Jan. 3, 1939. E. HURST 2,142,397

METHOD OF IMPREGNATING A WEB OF FIBROUS MATERIAL

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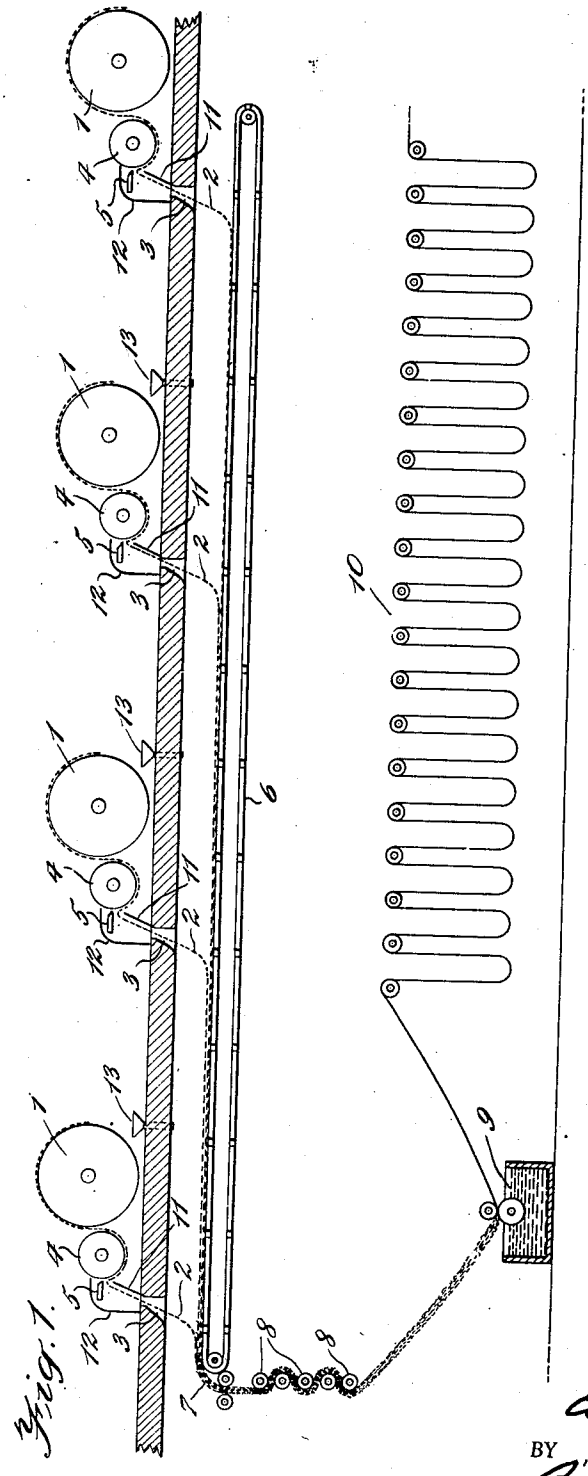


Fig. 1.

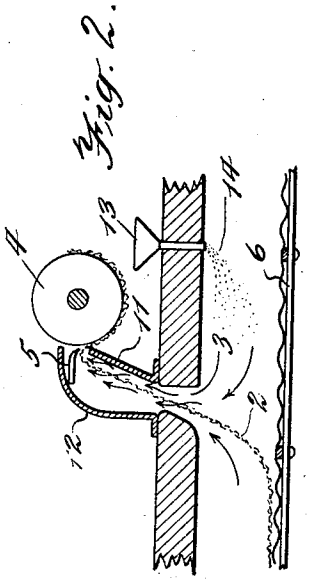


Fig. 2.

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ATTORNEYS.

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METHOD OF IMPREGNATING A WEB OF FIBROUS MATERIAL

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Application September 19, 1936, Serial No. 101,539

2 Claims. (Cl. 91—68)

This application is a continuation in part of my copending application, Serial No. 722,868, filed April 28, 1934, now Patent No. 2,055,411, granted September 22, 1936.

The invention relates to a novel and improved manner of impregnating a web of fibrous material, and the novel features will be best understood from the following description and the annexed drawing, in which I have indicated one manner in which the invention may be practiced. In the drawing:

Fig. 1 is a vertical sectional diagrammatic view of an apparatus which may be used in the practice of this invention;

Fig. 2 is a fragmentary view, on an enlarged scale, of part of Fig. 1, but showing a slightly different arrangement.

