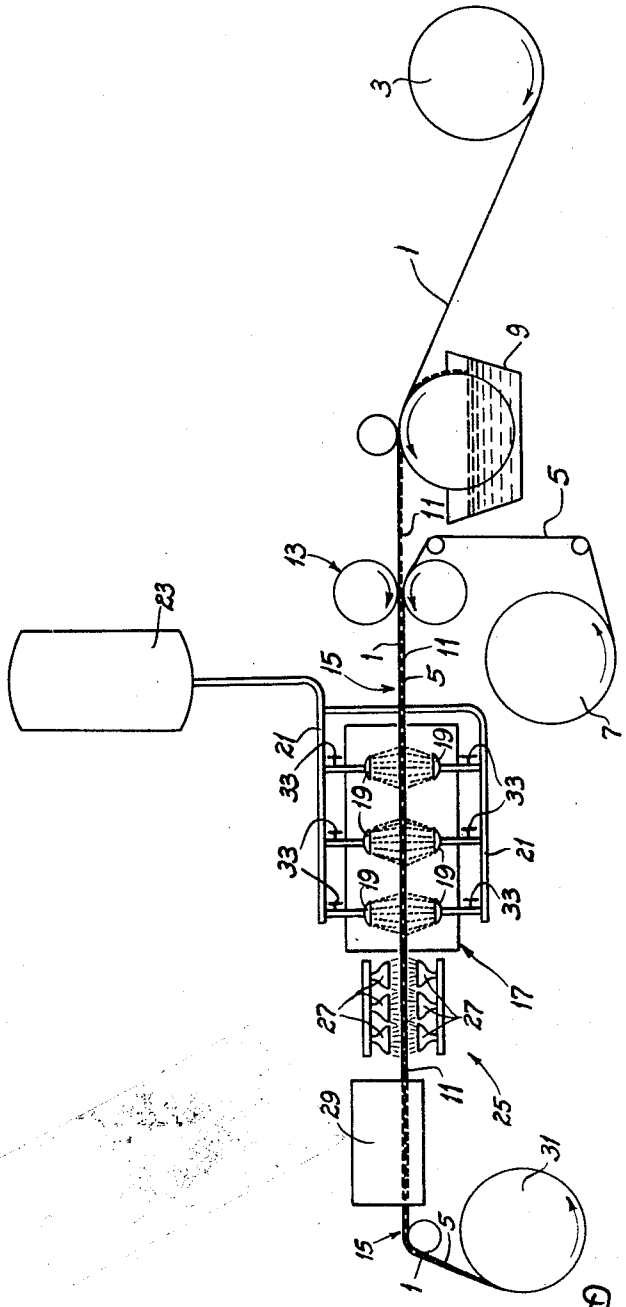
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METHOD OF PROOFING LAMINATED MATERIAL

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METHOD OF PROOFING LAMINATED MATERIAL

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This invention relates to a method of proofing the outsides of webs of paper and fabric and more particularly to proofing composite or multi-ply webs of such materials when organized by means of laminants such as asphalt, for example.

Among the several objects of the invention may be noted the provision of a simple waxing procedure which will provide a more flexible laminated material which is water-repellent or waterproof; the provision of a method of the class described which will produce a wax application adapted effectively to confine odors of the laminant; the provision of a method of the class described which avoids staining of the outer surfaces of the laminated materials by the laminant; the provision of a method of the class described which will economize on wax and produce a product of better appearance; and the provision of a more economical mechanical procedure for accomplishing the above which avoids a winding operation between any laminating operation and the waxing operation. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the steps and sequence of steps, and features of manipulation, which will be exemplified in the methods hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which are illustrated several of various possible embodiments of the invention, the single figure is a diagrammatic view illustrating the apparatus and methods employed.

Webs of paper and fabric materials, both individual and laminated, have heretofore been roller-coated or dipped into melted wax to produce waxed surfaces. Both of these processes or methods depended upon an application of an excess amount of wax, which had several disadvantages, namely, the reduction in flexibility of the resulting product, and the waste of wax; and in the case of multi-ply materials particularly, the lack of good appearance and escape of odors from the laminant.

