

UNITED STATES PATENT OFFICE.

HARRY S. MORK, OF BOSTON, ARTHUR D. LITTLE, OF BROOKLINE, AND WILLIAM H. WALKER, OF NEWTON, MASSACHUSETTS, ASSIGNORS, BY MESNE ASSIGNMENTS, TO CHEMICAL PRODUCTS COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

ARTIFICIAL SILK.

SPECIFICATION forming part of Letters Patent No. 712,200, dated October 28, 1902.

Application filed January 13, 1902. Serial No. 89,532. (No specimens.)

To all whom it may concern:

Be it known that we, HARRY S. MORK, of Boston, county of Suffolk, ARTHUR D. LITTLE, of Brookline, county of Norfolk, and WILLIAM H. WALKER, of Newton, county of Middlesex, State of Massachusetts, have invented an Improvement in Artificial Silk, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Our invention relates to artificial silk, and especially to artificial silk which is waterproof, and thereby different from and superior to the artificial silk heretofore produced, from which, moreover, our product differs in other essential particulars, as hereinafter set forth.

Without exception, so far as known to us, all commercial artificial silks thus far produced consist, essentially, of cellulose more or less modified or degraded by the cycle of chemical treatments to which it has necessarily been subjected in the processes of their manufacture. The properties of these artificial silks, and especially their relations to water, are thereafter, substantially, those of cellulose in its modified or degraded forms. Especially is the strength of all products of the prior art greatly influenced by the moisture they contain. They all absorb water readily and are greatly weakened by being wet.

As a step in the production of cellulose artificial silk from cellulose by certain processes artificial filaments of nitrocellulose are now prepared commercially in considerable quantities. These filaments and the threads produced therefrom are, however, extremely inflammable and under appropriate conditions explosive, for which reasons they are utterly unfitted for use in textiles and are not so employed. For the production therefrom of a merchantable material these nitrocellulose filaments or threads are therefore always subjected to further chemical treatment by which the nitrocellulose forming their substance is reduced to cellulose, which is the material of

which the finished product consists. During this treatment not only do the filaments lose a considerable proportion of their weight, but the treatment itself is expensive.

We have discovered that artificial silk can be produced by proper methods from certain stable non-explosive and relatively non-inflammable compounds or of derivatives of cellulose, and notably from the simple or mixed cellulose esters of the fatty acids, and of these compounds we prefer cellulose acetates, and particularly the compound known as "cellulose tetracetate." We have discovered that these compounds, and especially the compound specified, yield either by themselves or with suitable additions, as hereinafter indicated, filaments of sufficient tenuity and strength to permit of their use as artificial silk, for which use, moreover, they are preëminently qualified by the great brilliancy of their luster and the fact that they are waterproof. These filaments, moreover, may readily be produced or dyed in any color.

The physical properties of our new filaments and threads—such as their softness, strength, and elasticity—may be modified or made to vary over a considerable range by incorporating with the cellulose ester or other compounds mentioned various softeners, as oleic acid, acetylated castor-oil, thymol, phenol, &c.

Our new product has the important and unique advantage over all other artificial silks heretofore known of being entirely unaffected by water, and the chemical nature of our filaments is such as to permit at once of their commercial use. The radicals in combination with the cellulose molecule in our filaments as first formed constitute an essential and integral part of our commercial product.

We have set forth in another application, Serial No. 125,738, methods which we have found convenient for the manufacture of our product; but the methods themselves form no part of our present invention.

We do not jointly herein broadly claim cellulose acetate or other cellulose ester of the

fatty acids in combination with a softener, as oleic acid, acetylated castor-oil, thymol, phenol, &c.

What we do claim, and desire to secure by Letters Patent, is—

1. As a new article of manufacture artificial silk composed of a stable, non-explosive compound of or derivative of cellulose.
2. As a new article of manufacture artificial silk composed essentially of the cellulose ester of an organic acid
3. As a new article of manufacture artificial silk composed essentially of the cellulose ester of a fatty acid.
4. As a new article of manufacture artificial silk composed essentially of cellulose acetate.
5. As a new article of manufacture artificial silk composed of a stable, non-explosive cellulose compound, modified by the addition of a softener as above described.

6. As a new article of manufacture artificial silk composed of the cellulose ester of an organic acid, modified by the addition of a softener as above described.

7. As a new article of manufacture artificial silk composed of the cellulose ester of a fatty acid, modified by the addition of a softener as above described.

8. As a new article of manufacture artificial silk composed of cellulose acetate, modified by the addition of a softener as above described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HARRY S. MORK.
ARTHUR D. LITTLE.
WILLIAM H. WALKER.

Witnesses:

B. J. NOYES,
M. E. BILL.