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METHOD OF MAKING SATURATED SHEET MATERIAL

Filed Aug. 24, 1923

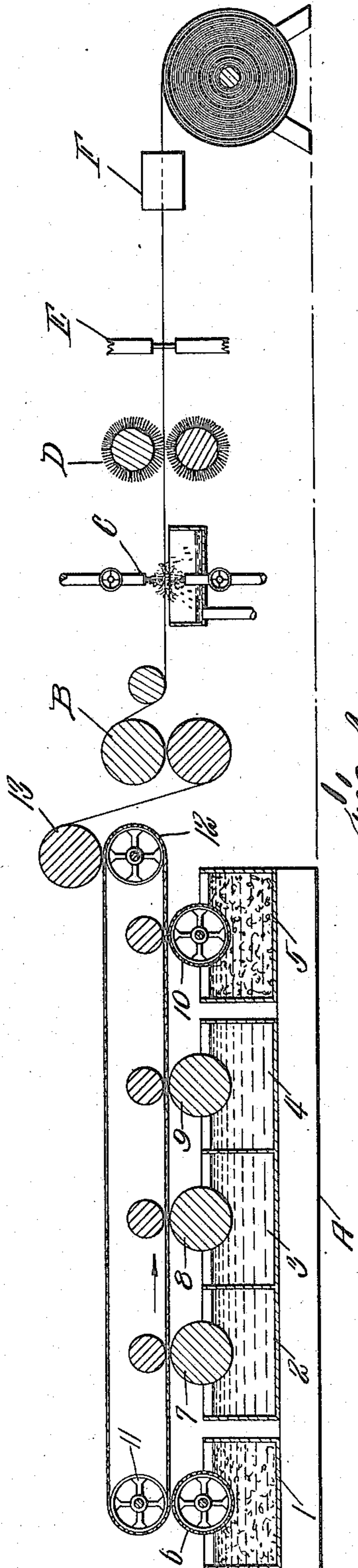


Fig. 1.

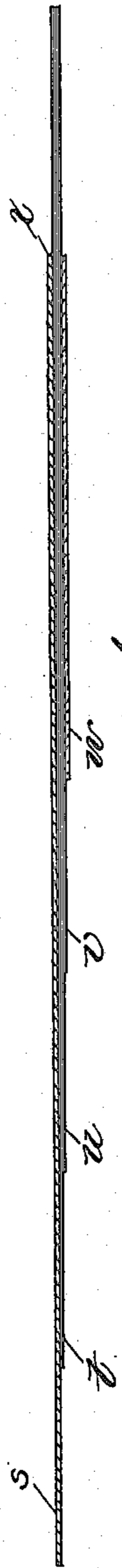


Fig. 2.

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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING SATURATED SHEET MATERIAL.

Application filed August 24, 1923. Serial No. 659,078.

To all whom it may concern:

Be it known that I, HENRY C. AVERY, a citizen of the United States, residing at New Brunswick, in the county of Middlesex and State of New Jersey, have invented new and useful Improvements in Methods of Making Saturated Sheet Material, of which the following is a specification.

This invention relates to a method of making highly saturated fibrous material suitable for roofing, building paper and the like, directly on a paper machine without the necessity of any subsequent saturating operation.

It has been found possible to incorporate a large amount of asphalt or other waterproofing material in fibrous material as felted on a paper machine by forming it into an emulsion, as for example, according to the Kirschbraun Patent No. 1,302,810 dated May 6, 1919, for bituminous composition and process of making same. Briefly this process consists in stirring melted asphalt into a hot mixture of water and colloidal clay. When considerable quantities of this emulsion, which is known in the trade as K-B emulsion, are added to the furnish for the paper machine, the felting of the cellulose fibers is quite satisfactory, but the asphalt renders the material so sticky that much trouble has been experienced from the sticking of the felted sheet to the blanket and drying rolls of the paper machine.

In order to overcome this difficulty, this invention contemplates the use of a multi-cylinder machine, the outer plies of the felted material being formed of fibrous material without the emulsion, and the inner ply or plies being supplied with the emulsion. Since the outer plies only are in contact with the blanket and drying rolls, and they contain no asphalt, sticking is entirely prevented.

In the product as delivered from the machine the asphalt is coalesced about the fibers of the inner ply or plies. The outer plies may then be removed by scrubbing the faces of the sheet while wet, the coalesced asphalt preventing the inner ply or plies from disintegrating by the scrubbing operation so that the final product is highly saturated fibrous material. The material is then air dried and may then be surfaced in any suitable manner, such as by dusting powdered talc or mica thereon, to prevent the convolutions of the material when wound in rolls from adhering.

