

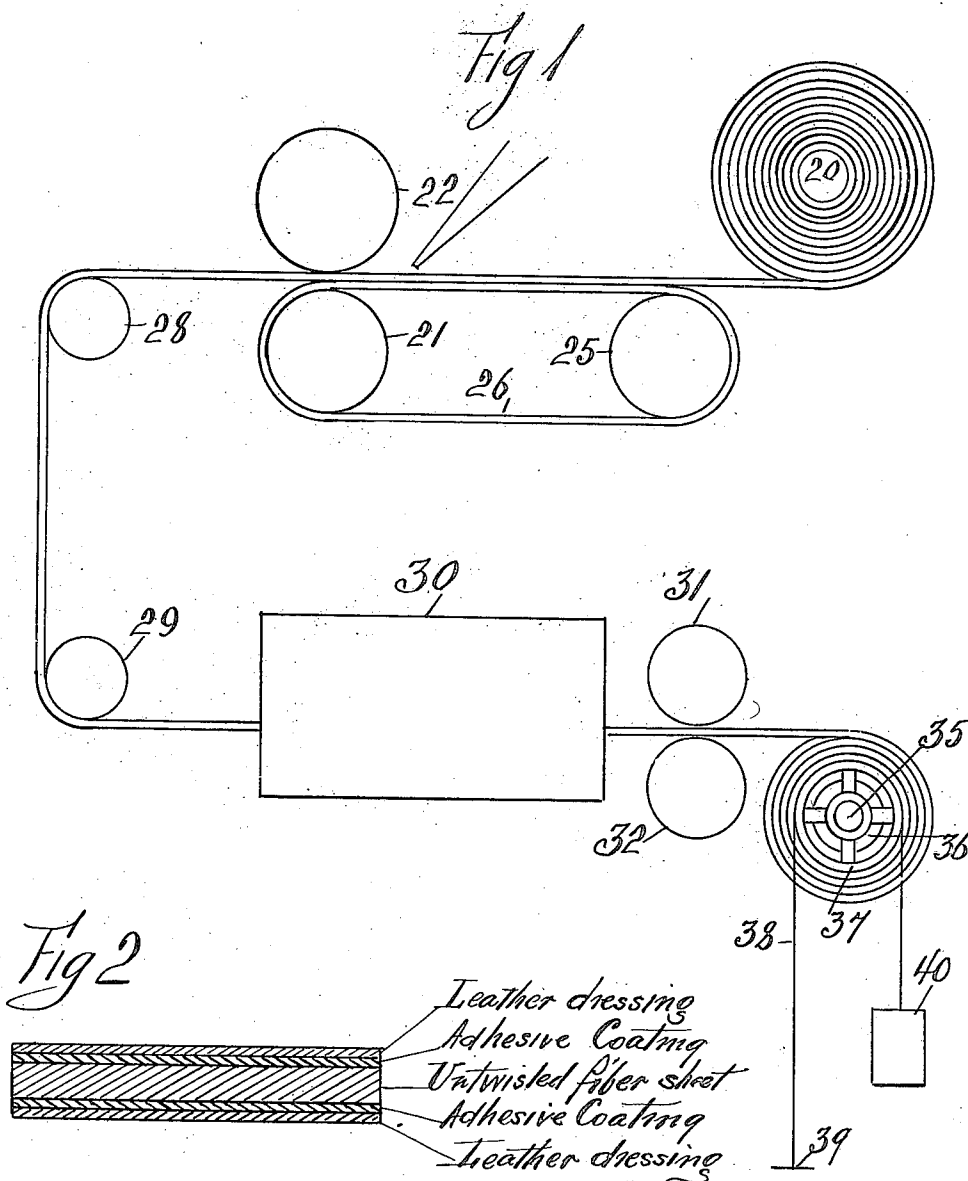
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R. B. RESPESS

PROCESS OF MAKING AN UNWOVEN FABRIC

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INVENTOR
Roland B. Respass
BY *Adel R. Respass*
ATTORNEY

UNITED STATES PATENT OFFICE.

ROLAND B. RESPESS, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO
RESPRO INC., OF CRANSTON, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

PROCESS OF MAKING AN UNWOVEN FABRIC.

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To all whom it may concern:

Be it known that I, ROLAND B. RESPESS, a citizen of the United States, and resident of the borough of Manhattan, city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Processes of Making an Unwoven Fabric, of which the following is a specification.

This invention relates to an unwoven fabric and the process for making the same. The object of this invention is the production of an unwoven fabric with the fibers thereof having a cellulose adhering to each other, made of the surface of the fibers, that binds said fibers together.

In the accompanying drawings Fig. 1 shows a side elevation of apparatus to carry out the steps of the invention and Fig. 2 indicates a cross section of one form of the product produced.

Referring to Fig. 1, a roller is indicated at 20. A pair of pressure rollers are indicated at 21 and 22. A nozzle 24 is located adjacent to the roller 22. A third roller is shown at 25. A conveyer belt 26 connects the rollers 21 and 25. Guide rollers are indicated at 28 and 29 and a heater is shown at 30. Pressure rollers are shown at 31 and 32. A roll 35 supports a core 36. A pulley 37 is fastened to the roll 35. A belt 38 has one end 39 fastened in place and bears on the pulley 37. The other end of the belt has attached thereto a weight 40.

