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E. B. SUTHERLAND

1,978,034

METHOD FOR SPRAYING LIQUIDS

Filed Sept. 10, 1932

Fig. 1.

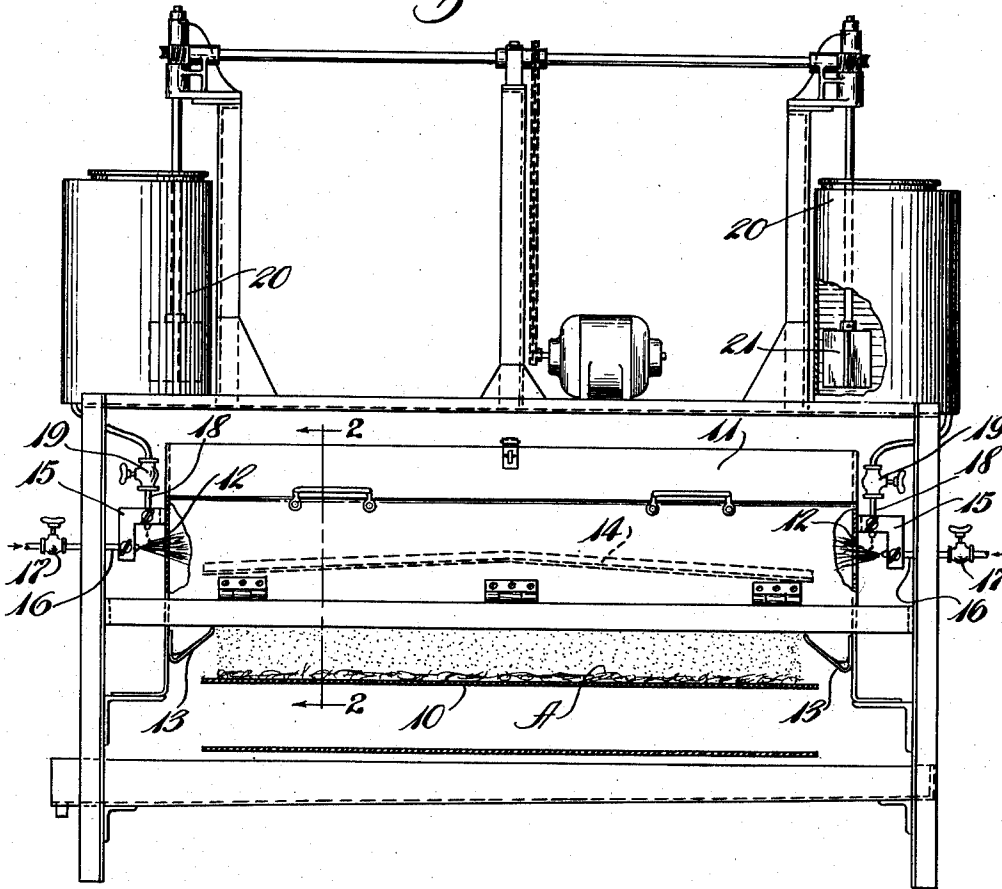


Fig. 2.

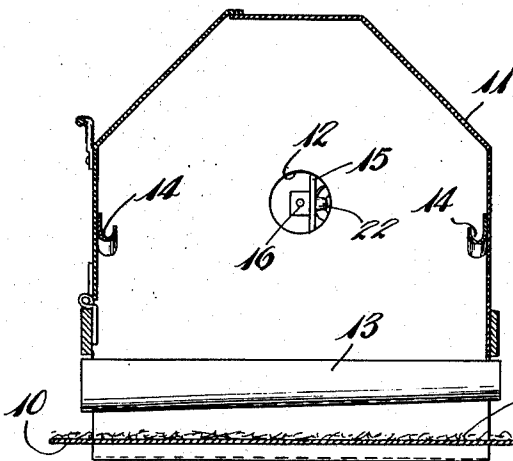
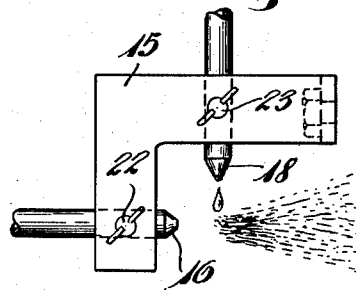


Fig. 3.



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UNITED STATES PATENT OFFICE

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METHOD FOR SPRAYING LIQUIDS

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Application September 10, 1932, Serial No. 632,557

1 Claim. (Cl. 91—68)

This invention relates to methods and apparatus for spraying liquids, especially easily coagulable liquids, such as aqueous dispersions of rubber, and the invention is especially useful in the manufacture of sheet material of unwoven fibers held united at their crossing positions in reticulated sheet form by a flexible agglutinant, as described in the copending application of Carl H. Heldenbrand, Serial No. 557,810, filed August 18, 1931, for Cushioning bodies and method of producing the same.

