Dec. 2, 1947. H. Y. JENNINGS 2,432,074

COATED PAPER AND METHOD OF PRODUCING THE SAME

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Fig. 1

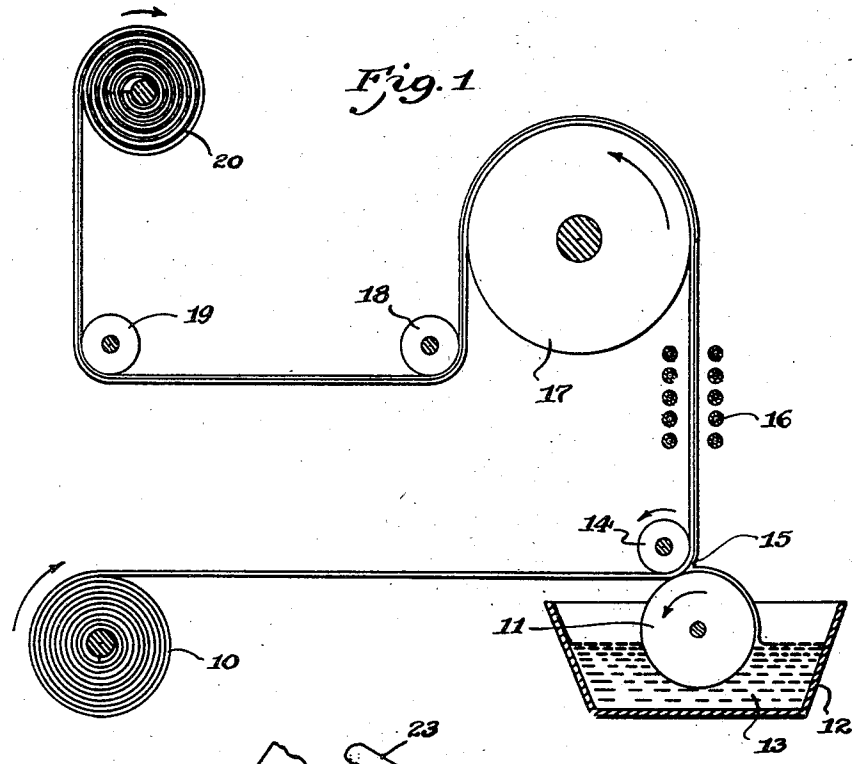


Fig. 2

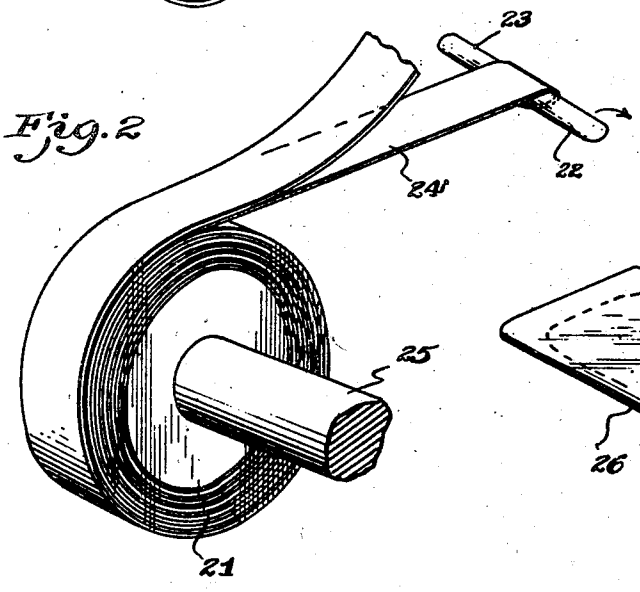
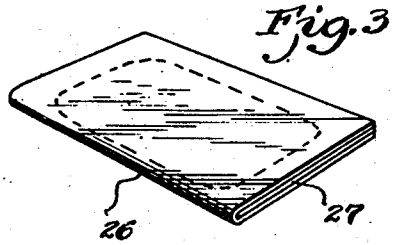


Fig. 3



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COATED PAPER AND METHOD OF PRODUCING THE SAME

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3 Claims. (Cl. 117—122)

1

This invention relates to apparatus for making coated paper and to the paper produced by such apparatus.

More specifically, the invention relates to an apparatus for applying an aqueous dispersion of rubber in a uniform coating to a fibrous water-absorbent material and to the method and means for thereafter dispensing the rubber sheet thus formed from a roll and for otherwise using the coated sheet in a new and novel manner.

It is an object of the present invention to provide uncured rubber sheets deposited from an aqueous dispersion of rubber in a readily accessible and usable form. The present is in part an improvement over the invention described in Reissue Patent No. 21,065, granted May 2, 1939, and assigned to the assignee of the present invention. According to that patent a rubber sheet or strip is dispensed from between two sheets or strips of paper by rupturing the paper and pulling out the rubber sheet under a tension sufficient to reduce the thickness of the rubber strip or sheet to the point where it will slide out freely from between the two protecting sheets.