The process consists first in making a sheet 42 of cotton or other suitable vegetable fiber, batting or felt, in the usual manner, on a carding or garnetting machine. The sheet 42 is located around the roller 20 and unwound therefrom on the conveying belt 26 and brought between the pressure rollers 21 and 22. Just prior to the sheet coming in contact with the roller 22 a liquid element which has the property to fully dissolve the vegetable fibers, if they were placed therein and allowed to remain, is deposited on the surface of the sheet from the nozzle 24. As the sheet 42 passes under the pressure roller 22 this dissolving element is pressed into the sheet and throughout the fibers thereof. In this process the pressure of the rollers 21 and 22, the thickness of the sheet and the viscosity of the dissolving liquid are so regulated that when the sheet passes under pressure between the

rolls, the liquid is pressed into the sheet and only such liquid as is required remains in the matted fibers of the sheet, after it passes from the rolls.

After the sheet 42 is saturated it passes to the dryer 30, where the solvent of the dissolving agent is evaporated or partly evaporated. The drying process is so regulated that the dissolving element, which would completely dissolve and destroy the fiber form, if given sufficient time and in sufficient quantity, only attacks the surface of each fiber and thereby forms a surface adhesive jelly or cellulose. The fibers are attacked only on their surface and made adhesive, by reason of the cellulose element formed by the dissolving agent. The sheet 45 after being dried passes between the pressure rollers 31 and 32 and is wound on the core 36 under tension by virtue of the effect of the belt 38. The fibers will be found to adhere each to the other and the sheet produced is an unwoven fabric of great strength and flexibility. This sheet may be washed in the usual manner that woven fabric is washed in order to keep same clean.

This sheet may also be finished in any of the usual methods that woven fabric is finished by bleaching, dyeing or printing or as unwoven sheet fabrics, such as wood fiber sheet of paper is treated with a surface dressing of clay or is calendered; or the sheet may be finished with suitable dressing in imitation of leather and may be used as a leather substitute as indicated in Fig. 2.

The sheet may be subjected to treatment with oil, or other suitable elements to make it soft and flexible, and when used as a leather substitute one side may be coated with a surface leather dressing and the other may be buffed to resemble buffed soft leather.

This unwoven fiber sheet made in the manner described, may be used for many different purposes in the same manner that woven sheet fabric is used or with special treatment, as artificial leather or genuine leather is employed in the arts, and in my claims for said invention I do not limit myself in any manner whatsoever as to the use for which the fabric may be employed.

The liquid dissolving agent I consider to be an adhesive agent, from its action on the fibers to form an adhesive element. The said agent is introduced into the fiber sheet for the purpose of forming an adhesive be-

tween the fibers. It may be composed of one of a number of dissolving agents. For instance, one method which might be employed, but by reason of its uncertainty of action is not preferred, is by treatment with diluted nitric acid and after the acid has partly attacked the fibers it is necessary to remove the acid and subject the fiber sheet to a treatment with ether and alcohol or other dissolving elements which will partly dissolve the surface of the fiber which has been first attacked by the acid.

Another method is by treating the fiber with caustic soda and a bisulphide.

A third method is by treating the fibers with a solution chemically known as ammonia cuprite or copper ammonia solution. This solution is prepared by dissolving blue vitriol or blue stone crystals in water to make a copper solution, practically twelve ounces to a gallon of cold water, then dissolving about four ounces of soda lye or potash lye in one half gallon of water and mixing the two solutions. The next step is to allow the mixture to settle and then siphon off the clear solution from the top, pour in additional water, stir the solution and allow it to settle and repeat until the solution is thoroughly washed. After the solution is thoroughly washed, it has the form of a blue mud and to this blue sediment is added ammonia water and the mixture thoroughly stirred and again allowed to settle. After it settles the clear liquid at the top is drawn off. This liquid will dissolve vegetable fiber completely, if the fiber is left in the full strength solution for a short time.

The ammonia cuprite solution, in some cases, may be used at its full strength, but I prefer in order to secure the best adhesive qualities, to take this solution and reduce its strength by dissolving therein some of the fiber, such as cotton, when the sheet is

made entirely of cotton or paper fiber when the sheet is made of a paper pulp, as in some cases may be desired in case of a carded cotton fiber sheet. By dissolving some of the fiber in the solution it will load the solution with pure cellulose material and in its dissolving action will reduce the strength of the mixture and when such mixture is introduced into the fiber sheet it not only attacks the surface of the fiber with the remaining strength of the solution but introduces also additional adhesive cellulose obtained from the fibers previously completely dissolved in the solution.

What I desire to secure by Letters Patent and claim is:

1. The herein described process of making an unwoven fabric consisting of forming an untwisted fiber sheet, saturating the sheet with a dissolving agent to attack the surface of the fiber throughout the sheet and thereby form an adhesive cellulose agent for and of the individual fibers, partly drying the sheet, and subjecting to pressure under tension.

2. The herein described process of making an unwoven fabric consisting in forming an untwisted fiber sheet, saturating the sheet with a dissolving agent to attack the surface of the fibers throughout the sheet and thereby form an adhesive coating for the individual fibers of the sheet, partly drying the sheet and subjecting it to pressure under tension and treating with oily compounds, as leather is treated to produce softness and flexibility in leather and coating the sheet with a suitable leather dressing.

Signed at the borough of Manhattan, city of New York, in the county of New York and State of New York, this 1st day of February, A. D. 1921.

ROLAND B. RESPESS.