For a more complete understanding of this invention, reference may be had to the accompanying drawings in which—

Figure 1 is a diagrammatic view of the machine for forming the desired product.

Figure 2 is an edge view showing the manner in which the material is formed in successive operations.

Referring to Figure 1, at A is indicated diagrammatically a multiple cylinder paper machine. This machine comprises the several vats 1, 2, 3, 4 and 5 for containing the pulp which is to be formed into felted material. Within each one of these vats is positioned the take-up roll, as shown at 6, 7, 8, 9 and 10. The pulp for the vats 1 and 5 is formed from suitable cellulosic material, such as rags, and the pulp for vats 2, 3 and 4 has in addition to this cellulosic material considerable quantities of asphalt emulsion, such as the K-B emulsion above referred to. The particular amounts of this material depend upon the amount of saturation desired and to the character of the cellulosic material used. A blanket passes over the upper surfaces of each of the take-up rolls 6, 7, 8, 9 and 10 in the usual manner and passes over end rolls 11 and 12, traveling in the direction shown by the arrow, first taking up a layer of cellulosic pulp from the take-up roll 6, this layer being indicated in Figure 2 at *s*. This adheres to the under face of the blanket in the usual manner. As this portion then passes over the take-up roll 7 a layer of cellulosic material having a large portion of asphaltic emulsion is deposited on the under face of the layer or ply *s*, forming the asphalt-saturated layer *t*. As the blanket then passes over the take-up roll 8, another layer or ply of cellulosic material saturated with asphalt on the take-up roll is formed as at *u*. A third layer of similar saturated fibers *v* is then added by the take-up roll 9. The material then passes to the take-up roll 10 which deposits a layer or ply of cellulosic material without asphalt as at *w*. The composite sheet thus formed, which is still adhering to the under side of the blanket, then passes about the end roll 12 and the fibrous material is removed therefrom and passes over the superposed roller 13 in the form of a continuous web or sheet. The blanket passes back to the roll 11 and is presented to the various take-up rolls in the same order continuously.

The continuous sheet is then fed from the roll 13 through a series of drying rolls indicated conventionally at B. During this drying operation the asphalt in the emulsion coalesces to form with the cellulosic material a fibrous sheet saturated more or less completely with asphalt. Next the opposite faces of the web, which contain no asphalt, are subjected to the action of water jets as shown at C, which thoroughly softens the outer unsaturated plies, but has no effect on the intermediate saturated plies, since the asphalt has coalesced as above noted and is waterproof. The fibrous outer plies, or liners, having been thus softened, the material may then be passed between stiff brushes D, which serve to scrape the unsaturated fibers from the surface and such fibers as may not be entirely removed from the sheet material by these brushes may be scraped therefrom by scrapers E. The sheet material then contains the central saturated ply or plies, as shown at the right of the point *x* in Figure 2. The web is then air dried, and if it is desired to form it into rolls is preferably dusted with powdered mica or talc as at F in order to prevent the successive convolutions from adhering in the roll.

While as shown three intermediate take up rolls have been employed, it is evident that this number may be more or less, depending upon the thickness of the final web desired and the nature of the furnish employed.

Having thus described an embodiment of this invention, it should be evident to those skilled in the art that various modifications and changes may be made therein without departing from its spirit or scope.

I claim:

1. The method of making saturated sheet material on a paper machine which comprises forming multi-ply sheet material, the

pulp for the inner ply or plies having saturant therein and that for the outer plies having no saturant therein, drying the material and permitting the saturant to coalesce through the inner ply or plies, and then removing the outer plies and finishing the material.

2. The method of making saturated sheet material on a paper machine which comprises forming a multi-ply sheet, the outer plies formed of fibrous material, and the inner ply or plies formed of fibrous material and a large proportion of emulsified saturant, drying the sheet so formed and permitting the saturant to coalesce, and then removing the outer plies.

3. The method which comprises making multi-ply material on a paper machine, the outer plies being formed of fibrous pulp and the inner ply or plies of pulp having asphalt emulsion mixed therewith, drying the sheet so formed permitting the asphalt to coalesce, then treating the surfaces of the sheet with water to soften the outer plies, and then scrubbing them off leaving only those plies having the asphalt therein.

4. The method which comprises forming multi-ply sheet material, one ply being made from fibrous pulp and one or more plies of such pulp having a large proportion of saturant incorporated therein, and then removing said pulp ply to leave only the ply or plies containing the saturant.

5. The method of forming a web from fibrous pulp having a sticky material incorporated therein, which comprises forming on a paper machine a multi-ply sheet, the outer plies having no sticky material and the inner ply or plies having said sticky material, and then removing said outer plies.

In testimony whereof I have affixed my signature.

HENRY C. AVERY.