end of this specification.

In the drawing, Figs. 1 and 2 represent sectional views illustrating building sheets of the type shown in said Robertson and Coffman patents, each being provided with the present antistick layer.

In order to successfully ship and handle the protected metal building sheets forming the subject matter of the Robertson and Coffman patents above referred to, it has been the practice to provide the outer bituminous weatherproofing coatings with antistick layers in order to prevent the sheets from adhering together during shipment, and particularly during shipment in warmer climates, and in practice, these prior antistick compositions have comprised either the coating composition forming the subject matter of United States Patent No. 1,904,341, or the antistick coating composition disclosed in the United States patent to Young and Jenkins No. 2,440,626.

While the water-soluble antistick coating compositions disclosed in said Patents Nos. 1,904,341 and 2,440,626 are capable of performing their primary antistick function in an efficient manner and without deleterious effects upon the underlying bituminous weatherproofing coatings of the protected metal sheets, nevertheless, after such sheets have been erected it has been found from experience that those exposed surfaces, such as the outer surfaces of the building sheets erected upon the building, whether as roofing or siding,

2

remain in a much better condition than the inner surfaces of the sheets which are not exposed to the weather. This has been found to be due to the fact that the effect of the weather upon the outer surfaces of the sheet has been to wash away the water-soluble antistick film from the outer surface of the sheet so that after a short period of time the outer surfaces or sheets become free from the antistick film.

In contrast therewith, experience has proved that those surfaces of the sheets which are not exposed to the weather, such as the undersurface of the sheets employed as the roof or the inner surfaces of the sheets employed as siding, do not remain in as satisfactory condition as do the outer or exposed surfaces of the sheets. This has been found due to the fact that in industrial buildings, such inner or undersurfaces of the sheet are normally subject to wide variations of temperature and variations in the humidity of the atmosphere within the building, both of which tend to induce strain between the antistick film and the underlying bituminous coatings to which the film is attached, and eventually checking, cracking, and alligatoring of the bituminous coatings result.

Because of the fact that it is impractical to wash off the antistick film or otherwise remove the same from such inner surfaces of the sheets prior to or after erection of the sheets on the building, it is extremely desirable to produce an antistick coating composition which not only is capable of functioning as a satisfactory antistick during shipment and handling of the sheet but which also possesses a minimum tendency to disrupt the bituminous coating on the under or inner surface of the sheet after the same has been erected upon the building. Prior attempts to control the plasticity of water-soluble films, such as the alginates and the cellulose ethers referred to in said U. S. Patents 1,904,341 and 2,440,626, so as to minimize the tendency of the films to induce strains in the bituminous coatings, have relied upon the use of plasticizers of the class of the polyhydric alcohols, such as glycerine, all characterized by a relatively high degree of hygroscopicity. Changes in moisture content in response to changes in humidity have been accompanied by variations in physical properties and dimensions of the films, all of which have been conducive to setting up stresses between the film and the underlying coatings. Furthermore, such film compositions have been subject to leaching out of the plasticizer by movement of moisture into and out of the film, and gradual reduction to the unplasticized state,

and as a result checking, alligatoring, and cracking of the bituminous coatings have resulted, diminishing the durability and impairing the appearance of the inner surfaces of the sheets.

The present invention contemplates an improved antistick composition and an improved building sheet provided with the antistick composition and is based upon the recognition of the importance of holding the moisture content of the antistick film to as constant a value as possible. Accordingly, a water-soluble antistick film-forming material, such as an alginate, either sodium or ammonium alginate, or one of the cellulose ethers or the like, and preferably methyl cellulose, is combined with a plasticizing agent of very low hygroscopicity and in such proportions that the moisture content of the resulting film over the normal range of humidity to be encountered in the building is no greater than that of the film-forming material under such conditions. In practice, a plasticizing agent which may be used for this purpose may comprise one of the water-soluble polyalkylene glycols and/or the mono-ether or mono-ester derivatives thereof. The principal glycols of this class which I may use comprise the polyethylene glycols and the water-soluble copolymers of ethylene and propylene glycols which are the subject of U. S. Patent No. 2,425,845. Among the derivatives of such polyglycols which may be used, I prefer to employ the mono-ethers of such polyglycols with the C to C_4 alkanols. The fluid water-soluble copolymers of ethylene and propylene glycols, and derivatives thereof, are found to offer a particularly advantageous combination of properties, to wit, low hygroscopicity, low vapor pressure, low solubility in and for bituminous materials, low pour point, and high viscosity index. Typical of these copolymers which may be employed are the members of the 75–H series (-diols) and the 50–HB series (monobutyl ethers) of fluids marketed under the trade name of "Ucon." Members of this water-soluble series are characterized by low-vapor pressure, low solubility in or for aliphatic hydrocarbons, and are only slightly hygroscopic.