Regarding the appearance factor, two difficulties occurred: First, the excess wax tended to show on the outside of the paper or fabric, and, second, the excess wax migrated into the laminant and changed its properties. This was true particularly in the case of asphalt which was caused to stain the surface of the laminated paper or fabric. Besides, the excess wax tended to crack and did not flex in a completely satisfactory manner. The present invention avoids these difficulties.

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Referring now more particularly to the drawing, numeral 1 indicates a web of wax-penetrable paper which is withdrawn from a roll 3 and numeral 5 represents another web of paper, or, if desired, a web of fabric, which is drawn from a roll 7. Or, both webs may be fabric. Web 1 passes through a laminant-coating unit 9 which applies the coat 11 to one side of the paper 1. Thereafter the webs 1 and 5 are combined in a laminating unit 13 and leave the unit as a composite, multi-ply or laminated web 15. The laminant 11 may be any of those usually used for the purpose. It is applied hot or cold, depending upon its characteristics. For example, if the laminant is asphalt then it is heated in the coating unit 9. Asphalt is taken as an exemplary laminant because of its effectiveness and its widespread use for the purpose.

Heretofore it has been the practice to allow the laminated web 15 to be rolled up, which, of course, involved cooling of the laminant whenever a hot laminant was used; and thereafter the composite web was unwound for a subsequent waxing treatment by roller-coating or dipping.

According to the present invention, the composite web 15 is led into a spray or atomizing chamber 17 wherein are located spray heads 19 for spraying atomized liquid wax on opposite sides of the web. The heads 19 may be of the type used in liquid spray guns which produce a fine atomized mist. These heads 19 are fed from a piping system 21 which leads from a wax melting tank 23. The wax is maintained hot and in liquid form from the time it leaves the tank 23 until it is deposited upon the web 15.

The wax used may be any suitable amorphous or crystalline wax.

The amount of the sprayed material is such that atomized particles or globules of wax are only lightly distributed over the surfaces of the webs. The distribution of globules on the web is such as to produce a matt appearance, assuming that the web is sufficiently cool to solidify the wax when reached by it. Thus, the composite web has applied to its outside surfaces a fine mist of wax globules in a very thin layer. The thickness of the layer is only of the order of one or, at most, a few globules.

If it be assumed, as may occur, that the composite web 15, in approaching the spray chamber 17, has cooled below the solidification temperature of the wax, there will be said matt appearance of the applied wax globules. This is because the globules solidify more or less individually as they strike the cool web, particularly inasmuch as they are applied thinly. While ad-

jacent globules may coalesce to some degree, there is no excess to cause any pools, running or dripping. Nor is it desired to build up any solid layer of wax on the web of any appreciable thickness.

In order to cause the sparsely applied globules to run together, but without causing any more than superficial penetration of the webs 1 and 5, that is, without penetrating into the laminant 11, two methods may be used. One method is to heat the laminated and sprayed material after it leaves the chamber 17, as indicated at 25. The heater 25 in the present example consists of infra-red lamps 27 shining on opposite sides of the composite web. These bring up the temperature of the coating of wax to be melted. The amount of heating is preferably only enough to supply the latent heat of fusion of the wax, without in addition softening the laminant. This causes the wax to melt into the paper but not through it, the amount of wax deposited being controlled or limited to obtain this result. Control valves for the purpose are shown at 33. Finally, the sprayed and heat-treated web passes through a cooler 29 where the remelted wax is again solidified. Thereafter the web is wound into a storage roll 31.

Instead of using the lamps 27, this may be dispensed with if the distance between the combining unit 13 and the entry of chamber 17 is short enough and/or the speed of the composite web is fast enough that the temperature of a laminant (of the hot type) is not too much reduced. In this form the heat content and residual temperature of the composite web in the chamber 17 should be enough to prevent solidification of the lightly applied globules so that they may immediately penetrate the desired distance as they come from the atomizers 19. Then the treated composite web passes through the cooler 29, the heater unit 25 being dispensed with.

