

An improved casein-cellulose composition and process for producing same.

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COMPLETE SPECIFICATION.

**An Improved Casein-cellulose Composition and Process for
Producing same.**

A communication from abroad by the CASEIN COMPANY of America, a corporation organised under the laws of the State of New Jersey, having their place of business at 111 Broadway, New York City, New York, United States of America.

I, JOHN CORRY FELL, of the Firm of Fell and James, of 1 Queen Victoria Street, London, E.C. Consulting Engineer and Chartered Patent Agent, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement.

Some experiments have heretofore been made with a view of producing a composition of matter consisting largely of casein and nitro-cellulose, and which, while having the properties and characteristics of celluloid, would be produced at a lesser cost. In thus attempting to produce the celluloid-like products comprising casein many difficulties have been experienced in securing a homogeneous product, owing to the fact that different solvents have been required for the casein and the nitro-cellulose, and in order to form a homogeneous compound, comprising these different ingredients, slow and more or less complicated processes have been required, as well as somewhat expensive solvents for the mixed ingredients after the same had been separately reduced to plastic or viscous condition by their separate solvents.

This invention or discovery has for its object to provide a celluloid-like product, of a homogeneous character, and by a comparatively inexpensive and rapid process, and the cost of which product will be very much less than the cost of celluloid, while the product itself will be practically just as good as celluloid in that it will be hard and somewhat elastic or flexible without being brittle; will be impermeable to water, so as not to be softened thereby, and will be capable of being sawed, turned or carved, or otherwise treated like celluloid, in the production of various articles.

In conducting experiments to secure these results a common solvent, to wit: glacial acetic acid, has been discovered for the casein and nitro-cellulose; so that by the use of this acid these two substances can both be dissolved and thus combined into a homogeneous product without the use of the expensive solvents and processes required in the past for making a homogeneous celluloid-like compound comprising casein and nitro-cellulose. One important feature of this discovery that casein is soluble in glacial acetic acid is the fact that a casein solution produced by this acid does not affect the chemical or physical character of the nitro-cellulose or of the other ingredients usually employed in the manufacture of celluloid when the glacial acetic acid solution of casein is mixed with the solution of nitro-cellulose, camphor, and the other ingredients usually employed in the manufacture of celluloid; whether the nitro-cellulose solution has been produced by glacial acetic acid or by any other proper solvent therefor. Owing to this feature of the discovery the process of combining casein with nitro-cellulose and the other ingredients usually employed in the manufacture of celluloid is greatly simplified over what has been required in

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An Improved Casein-cellulose Composition and Process for Producing same.

the past, where the casein has been dissolved with alkaline solvents and which alkaline casein solvents have required comparatively slow and expensive processes of treatment to bring them into a condition to be combined with nitro-cellulose in a homogeneous compound.

In practicing the invention or discovery the nitro-cellulose may, as above suggested, be dissolved in any suitable manner heretofore practiced, either by glacial acetic acid or any other proper solvents. To dissolve ordinary commercial casein for the celluloid-like composition, either in a dry or wet condition, about equal parts of the casein and glacial acetic acid are mixed together and the mixture is then preferably heated over a water-bath or in a jacket-kettle to obtain a perfect solution of the casein, which will be effected in about twenty minutes, and the casein solution thus obtained will be comparatively clear and transparent. This casein solution can then be added directly to the solution of nitro-cellulose and the other ingredients usually employed in the manufacture of celluloid, either with or without being diluted with alcohol or other substances not affecting the chemical or physical character of the casein and other ingredients of the celluloid-like product, in a proportion of say about 100 parts of the casein solution to 200 parts of the nitro-cellulose solution, and the whole mixture will then be stirred or agitated in any suitable manner, and quickly combined into a homogeneous product or mass which can be worked by any of the usual methods or machines employed in the manufacture of celluloid.

The invention or discovery is, however, not to be understood as being limited to the above-mentioned proportions of casein and nitro-cellulose; as, while a mixture of 100 parts of the casein solution to 200 parts of the nitro-cellulose solution will give a product not inferior to ordinary celluloid, but considerably cheaper; still cheaper celluloid-like products may be made by using larger percentages of casein and smaller percentages of nitro-cellulose. Also instead of dissolving the casein and nitro-cellulose separately, as hereinbefore suggested, these ingredients may be mixed together in the desired proportions and the mixture then be dissolved by the glacial acetic acid, owing to the fact that this acid is a common solvent for both substances. Also the invention or discovery is not to be understood as being limited to the use of glacial acetic acid; as any other equivalent acid or acid salt which will dissolve both the casein and nitro-cellulose will be included by the invention or discovery.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. The herein described celluloid-like product, of a homogeneous character, comprising nitro-cellulose, casein, and a common solvent for these two ingredients.
2. The herein-described celluloid-like product, of a homogeneous character, comprising nitro-cellulose, casein and glacial acetic acid.
3. The herein described process for producing a celluloid-like product, consisting in dissolving casein with glacial acetic acid and then thoroughly mixing the said casein solution with nitro-cellulose and other ingredients usually employed in the manufacture of celluloid.
4. The herein-described process for producing a celluloid-like product, consisting in dissolving both casein and nitro-cellulose with glacial acetic acid, and then thoroughly mixing the said dissolved ingredients and other usual ingredients of celluloid together to form a homogeneous composition.

Dated this 2nd day of November 1903.

FELL & JAMES
Agents for the Applicant.

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