The apparatus shown is similar to that described and claimed in the copending application of Myrick Crane and myself, Ser. No. 21,947, filed May 17, 1935, now Patent No. 2,055,412, granted September 22, 1936, that application in turn being a division of our copending application, Ser. No. 673,392, filed May 29, 1933, which has now become Patent No. 2,055,410, granted September 22, 1936, in which latter is claimed the product obtained by use of the apparatus and method claimed in application Ser. No. 21,947.

As more fully set forth in said copending applications, the apparatus comprises a plurality of cards 1, which may be of any suitable form and each adapted to discharge a membrane or lap 2 through orifices 3 in the floor upon which the cards rest. Each of these cards is provided with the usual doffer 4 and comb 5 adapted to remove the membrane or lap from the doffer.

Various membranes, as they pass through the orifices 3, are preferably deposited upon a traveling conveyor 6, one on top of the other, which conveyor may be vibrated to aid in causing the various fibers of the membranes to interlock or interweave to form a web 7 in which the fibers are still further interlocked and interwoven by the web being carried over rolls 8 without pressure. The web is then impregnated with latex or other adhesive at the bath 9 and dried on the drier 10.

The membrane or lap, as it comes from a card, is formed of unspun fibers, as is known in the art, and is extremely light and filmy. While the invention may be practiced with any kind of suitable fibers, I have assumed that the fibers are cotton, as that is a highly suitable material. The fibers are preferably treated in the manner described in my prior application, Ser. No. 722,868, now Patent No. 2,055,411, as a membrane passes through one of the orifices 3. As best shown in Fig. 2, each membrane 2 is conducted along a conduit formed of walls 11 and 12 as it passes from the doffer to the orifice, and as it passes along the conduit and through the orifice it is subjected to a differential of pressure between opposite sides of the membrane, which causes a current of air to pass through the membrane. This differential is carefully regulated, as pointed out in my prior application aforesaid, so as not to disturb the continuity of the membrane, but nevertheless so as to rearrange individual fibers in the membrane to cause them to interlock with each other. Ordinarily, currents of air will flow along opposite sides of the membrane in a direction generally parallel thereto but opposite to that in which the membrane is moving. The differential will cause air to flow through the membrane, in the manner more fully described and claimed in my aforesaid copending application.

As an aid to the above action, it is preferable to stream-line the walls of the orifice and maintain the walls 11 and 12 smooth so as to avoid any substantial amount of turbulence in the currents of air passing along opposite sides of the membrane.

I have described the above method as being practiced with air, although it is to be understood that any other gas may be used. According to the invention of this application, I prefer to use air carrying with it some impregnating material which may be suspended in the air. Thus, as the air passes through or in contact with the membranes, the impregnating material will collect on the fibers and the membrane will be thoroughly impregnated with the desired material. For example, I have shown very diagrammatically a hopper 13 adjacent each of a plurality of cards and arranged to discharge powder or other impregnating material as indicated at 14, in such a manner as to load the air passing through and in contact with the membrane 2. This is a convenient way of loading the air with impregnating material. This material may be formed of powder or liquid, vapor, or gas. By this method, the amount of impregnating material may be accurately regulated and uniformly distributed through the membrane. The material may be introduced at any suitable point, and in the drawing I have shown two points which are suitable. In Fig. 1 each hopper 13 is shown as back of one of the cards 1 and, more specifical-

ly, back of the large cylindrical drum thereof, whereas in Fig. 2 the hopper is shown as being located adjacent the doffer 4.

From the foregoing it will be seen that I have provided a novel and improved manner of forming a web of fibrous material impregnated with any desirable substance. The various membranes may each be impregnated in the manner shown in Fig. 2, and then the successive membranes, when assembled and formed in the one web, will comprise a thoroughly impregnated web.

Although I have described the invention as practiced according to a certain method, it is to be understood that various changes may be made without departing from the scope of the invention as defined by the appended claims.

I claim:

1. The method of forming a web which comprises forming a membrane of unspun fibers, passing said membrane through an orifice while simultaneously passing through the orifice a current of air laden with an impregnating material and in a direction generally parallel to the length of the membrane, and maintaining a differential of pressure on opposite sides of the membrane to cause some of said laden air to flow therethrough.

2. The method of forming a web which comprises forming a membrane of unspun fibers, maintaining a differential of pressure between opposite sides of the membrane to cause a current of air to flow therethrough, said differential being sufficiently high in amount to change the positions of individual fibers within the membrane, relatively to each other, and thus to cause said fibers to interlock with each other, but being sufficiently low in amount to avoid substantial disturbance of the continuity of the membrane, and depositing in said air finely divided impregnating material before the air thus flows through the membrane whereby the air, in flowing through the membrane, will deposit said material on the fibers in the membrane.

EDWARD HURST.