June 20, 1939. F. E. WILLIAMS 2,162,769

COATED SHEET MATERIAL

Filed Nov. 20, 1937

Fig. 1.



Fig. 2.

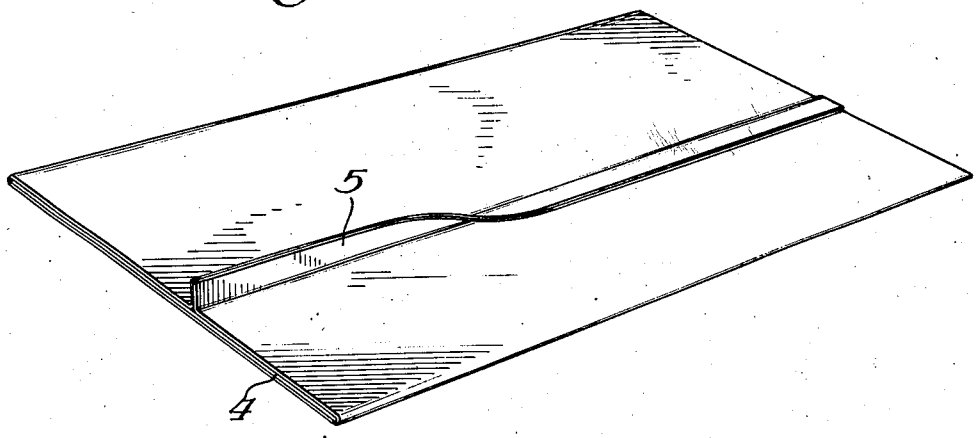
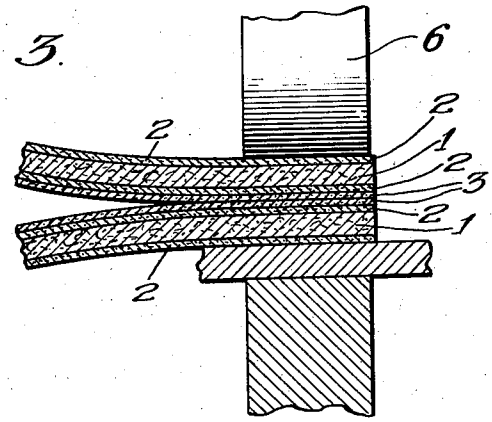


Fig. 3.



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COATED SHEET MATERIAL

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4 Claims. (Cl. 91—68)

This invention relates to coated sheet material and articles of manufacture made therefrom. More particularly, it relates to coated paper and paper receptacles such as bags and cups.

An object of this invention is to provide a coated sheet which may be heat sealed to itself or to another material to form a seam having a neat and attractive appearance.

A further object is to provide coated paper containing a softener which may be heat sealed in a secure manner.

Another object is to provide a coated paper containing a softener which may be heat sealed without causing migration of the softener from the paper into the sealing medium.

A further object is to provide a heat sealed paper bag of neat and attractive appearance.

Other objects and advantages will become apparent as the following detailed description progresses, reference being had to the accompanying drawing wherein:

Fig. 1 represents a cross-section of a coated sheet showing the relative positions of the different coatings.

Fig. 2 represents a perspective view of a bag made from the sheet illustrated in Fig. 1 and illustrating the sealing feature.

Fig. 3 is a diagrammatic view showing an arrangement for sealing together the coated sheet material.

In accordance with my invention, sheet material is coated with a film-forming composition of a predetermined softening point to form a coated sheet. On one side of this coated sheet I then apply a coating of a film-forming composition which has a lower softening point than that of the underlying composition.

Referring to the drawing in which a preferred form of my invention is illustrated, there is shown a sheet 1 of paper having a coating 2 on both sides. On one side of the coating 2 is a coating 3 of a film-forming composition which has a lower softening point than that of the composition of coating 2.

One embodiment of my invention is a bag (shown in Fig. 2 as a flat type of bag, but it is to be understood that a bellows type is included) formed from my coated sheet material, the coating 3 of the low softening point composition being on the inside of the bag.

The sides and bottom of the bag are sealed together along the marginal edges 4 and 5, as shown in Fig. 2, by applying heat and pressure by means of a roller 6, shown in Fig. 3, or some other heat sealing mechanism.

It will be noted from Fig. 3 that the heat sealing mechanism 6 is applied to the outside high-softening point composition 2. The heat and pressure are so regulated that they will be insufficient to melt and materially deform the high-softening point composition 2, but will be sufficient to soften and render adherent the low-softening composition 3.

The base sheet material 1 is preferably paper containing a softener. Various types of paper may be used, such as any of the papers commonly used in making bags, including kraft, sulphite paper, glassine, and parchment. The softeners which may be suitably used in the paper include glycerine, ethylene glycol and other softeners which have been used to render paper more pliable and decrease its permeability. A suitable paper may contain 15% of glycerine.