It has been found that where such a liquid as an aqueous dispersion of rubber is sprayed by means of such prior devices as comprise a liquid feeding nozzle and an air jet directed to blow the liquid from the nozzle, the liquid rapidly coagulates at the nozzle, due to the drying influence of the air blast, and the nozzle becomes obstructed, causing a lack of uniformity in the delivery of the liquid and requiring frequent cleaning of the nozzle.

It is an object of this invention to provide improved spraying procedure and apparatus with avoidance of the above difficulties, and it is a further object of the invention to provide procedure and apparatus especially well suited to the effective depositing of a liquid agglutinant upon a layer of crossed, unwoven fibers to unite them in reticulated sheet form for such purposes as are described in the said copending application.

These and further objects will be apparent from the following description, reference being had to the accompanying drawing, in which:

Fig. 1 is an elevation, with parts broken away and sectioned, of apparatus constructed according to and embodying the invention in its preferred form.

Fig. 2 is a section taken along the line 2—2 of Fig. 1.

Fig. 3 is an enlarged elevation, with parts broken away, of the left hand spraying device of Fig. 1, and illustrating its operation.

In a suitable frame structure, as shown, is mounted a conveyor belt 10 for supporting and advancing a layer A of the material upon which it is desired to deposit the liquid, the layer illustrated being of unwoven fibers arranged in crossing relation and upon which it is desired to deposit an aqueous dispersion of rubber to unite the fibers at their crossing positions to form a flexible, reticulated sheet.

Above the belt 10 is mounted an open-bottomed, chamber-defining structure 11 arranged substantially to confine a space directly above

and accessible to the layer A. The wall of the chamber, preferably at both ends thereof, is apertured at 12, 12 for the admission of the liquid in spray form, and for limiting the extent of the liquid deposit to the width of the layer A, the chamber is provided with end troughs 13, 13 adapted to catch the superfluous liquid. Preferably also, troughs 14, 14 are provided at the side walls of the chamber to catch the liquid that accumulates and flows in contact with the walls, so that substantially the only liquid deposited upon the layer is that of the free mist of the liquid sprayed into the chamber. Suitable drains (not shown) may be provided for the troughs.

For creating a mist of the liquid within the chamber, spray devices are provided at the chamber apertures 12, 12. Each of these spray devices comprises a supporting bracket 15 in which is mounted a horizontally disposed air jet 16 connected through a valve 17 to a suitable source (not shown) for delivering a continuous stream of air horizontally into the chamber.

Vertically disposed in the bracket is a nozzle 18 having its orificed tip lowermost and being connected through a valve 19 to a fluid supply tank 20 for gravity feed of the liquid to the nozzle. Each tank preferably is provided with a suitable motor driven agitator 21. The agitators of the two tanks may be driven together as shown.

Each of the air jets 16, 16 and liquid nozzles 18, 18 preferably is adjustably mounted in its supporting bracket, as by means of clamps 22, 22 and 23, 23, respectively, so that these parts may be relatively positioned for most effective operation.

The liquid nozzle 18 of each spray device is mounted in such vertically spaced relation to the horizontal flow of air from the jet 16 that the tip of the nozzle is substantially clear of the air flow. The objectionable drying action of the air flow at the tip of the liquid-supplying nozzle that is present in prior spraying devices is thereby substantially avoided in the apparatus herein described.

The liquid may be permitted to flow from the nozzles 18, 18 at any desired rate, but preferably the valves 19, 19 are adjusted to cause the liquid to flow in successive independent drops which, when they strike the horizontal streams of air from the jets 16, 16, are minutely broken up by the forces of the air flow and the liquid is delivered into the chamber in the form of mist. This is desirable where the structure to be sprayed is a

layer of crossing fibers of widely open mesh inas-
much as the large number and well distributed
character of the liquid particles facilitates the
chance depositing of an adequate amount of the
5 liquid at the small zones of the crossing positions
of the fibers to unite them with sufficient tenacity
for subsequent manipulation of the reticulated
sheet. The small and light liquid particles de-
scend gently onto the fibers so that even the
10 descending particles that only lightly contact the
fibers may adhere thereto instead of dropping to
the supporting surface beneath. Uniformity of
distribution of the liquid particles upon the ma-
terial is facilitated by the location of the spray-
15 ing device at opposed positions with relation to
the chamber, which facilitates the production of
a mist of uniform density rather than a mist of
greater density at one side than the other.

Variations may be resorted to without depart-
ing from the scope of the following claim.

I claim:

The method of producing a reticulated sheet of
unwoven fibers united at their crossing positions 80
by a flexible agglutinant which comprises dispos-
ing the fibers in a loosely matted layer upon a
supporting surface, dropping the agglutinant in
liquid form in independent drops through an air
space, directing an air current in a direction to 85
intercept the falling drops and to create a fine
mist of the liquid in a zone above the supported
fibers, and permitting the particles of the mist to
be deposited upon the fibers substantially by
gravity alone. 90

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