UNITED STATES PATENT OFFICE.

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MANUFACTURE OF ARTIFICIAL SILK.

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To all whom it may concern:

Be it known that I, HENRY BERNSTEIN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Manufacture of Artificial Silk, of which the following is a specification.

My invention relates to the manufacture of artificial silk.

An object is to present a high silk appearance combined with exceeding softness and pliability.

A further object is to gain great strength and uniformity.

A further object is to make it possible to dye the silk evenly and fully.

A further object is to secure a practically waterproof product.

A further object is to make use of an extract from the natural silk to aid in the imitation of the same.

A further object is to advantageously alter the temperature of the materials used during their treatment.

In carrying out my invention I make use of a cuprinatrum precipitate, which is obtained in a different manner from the process usually made use of in that it is a cupric hydrate produced by the use of sodium hydrate as precipitant. To produce this precipitate, I preferably dissolve copper sulfate in water to a concentrated solution and to make the same quite clear add a small quantity of sulfuric acid. I then add a solution of natrium hydrate, otherwise known as "sodium hydrate." All the copper will be precipitated as cupric hydrate, and the precipitate is then washed clear from the sodium sulfate remaining. In previous efforts to produce my result the cupric hydrate has not been so cleansed from the solution in which it was produced, with corresponding injury to the product and delay in the process. The cupric hydrate so produced is now dissolved in aqua-ammonia and dry cellulose added thereto. The liquor resulting from the treatment or boiling of raw silk containing natural gum and other secretions of the silk-worm is then added. In carrying out my invention I preferably use about one ounce of precipitated cupric hydrate, two pounds of aqua-ammonia, two ounces of dry cellulose, and liquor amounting to ten per cent. or like proportion. I preferably mix these in a comparatively cool condition and immediately subject the solution to a gradual rising temperature, the time taken being ordinarily about three hours and the solution then being perfectly clear. When the solution has reached the desired consistency, it is formed into filaments or threads by pressing it through a small nozzle, orifice, or other opening or by any other desired means, after which these filaments are spun through or within a bath of about eighty per cent. acetic acid and subsequently wound on rollers and exposed to the air. The filaments are washed in a gelatinous preparation composed of castor-oil treated with sulfuric acid and neutralized and saponified by sodium hydrate. The proportions are preferably about one thousand grains of castor-oil, two hundred grains of sulfuric acid, and two hundred grains of sodium hydrate—that is, five parts of castor-oil to one each of sulfuric acid and sodium hydrate—the liquid being diluted, as desired, with water. The threads are then grouped, twisted, and reeled into skeins ready for use. The artificial silk thus formed possesses a high luster and great strength. It will not break in twisting. It is, moreover, waterproof, is readily dyed, and of uniform quality. It is insoluble even in a hot bath.

A group of filaments formed as above when subjected to a bath of sulfuric acid reunites into uniform threads, stiff, lustrous, and elastic, and forms a very serviceable imitation of horsehair.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Artificial silk containing cellulose and gum from the liquor obtained by boiling raw silk.

2. Artificial silk containing cellulose, gum from the liquor obtained by boiling raw silk and a gelatinous substance.

3. As a step in the process of making artificial silk, the treatment of dissolved cellulose with a liquor obtained by boiling raw silk.

4. As a step in the process of making artificial silk, the treatment of dissolved cellulose at a gradually-increasing temperature with a liquor obtained by the boiling of raw silk.

5. In the process of manufacturing artificial silk, the treatment of cellulose with a solution of cupric hydrate in aqua-ammonia and the liquor obtained by boiling raw silk.

6. In a process of manufacturing artificial silk, the treatment of cellulose with cupric hydrate dissolved in aqua-ammonia in the presence of the solution obtained by boiling raw silk, and the subjecting of the solution obtained to a rising temperature.

7. In the process of manufacturing artificial silk, the treatment of dissolved cellulose beginning in a comparatively cool condition, with a liquor obtained by boiling raw silk, gradually increasing the temperature thereof, forming it into threads and treating it with a gelatinous substance.

8. In a process of manufacturing artificial silk, mixing cupric hydrate with aqua-ammonia, adding cellulose and a liquor obtained by boiling raw silk and raising the products from a comparatively cool condition gradually to the maximum temperature of treatment.

9. In a process of manufacturing artificial silk, the addition of ammonia to cupric hydrate, adding cellulose and a liquor obtained by boiling raw silk thereto in a comparatively cool condition, subjecting the solution to a gradually-rising temperature, forming the same into filaments and treating it in an acid-bath.

10. In a process of manufacturing artificial silk, dissolving cellulose in a solution of cupric hydrate and ammonia, adding the liquor obtained by boiling raw silk thereto, treating the product to obtain threads and washing the threads in a solution of castor-oil, sulfuric acid and sodium hydrate.

11. In a process of manufacturing artificial silk, the dissolving of cellulose in cupric hydrate and aqua-ammonia, the addition of a liquor obtained from boiling raw silk thereto, forming the same into threads, treating the threads with a preparation of castor-oil, sulfuric acid and sodium hydrate and subsequently treating with an acid-bath.

HENRY BERNSTEIN.

Witnesses:
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