

UNITED STATES PATENT-OFFICE.

EMILE BRONNERT, OF NIEDERMORSCHWEILER, AND MAX FREMERY AND
JOHANN URBAN, OF AACHEN, GERMANY.

METHOD OF OBTAINING THREADS FROM CELLULOSE SOLUTIONS.

SPECIFICATION forming part of Letters Patent No. 698,254, dated April 22, 1902.

Application filed April 22, 1901. Serial No. 56,968. (No specimens.)

To all whom it may concern:

Be it known that we, EMILE BRONNERT, chemist, residing at Niedermorschweiler, near Mülhouse, Alsace, Germany, and MAX FREMERY, chemist, and JOHANN URBAN, engineer, residing at Oberbruch Station, Dremmen, Regierungsbezirk, Aachen, Germany, citizens of Germany, have jointly invented a certain new and useful Method of Obtaining Threads from Cellulose Solutions, (for which we have made application for a patent in Great Britain, dated February 28, 1901, No. 4,303, and in Germany, dated October 18, 1900,) of which the following is a specification.

This invention relates to a method for making from solutions of cellulose in such solvents as ammoniacal cupric-oxid solution or zinc-chlorid solution threads of sufficient strength, elasticity, and luster for use as a substitute for silk. Such threads have not hitherto been obtained, because, although the general principle of the method—namely, the expression of the ammoniacal cupric solution or zinc-chlorid solution of the cellulose into an acid—has been known, the threads produced have been of inferior kind, owing to ignorance of the essential condition, which is the strength of the acid. When sulfuric acid of strength commonly called “dilute”—that is, containing from ten to twenty per cent. of real acid—is used for receiving the expressed cellulose solution, the cellulose is only incompletely precipitated or separated from its solution, and what does separate seems to have undergone a partial decomposition, so that the threads frequently break as they are wound up and are gummy and without the necessary softness and strength after they have been dried.

By the present invention the cellulose solution is expressed into sulfuric acid containing from thirty to sixty-five per cent. of real acid. An energetic reaction ensues and the cellulose seems to undergo a kind of intro-

molecular change, by which its particles are drawn together to form a strong product. If the cellulose solution has been well filtered, the thread obtained by this method may be withdrawn from the acid at considerable speed and even in its wet condition may be wound without breaking. The washed and dried thread has all the properties set forth above.

The best results are obtained at the ordinary temperature with sulfuric acid containing about fifty per cent. of H_2SO_4 ; but the concentration may be varied within the limits named for the purpose of regulating the action to suit variations of temperature. Acids weaker than these have the disadvantages aforesaid, and stronger acids attack the separated cellulose too much.

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

1. A method of obtaining threads from solutions of cellulose by expressing the cellulose solution into sulfuric-acid solution containing from thirty to sixty-five per cent. of real acid.

2. A thread produced from a cellulose solution expressed into a sulfuric-acid solution containing from thirty to sixty-five per cent. of real acid.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

EMILE BRONNERT.
MAX FREMERY.
JOHANN URBAN.

Witnesses to the signature of Emil Bronnert:

GEO. GIFFORD,
JOHN G. PLATNER.

Witnesses to the signatures of Max Fremery and Johann Urban:

H. QUADFLIEG,
E. CRÜTSEN.