The coating 2 which is applied directly to the paper may suitably be any composition which is flexible in thin film form and which has a higher softening point than coating 3. Preferably, it should be relatively hard and non-tacky at room temperature. Coating 3 may be of any flexible composition which has a lower softening point than coating 2 and which becomes tacky and adherent on the application of heat.

Many film-forming materials will become apparent for use from the above. Some suitable combinations are given in the following table:

High softening	Low softening
Cellulose acetate	Chlorostannic acid or phenol type rubber condensation derivatives.
Do	Rubber hydrochloride.
Rubber hydrochloride (crystalline type).	Rubber hydrochloride (amorphous type).
Rubber hydrochloride.	Chlorostannic acid or phenol type rubber condensation derivatives.
Cellulose acetate	Ethyl cellulose.
Rubber hydrochloride.	Chlorostannic acid or phenol type rubber isomerparaffin wax.

The above materials are examples of base film-forming ingredients. Other ingredients may be incorporated therein for various purposes, as for modifying the softening point (for example, low-softening resins), increasing water resistance (for example, waxes), or for plasticizing (plasticizers for each of the above materials are well-known).

The rubber hydrochloride designated as "crystalline type hydrochloride" is the general type of rubber hydrochloride described in patents to Bradley and McGarvack, No. 1,519,659, and to Calvert, No. 1,989,632, and may be made by reacting solutions of rubber with hydrogen chlo-

ride. A similar slightly higher softening material may be made by reacting solid sheet rubber with gaseous hydrogen chloride at elevated temperatures. The softening point of crystalline rubber hydrochlorides may be lessened by making a partially saturated rubber hydrochloride rather than saturated rubber hydrochloride. The amorphous rubber hydrochloride is described and claimed in Gebauer-Fuelnegg and Moffett application, Serial No. 30,515. This material may be obtained by reacting thin sheet rubber with liquid hydrogen chloride at —85° C.

The chlor-stannic acid rubber condensation derivatives mentioned in the table may be obtained by reacting solutions of rubber with chlorostannic acid, pouring the product into water and isolating the condensation derivative from the liquid by steam distillation. They are described in various patents and other publications, including patents to Bruson, No. 1,797,188, Gehman, No. 2,050,209, and to Endres No. 2,052,391. The phenol type rubber isomer is a resin-like, low-flowing condensation derivative of rubber and may be made by reacting rubber with phenol and hydrogen chloride.

The coating compositions may be applied by means well-known to the art. The sheet to be coated may be sprayed, brushed or dipped with solutions of the ingredients in a volatile solvent and the solvent evaporated, leaving the coating or layer of solid material. Moreover, pre-formed films may be laminated to the paper by means of heat and pressure.

The low-softening coating is preferably applied so as to entirely cover the paper and the inside of the bag made therefrom. However, the low-softening material may be applied in strips along the marginal edges so that it will serve as a thermoplastic sealing medium in forming a bag. Thus, for example, a narrow strip of low-softening adhesive may be applied over the higher softening layer solely along edges 4 and 5.

Various other modifications of the invention may be made, and it is to be understood that the invention is not to be considered as limited by the specific examples herein given as illustration of the invention, except as may be necessitated by the prior art.

Having thus described my invention, What I claim as new follows:

1. Water and oil resistant sheet material suitable for the manufacture of heat sealed containers comprising a fibrous cellulosic base having a water soluble softener incorporated therein, a layer of crystalline rubber hydrochloride attached to each side of said base, and a layer of amorphous rubber hydrochloride attached to a layer of crystalline rubber hydrochloride solely on one side of said base.

2. Water and oil resistant sheet material suitable for the manufacture of heat sealed containers comprising a base of paper in sheet form containing a water soluble softener, a thin coating of crystalline rubber hydrochloride forming a thin continuous coat on each side of said base, and on said coating of crystalline rubber hydrochloride on solely one side of said base, a thin coating of amorphous rubber hydrochloride.

3. Water and oil resistant sheet material suitable for the manufacture of heat sealed containers comprising a thin sheet of fibrous cellulosic material softened with a water soluble polyhydroxy alcohol, a thin thermoplastic surface coating of rubber hydrochloride on one side of said cellulosic sheet, and dispersed between said sheet and said surface coating and retarding migration of said polyhydroxy alcohol from said sheet a thin continuous coating of a rubber hydrochloride of higher flow point than said rubber hydrochloride of the surface coating.

4. Water and oil resistant sheet material suitable for the manufacture of heat sealed containers comprising a thin sheet of paper softened with a water soluble polyhydroxy alcohol, a thin thermoplastic surface coating of amorphous rubber hydrochloride on one side of said celluluosic sheet, and dispersed between said sheet and said surface coating and retarding migration of said polyhydroxy alcohol from said sheet a thin continuous coating of substantially saturated crystalline rubber hydrochloride.

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