

# UNITED STATES PATENT OFFICE.

PETER SCHMID, OF BASEL, SWITZERLAND.

CONSOLIDATED NATURAL SILK AND PROCESS OF MAKING THE SAME.

No. 897,159.

Specification of Letters Patent.

Patented Aug. 25, 1908.

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*To all whom it may concern:*

Be it known that I, PETER SCHMID, a citizen of the Swiss Republic, and resident of Basel, Switzerland, have invented a new Consolidated Natural Silk and a Process of Making the Same, of which the following is a full and exact specification.

It is known that natural raw silk can be consolidated by hardening its coating of sericin, which envelops the fibroin; by means of formaldehyde (see for example the United States Letters Patent No. 549257 dated November 5th, 1895). This treatment of the raw silk with formaldehyde had however not the desired results, since the thereby obtained consolidated silk was not sufficiently supple and remained dull at the dyeing. I succeeded in avoiding these disadvantages by freeing the natural silk with sericin hardened by formaldehyde from the exterior or superficial layers or strata of sericin, which are precisely the most spongy and prevent the obtaining of bright, glossy tints in dyeing, the hardened sericin enveloping the fibroin becoming thus thinner and consequently the fiber remaining suppler.

For carrying out my invention, I proceed for example as follows: The raw natural silk in the form of threads or in woven, knitted, plaited, etc. condition, or in the form of silk waste, is placed in a formaldehyde solution containing 2 to 5 per cent pure formaldehyde of the weight of the treated silk material and is allowed to remain in this solution for about 1 to 3 days at ordinary temperature, in order to harden entirely the sericin, what occurs when the sericin coating of the raw silk has become insoluble in water. The raw silk thus treated is then—eventually after it has been dried—subjected to the action of the soap lather produced by heating soap water to boiling in the presence of air (for example as it is specified in my United States Letters Patent Ser. No 848605 dated March 26, 1907), during few minutes to 45 minutes or more, according to the nature of the silk or the more or less energetic action of the formaldehyde or according as the hardened sericin coating shall be softened or made soluble more or less deeply. This treatment with soap lather is stopped when a sample of the treated raw silk loses by its washing 3 to 5

per cent of the original weight of fibroin less than when the same silk is entirely ungummed by the usual process. Finally the silk is washed in water, whereby the softened exterior layers of the sericin coating are removed from the fibroin, while the inner, more dense layers of the said hardened sericin coating, which have not been made soluble by the soap lather, remain on the fibroin. The silk thus obtained has a hardened sericin coating of more or less reduced thickness, but in every case freed from the superficial or exterior layers of the sericin coating shown by the said silk before treatment. The sericin remaining on the obtained silk is condensed to a silky matter analogous to the fibroin and assuming as this latter a bright glossy appearance on dyeing. The said sericin increases the volume of the silk thread. The silk having a reduced sericin coating hardened by formaldehyde has further a greater affinity for the weighting substances usually employed, so that it can be weighted more.

By dyeing the silk having a reduced sericin coating hardened by formaldehyde, the said hardened sericin protects the fibroin, so that the physical structure of the silk is saved and the dyed silk becomes less downy.

The silk treated by the new process is designed to be substituted for the ungummed silk usually employed.

What I claim is:

1. The herein described process for the manufacture of a consolidated natural silk consisting in first treating the raw natural silk with a formaldehyde solution in order to harden its sericin coating, then making soap water and treating the raw silk having a hardened coating with lather of the said soap water in order to soften the exterior layers of the said sericin coating and finally washing the silk thus treated in order to remove the said softened exterior layers of sericin.

2. As a new article of manufacture the described consolidated natural silk from which only the exterior layers of sericin have been removed while its fibroin remains covered by the inner, more dense sericin layers hardened by formaldehyde, and representing about 3 to 5 per cent of the weight of the said fibroin, the said silk being sufficiently sup-

ple to be substituted for the silk entirely ungummed, assuming, on dyeing, the glossy appearance of this latter, becoming by dyeing less downy than the entirely ungummed  
5 silk and having a greater affinity than this latter for weighting substances.

In witness whereof I have hereunto signed

my name this 30th day of November 1906, in the presence of two subscribing witnesses.

PETER SCHMID.

Witnesses:

GEO. GIFFORD,  
AMAND RITTER.