According to the present invention, I have found that a single sheet of paper may be coated on one side with rubber deposited from an aqueous dispersion, and that the paper may then be rolled into a tight roll, preferably although not necessarily, with the latex coating facing toward the center of the roll, from which roll the latex sheet may be dispensed as needed and as hereafter described.

Instead of dispensing the latex film or sheet from the roll and using it per se as a wrapping material, it may be desirable to cut off a piece of the latex-coated paper from the roll and wrap it around an article to be packaged, with the coated side adjacent the article, and with the edges of the paper pressed together around the article, whereby, because of the inherent self-sealing property of unvulcanized latex, the article will be enclosed in a self-sealed, dust-proof and moisture-proof package, which cannot easily be punctured. The latex film on the paper serves the double purpose of providing a self-sealing joint around the edges of the article and also acting as a temporary protective coating for the article. In addition, should the paper backing be ruptured, the latex film, because it is readily distortable and resilient, will continue to offer protection to the article in spite of the torn or ruptured paper.

In order to provide satisfactory latex-coated

2

paper to be used as previously described, it is desirable that a selected type of paper should be used and that the latex be applied to the paper in the manner herein described. The paper used should be of such composition that the dried latex film will adhere tenaciously to it when it is being unrolled but it is also necessary that the back surface of the paper, that is the uncoated side, should be such that there will be substantially no adhesion between it and the latexed surface when the coated paper is being unrolled.

The latex should be applied in such a manner as to provide a smooth continuous and heavy film when it is dried, and should be non-tacky, so that it will leave no deposit when it is removed from a surface to which it has been applied for protective purposes, such for example as a glass or enameled surface or a polished metal surface. Further, the latex film should be quite substantial and heavy; that is, it should be capable of being distorted or extended without rupturing. An important feature of my invention therefore is the provision of a laminated latex and paper sheet wherein the latex film is heavy or thick enough to distort and stretch even though the backing sheet of paper be torn or ruptured.

Other objects and advantages of the invention will be readily apparent from the following description and accompanying drawings wherein:

Fig. 1 is a diagrammatic elevational view of a paper coating apparatus and showing a method of applying a latex film to a paper sheet.

Fig. 2 is a perspective view showing a preferred manner of dispensing a latex film from a laminated paper and latex roll, and

Fig. 3 is a perspective view showing an article sealed in a single sheet of latex-coated paper.

Referring specifically to Fig. 1, 10 designates a roll of paper to be coated. In practicing my invention I prefer to use a paper such as ordinary 25 to 40 pound kraft paper which has been polished or super-calendered on one side only. The latex film is applied to the other side, which is of ordinary texture, slightly porous and rough, so that the latex film will adhere firmly thereto. When the laminated paper is being unrolled, however, after the latex film has been set, the latexed surface which contacts the polished back surface of the paper will readily separate therefrom without taking any paper particles or lint with it. Instead of having a supercalendered surface on one side of the paper, which is obtained by a mechanical polishing action, I may

use a paper which has had one side filled with starch to give a smooth polished surface.

The paper travels from the roll 10 in a general horizontal direction to the coating roll 11. The roll 11, which is preferably made of polished metal, dips into a trough 12 containing the latex bath 13. The paper to be coated is held in contact with the coating roll 11 by a smaller roll 14. There are three important factors with respect to this coating mechanism which cooperate to provide a smooth, uniform latex coating.

(1) The coating roll turns in the direction opposite that in which the paper is moving;

(2) The rate of rotation of the coating roll is faster than the rate at which the paper moves, preferably about twice as fast, and

(3) The position at which the paper leaves the coating roll is substantially at a right angle to the horizontal position at which it contacts the roll 11 and is somewhat off-center (to the left in Fig. 1 with respect to the vertical center line of the coating roll).

This arrangement of parts provides a pocket 15 formed in the angle between the vertically-moving paper and the coating roll. Because of its relatively high speed and the direction in which the coating roll 11 moves an excess of latex is maintained in the pocket 15, thus assuring an ample supply at all times and insuring a relatively heavy uniform coating. An additional feature of this arrangement, as has been shown by repeated operation, is that there is no coagulation of the latex around the roll as is common with other coating devices.

The concentration of the latex bath is determined by the thickness of the film to be deposited. I have found that concentrations of from 20% to 40% solids are satisfactory depending on the ultimate use to which the paper is to be put. The latex bath may be pure latex or it may be compounded with suitable ingredients such as stabilizers, fillers and deodorants. I have found that a compounded latex sold by American Anode Inc. of Akron, Ohio, under the name Protex No. 11776 is particularly suited for paper coating purposes.

After being coated, the paper may be passed adjacent a heating element 16, which may be steam coils or an electric element, and then passes, with its coated side exposed, over a heated drum 17. The element 16 and the drum 17 remove substantially all the moisture from the coated paper, and the drum 17 also helps to smooth the paper. The paper then passes under guide rolls 18 and 19 and is wound, with the coated side innermost into a roll 20.

