

UNITED STATES PATENT OFFICE.

EMILE BRONNERT, OF MÜLHAUSEN, GERMANY.

PROCESS OF PRODUCING SOLUTIONS OF CELLULOSE.

SPECIFICATION forming part of Letters Patent No. 646,799, dated April 3, 1900.

Application filed October 26, 1899. Serial No. 734,869. (No specimens.)

To all whom it may concern:

Be it known that I, EMILE BRONNERT, a citizen of Germany, residing at Niedermorschweiler, Mülhausen, Germany, have invented a certain new and useful Improvement in Processes of Producing Solutions of Cellulose, (for which I have applied for a patent in Great Britain, dated September 9, 1899, No. 18,260, and in Germany, dated August 7, 1899,) of which the following is a specification.

It has been proposed to utilize solutions of cellulose in zinc-chlorid solution in the arts. Wynne and Powell, English Patent No. 16,805, dated December 22, 1884, dissolve cellulose in zinc-chlorid solution of specific gravity 1.8 or in a corresponding solution of another zinc salt, to which, if necessary, the chlorid of an alkaline earth has been added, at a temperature of 100° centigrade and express the warm solution at high pressure to form filaments for incandescent lamps and other purposes. Draper and Tompkins, English Patent No. 17,901, dated July 30, 1897, prepare fine silky threads in nearly the same way as that described in the Patent No. 16,805. While Wynne and Powell's process has proved successful for making carbon filaments, Draper and Tompkins's process has not been applied, the reason being that the threads made in this manner have little strength. This lack of strength is due, on the one hand, to the small percentage of cellulose—at highest some four per cent.—contained in the solution, and, on the other hand, to the use of heat in making the solution, which decomposes much of the cellulose. I have found that cellulose is much more easily soluble in concentrated zinc chlorid and that the thread produced by decomposing the solvent is much stronger if the cellulose is first hydrated by known methods, then treated with oxidizing agents, or first treated with suitable oxidizing agents and then hydrated and finally dissolved without application of heat.

My invention consists in the application of this discovery, and for this purpose the raw material, freed from fat and bleached, is first treated for about one hour with a cold concentrated solution of caustic soda. After it is thoroughly mercerized by this treatment it is submitted to centrifugal action, transferred to much water, and washed free from alkali.

The material thus uniformly hydrated or any other hydrate of cellulose is next treated with an oxidizing agent—advantageously an electrically-prepared weak bleaching solution containing some two grams of available chlorine per liter. Other bleaching materials, such as chlorid-of-lime solution and the like, may, however, be used. It will be seen that I treat the material with a weak bleaching solution instead of the energetic bleaching solution containing some five grams of active chlorine per liter, with which it has hitherto been treated for twelve to eighteen hours. The bleached material is next thoroughly washed, finely divided, if necessary, and without drying dissolved directly in concentrated zinc chlorid without application of heat. When cellulose is used, it may be first treated with an oxidizing agent and then with a hydrating agent. In this manner a light viscous solution containing upward of eight per cent. of cellulose is obtained, which is of a consistence suitable for the production of thread by a gentle pressure at the ordinary temperature.

To produce an artificial thread more nearly approaching silk in its properties than does cellulose thread, natural-silk waste may be dissolved in a concentrated solution of zinc chlorid in the known manner, and the solution may be mixed cold in the necessary proportion with the cellulose solution prepared as described above. The addition of the silk solution impairs the thread-making properties of the cellulose solution, and it is well to limit the quantity of the silk to about one-fifth of that of the cellulose.

Having thus described the nature of this invention and the best means I know of carrying the same into practical effect, I claim—

1. The process herein described for producing solutions of cellulose in concentrated zinc-chlorid solution, which consists in first treating cellulose, freed from fat and bleached, with concentrated caustic-alkali solution, as in the mercerizing process, at a low temperature, then submitting it to centrifugal action and washing it, then treating it with an oxidizing agent, and finally, after again washing and submitting it to centrifugal action, dissolving it directly in concentrated zinc-chlorid solution.

2. The process herein described for producing solutions of cellulose in concentrated zinc-chlorid solution which consists in first treating cellulose, freed from fat and bleached,
5 with an oxidizing agent, then submitting it to centrifugal action and washing it, then treating it with concentrated caustic-alkali solution, as in the mercerizing process, at a low temperature, and finally, after again washing and submitting it to centrifugal action,

dissolving it directly in concentrated zinc-chlorid solution.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EMILE BRONNERT.

Witnesses:

EMMA FETTER,

PAUL SCHLUMBERGER.