The invention is particularly useful in the case of composite webs employing asphalt as a laminant because the light application of atomized wax is only such as superficially to penetrate the web or webs without migration into the asphalt. Ordinarily with an excess amount of wax such migration into the asphalt changes the properties of the asphalt so as to cause it to stain the paper. With a mere penetration of the wax into and not through the paper the wax never reaches the asphalt. Under these conditions the asphalt also is not permitted to abstract wax from the paper, which in itself would be a disadvantage in reducing the desired waxed content of the paper.

The spraying may be effected on both sides of the laminated material or only on one side if proofing is required on said one side.

For example, if the composite web is used to make bags it may be necessary only to wax an inner or outer surface, thus requiring waxing of one only of the plies 1 or 5.

It is to be understood that other than infra-red heaters may be used at 25, such as, for example, heating coils or the like.

It will be noted that when the heat of a hot laminant is used for causing globules to coalesce and superficially to penetrate the paper in the box 17, no extra heat is required to melt the wax. In some instances there may be only partially enough heat in the hot laminant to effect superficial penetration of the sprayed wax into the paper, and in such instances additional heaters such as 25 may be used to complete the penetrating process.

As indicated above, the invention is applicable

to layered constructions in which one or more layers are paper, or one or more layers are fabric; and one in which all of the layers are fabric, or in which all layers are paper. The following claims, where not otherwise specifically limited, are intended so to be construed.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in the above methods without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. The method of producing a water-repellent laminated sheet material comprising plies of sheet material laminated by an asphalt laminant wherein at least one of the plies consists of a web of wax-penetrable paper of such thickness that, if dipped in or roller-coated with melted wax, the wax would penetrate completely through the paper, while a light application of wax, in thickness of the order of a few globules of atomized wax, will only superficially penetrate the paper without penetrating completely through the paper from one surface thereof to the other, comprising the steps of laminating the plies with an asphalt laminant, presenting the outer surface of the said ply of wax-penetrable paper to a fine atomized mist of wax for an interval of such short duration as to provide a coating of wax having at any point on the surface of the paper a thickness at most of the order of a few globules of atomized wax, and heating the applied wax to melt it and cause all of it to penetrate into the paper from the outer surface thereof without any of the wax penetrating completely through the paper to the asphalt laminant and thereby avoiding staining of the paper by the laminant.

2. The method of producing a water-repellent laminated sheet material comprising plies of sheet material laminated by an asphalt laminant wherein at least one of the plies consists of a web of wax-penetrable paper of such thickness that, if dipped in or roller-coated with melted wax, the wax would penetrate completely through the paper, while a light application of wax, in thickness of the order of a few globules of atomized wax, will only superficially penetrate the paper without penetrating completely through the paper from one surface thereof to the other, comprising the steps of laminating the plies with a warm asphalt laminant, presenting the outer surface of the said ply of wax-penetrable paper while the laminant is still warm to a fine atomized mist of wax for an interval of such short duration as to provide a coating of wax having at any point on the surface of the paper a thickness at most of the order of a few globules of atomized wax, the residual warmth of the laminant heating the applied wax to melt it and cause all of it to penetrate into the paper from the outer surface thereof without any of the wax penetrating completely through the paper to the asphalt laminant and thereby avoiding staining of the paper by the laminant.

3. The method of producing a water-repellent laminated sheet material comprising two plies of paper laminated by an asphalt laminant wherein each of the plies consists of a web of wax-penetrable paper of such thickness that, if dipped in or roller-coated with melted wax, the wax would penetrate completely through the paper, while a

light application of wax, in thickness of the order of a few globules of atomized wax, will only superficially penetrate the paper without penetrating completely through the paper from one surface thereof to the other, comprising the steps of laminating the plies with an asphalt laminant, presenting the outer surfaces of both webs of wax-penetrable paper to a fine atomized mist of wax for an interval of such short duration as to provide coatings of wax having at any point on the surfaces of the paper webs a thickness at most of the order of a few globules of atomized wax, and heating the applied wax to melt it and cause all of it to penetrate into the paper webs from the outer surfaces thereof without any of the wax penetrating completely through the webs to the asphalt laminant and thereby avoiding staining of the webs by the laminant.

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