The factors of time and temperature are most important in conditioning the latex-coated surface before the paper is rolled. The main point is that substantially all the moisture should be removed before the paper is rolled, but the heat applied, and the time the latexed surface is exposed to the air should be just short of that required to "cure" the latex. This leaves the rubber surface in such a condition that when it is unrolled, the latexed surface will be self-adherent when contacted with itself and forms a homogeneous rubber mass which cannot be again separated to its original form. Generally speaking the heat applied should not exceed the boiling point of water, namely 212° F. although this should not be construed a strict limitation, for the exact temperature will be determined by the nature of the latex compound used. Likewise, the time of exposure to the air before winding should

be less than that required to "cure" the latex. The ordinary paper coating machine runs at a speed fast enough to prevent "curing" of the latex.

When the coated roll is completed the latexed surface is protected from the atmosphere so that no further curing takes place, and when the sheet is unrolled the latexed surface is in such condition that when pressed upon itself the latex is self-sealing and forms a homogeneous body which cannot be separated from itself.

Prior to being unrolled, the paper may be slit and rolled in strips of any suitable width. Such a rolled strip is shown at 21 in Fig. 2. A roll of this may be used to dispense a latex film or sheet, for example, where an article is to be wrapped with latex without any paper being used. One application of such a sheet is shown in Fig. 2 where two rods 22, 23 are being spliced by overlapping their ends and then wrapping them with a latex strip 24 which is withdrawn from the roll.

The roll 21 may be supported on a shaft 25 which is in turn supported by any suitable means (not shown). The roll should rotate on this shaft, but not too freely, as it has been found that the latex sheet strips from the roll more easily if the roll offers some resistance to the force exerted in stripping the latex sheet from the roll.

Thus, when an article such as the rods 23, 24 are to be wrapped with a latex sheet, a break is made in the paper at its free end and the latex strip 24 is drawn from the roll by turning the article to be wrapped. The self-sealing properties of the latex strip allow both hands of the operator to be used to turn the article being wrapped, and by suitable manipulation a uniform homogeneous coating of latex is formed around the article 23, 24 or such parts of it as it may be desirable to cover. When the article is wrapped, the latex strip and the loose paper may be cut off leaving the roll ready for a subsequent operation.

In some cases it may be desired to wrap an article in a single sheet of latex-coated paper without separating the latex from the paper, in order to provide a package sealed against dust and moisture. To accomplish this result, a sheet of the latex-coated paper of suitable width is cut off the roll. The sheet is laid on a flat surface with its coated side up, and the article to be sealed is laid on the sheet adjacent, but not touching one edge thereof. The remainder of the sheet is then folded over the article and the contacting latex surfaces are firmly pressed together around the edges of the article. Thus the article is not only sealed against dust and moisture, but its surfaces are protected against marring and abrasion by a layer of paper superposed on a resilient rubber film. A sealed package such as has just been described is indicated at 26 in Fig. 3 wherein 27 indicates one of the latex-sealed edges of the package.

Obviously, the latex film may be of any desired thickness, determined by the concentration of the latex bath and the number of times the paper is run through the coating bath. It is necessary, however, that the applied rubber film be dried before the next film is applied.

The terms "latex," "aqueous dispersions of rubber," and "rubber" as used in the specification and claims are intended to cover both natural and synthetic materials or combinations of natural and synthetic materials, as well as compounds or mixtures of natural or synthetic latices with other ingredients which may be added to impart stability, fluidity, viscosity and other desirable features to the coating bath, pro-

vided that the resultant film is non-tacky and has the property of self-adhesion.

I claim:

1. The method of dispensing sheet rubber which comprises coating only one side of a strip of imperforate backing material with an aqueous dispersion of rubber, depositing such rubber as a uniform membrane in such consistency and setting up the membrane to the extent that the coating will temporarily cohere to itself but not to the backing, and rolling the resulting laminated sheet to exclude air and maintain the condition of the rubber coating as temporarily cohesive until it is dispensed by unrolling.

2. The method of dispensing sheet rubber which comprises uniformly coating only one side of a strip of paper, the other side of which is smooth and non-porous with an aqueous dispersion of rubber, depositing such rubber as a uniform membrane in such consistency and setting up the membrane to the extent that the coating will only temporarily cohere to itself but not to the backing, rolling the resulting laminated sheet to exclude air and maintain the condition of the rubber coating as temporarily cohesive until it is dispensed by unrolling.

3. The method of forming and maintaining a sheet of temporarily cohesive rubber available for subsequent dispensing, which comprises coating one surface of a sheet of fibrous material

such as paper having one surface smooth and non-porous with a layer of an aqueous dispersion of rubber, partially drying the coated surface until it forms a continuous substantially set-up membrane which if further dried and exposed to the air would set-up into a non-tacky non-adhesive surface, and protecting the temporary cohesive properties of said membrane by forming the rubber-coated paper into a roll, whereby the cohesive rubber membrane is available for dispensing from the roll by application of a tension greater than that which bonds it to the fibrous material.

HARLEY Y. JENNINGS.

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