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PROCESS OF TREATING VISCOSE.

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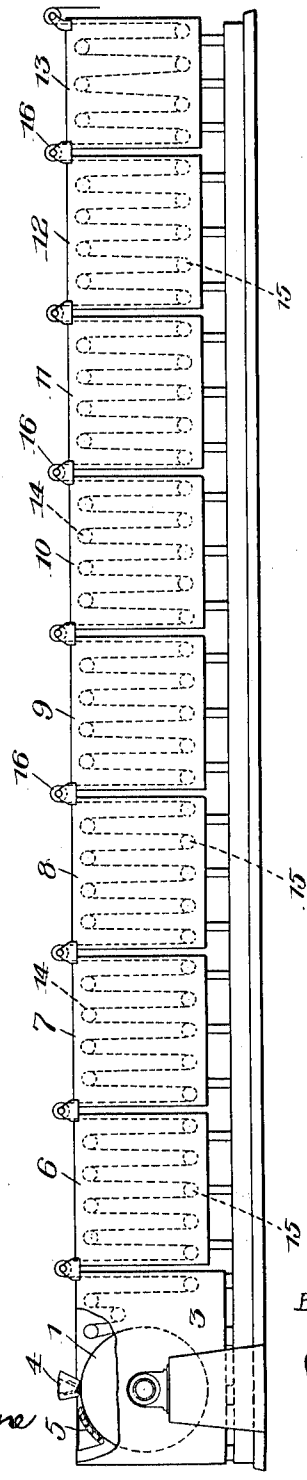
1,117,604. Patented Nov. 17, 1914.



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PROCESS OF TREATING VISCOSE.

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To all whom it may concern:

Be it known that I, DAVID E. REID, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Processes of Treating Viscose; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to the treatment of viscose or cellulose xanthate and its formation into sheets, webs or filaments, and it has for its object to provide an improved process whereby such material may be made in continuous lengths and uniformly smooth, clear and transparent so that it is well adapted for use for any purpose and particularly as a support for sensitized emulsion and the manufacture of photographic film. The process involves generally the treatment of an aqueous solution of viscose with a saturated solution of an alkaline sulfite, preferably of sodium sulfite, removing the sulfite from the material and rendering the viscose insoluble by the use of suitable agents such, for instance, as mineral acids, and finally removing the acid by washing or neutralizing it. More specifically and in order to obtain the best results, in carrying out the process, I form the aqueous solution of viscose into its ultimate shape as a sheet, film or filament and preliminarily coagulate or set its surface before it enters the liquid coagulant, so that its form or shape will not be altered by the latter, as, for instance, if a sheet is to be formed the viscose solution is deposited upon the surface of a carrier such as a drum, partially submerged in the liquid and between the point of its application to the drum surface and the liquid coagulant it is subjected to the action of heat which will tend to slightly set the surface and insure its proper introduction into the liquid. The first of the baths into which the thin sheet or, if desired, filament of viscose is introduced is composed of a saturated solution of sodium sulfite and from this the sheet or filament passes through another bath also of a saturated solution of sodium sulfite, then through two or more baths containing gradually decreasing amounts of sulfite, then through a bath of a liquid which prepares the sheet for the liquid rendering the sheet insoluble. In practice, after passing through two tanks containing the saturated solution, the sheet or web passes through a tank containing a half saturated solution of sodium sulfite; then through a tank containing a 15 per cent. solution of sodium sulfite; then through a tank containing a 20 per cent. solution of ammonium sulfate, then through a tank containing a 5 per cent. solution of hydrochloric or other suitable mineral acid; then through a tank containing an acid neutralizing material such as a 2½ per cent. solution of hypochlorite of sodium, and afterward is washed in pure water. The strength of the solutions in the first two tanks is maintained by pumping their contents into a reservoir containing an excess of sulfite and from said reservoir back through a suitable filter so that a continuous circulation of fresh saturated solution is maintained and the sulfur compounds extracted by the first baths are removed, thus obviating any liability of unduly staining the viscose during the first coagulation. By the employment of sulfite solutions of gradually decreasing strength, the sulfur compounds are removed from the viscose and at the same time a gradual, complete coagulation is obtained, thus materially strengthening the web and the farther the web travels, the cleaner it becomes, the treatment in each succeeding tank leaving less sulfite in it, and the ammonium sulfate then removes from the web the last remnant of the sulfite and prepares it for the acid bath which renders the web insoluble. The acid is then neutralized by the solution of hypo-chlorite of sodium which also bleaches out any color remaining in it and the web is then washed in any suitable manner. When using the other alkaline sulfites, such as potassium, ammonium and lithium, the precipitation of the viscose is considerably slower.

The apparatus employed may be of any usual type, and in the drawings, I have shown a conventional sectional view of a suitable machine consisting of a drum 1 partially submerged in the saturated solution of sulfite contained in the tank 3. Mounted above the drum is a suitable distributing hopper 4 for applying the liquid viscose to the surface, and 5 indicates a heater consisting of a hollow metallic chamber into which steam is applied, arranged in proximity to

the surface of the drum between the hopper and the surface of the liquid in the tank. 6 indicates a tank containing the second saturated solution; 7 the tank containing the half saturated solution; 8 the tank containing the 15 per cent. sulfite solution; 9 the tank containing the ammonium sulfate solution; 10 the tank containing the acid solution; 11 the tank containing the hypochlorite of sodium solution, and 12 and 13 the washing tanks. Each of these tanks also contains the upper and lower sets of rollers 14 and 15, respectively, around which the web passes and the rollers 16 arranged between the tanks.

I claim as my invention:

1. The process of coagulating viscose, consisting in subjecting an aqueous solution thereof to the action of a saturated solution of sodium sulfite, removing the sulfite and rendering the material insoluble.

2. The process of coagulating viscose, consisting in subjecting an aqueous solution thereof to the action of a saturated solution of sodium sulfite and then to one or more baths containing a lesser percentage of sodium sulfite, then removing the sulfite and rendering the material insoluble.

3. The process of coagulating viscose, consisting in subjecting an aqueous solution thereof to the action of sodium sulfite, then to the action of ammonium sulfate, then to an acid, and then removing the acid.

4. The process of coagulating viscose, consisting in subjecting an aqueous solution thereof to the action of a saturated solution of sodium sulfite, then to several separate baths containing gradually decreasing percentages of sulfite, then removing the sulfite and rendering the material insoluble.

5. The process of treating viscose, consisting in forming an aqueous solution thereof into a sheet or filament, setting the surface thereof by the application of heat and then passing it into a liquid coagulant.

6. The process of treating viscose, consisting in forming an aqueous solution thereof into a web, setting the surface thereof by heat, then passing it into a saturated solution of sodium sulfite.

7. The process of coagulating viscose, consisting in subjecting an aqueous solution to the action of a saturated solution of an alkaline sulfite, removing the sulfite and rendering the material insoluble.

8. The process of coagulating viscose, consisting in subjecting an aqueous solution thereof to the action of a saturated solution of an alkaline sulfite and then to one or more baths containing a lesser percentage of the sulfite, then removing the sulfite and rendering the material insoluble.

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