The film deposited from a water solution of equal parts by weight of methyl cellulose and "Ucon" fluid 50–HB–660 is cited as an example of an effective antistick which is relatively free from tendency to distort the bituminous surfaces for which intended, even after long periods of contact under adverse conditions.

A somewhat lower ratio of the "Ucon" fluid to methyl cellulose might be employed, and some advantage is gained by increasing the ratio to as much as two parts of plasticizer to one part of methyl cellulose. Variations in ratio of this order have not been found to make any appreciable difference in effectiveness of the films in preventing sticking. While the "Ucon" fluid has been referred to as a plasticizer for the methyl cellulose, it is rather obvious from the proportions that may be employed that both ingredients are effective in fulfilling the antistick function, and that it would be equally proper to refer to the cellulose ether as a thickening or bodying agent for the polyalkylene glycol derivative.

Referring now to the drawing, in Fig. 1 I have illustrated a building material of the type illustrated in the Robertson patent above referred to, wherein 10 represents the metal core sheet; 12 the enveloping asphaltic protective coating; 14 the adhering layers of fibrous material, such as asbestos felt; 16 the bituminous weatherproofing coating; and 18 the present antistick film. In Fig. 2, I have illustrated the building sheet of the type illustrated in the Coffman patent above referred to wherein 10 represents the metal core sheet having a layer 20 of zinc or equivalent metal coating upon the core sheet 10, and by which the layers 14 of asbestos felt are bonded to the metal core sheet 10. The asbestos felt layers 14 are provided with the enveloping bituminous weatherproofing coating 16 and the latter with the present antistick film 18.

The polyalkylene glycols and derivatives thereof of low hygroscopicity would not ordinarily be selected as plasticizers for water-soluble cellulose ethers or alginates because of their relatively poor compatibility with such materials and the results obtained by their use have been quite unexpected.

An efficient antistick solution may be made by dissolving the following in water:

	Per cent by weight
Alginate	2
Soap	1
A polyalkylene glycol or derivative characterized by low hygroscopicity	1 to 2

The alginates used may be single salts, such as sodium, potassium, or ammonium alginates or double salts, such as copper ammonium alginate or zinc ammonium alginate.

An example of an efficient antistick composition embodying a cellulose ether, such as methyl cellulose, may comprise the following:

	Parts by weight
Methyl cellulose	2
A polyalkylene glycol or derivative characterized by low hygroscopicity	1 to 4

This antistick composition may be applied in any convenient and desired dilution, even as low as 3% solids, and operates not only as a satisfactory and efficient antistick but also one in which the disadvantages above enumerated with respect to checking, alligatoring, and cracking of the bituminous coating 16 are reduced to a minimum, and in practice eliminated.

Having thus described the invention, what is claimed is:

1. A building sheet for roofing and siding purposes, comprising a protected steel core sheet having an outer protective waterproofing, bituminous coating characterized by a normally tacky surface, and a film covering said tacky surface and comprising a water-soluble cellulose ether and a plasticizer therefor consisting of a monoalkyl ether of a polyalkylene glycol, the alkyl group having 1 to 4 carbon atoms.

2. A building material as defined in claim 1 wherein the water-soluble cellulose ether and the water-soluble polyalkylene glycolic material are in the ratio of from 1 to ½–2 parts by weight.

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