# UNITED STATES PATENT OFFICE.

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## PROCESS OF IMPARTING SILKY LUSTER TO YARNS, THREADS, &c.

SPECIFICATION forming part of Letters Patent No. 665,680, dated January 8, 1901.

Application filed February 2, 1899. Serial No. 704,278. (Specimens.)

*To all whom it may concern:*

Be it known that I, EDUARD HEBERLEIN, chemist, a citizen of the Swiss Republic, and a resident of Wattwil, canton of St. Gall, Switzerland, have invented certain improvements in the treatment of yarns, threads, and woven fabrics of vegetable fibers for imparting stiffness and a silky luster thereto, of which the following is a clear and complete specification.

If starch of any kind or any preparation thereof or glue or gelatin material or other colloidal agent is treated with hot water, or even if merely stirred up with cold water, mixed with soda-lye or other alkaline lye, or if the above-named starchy or gelatin substances be at once mixed with alkaline lye the starch is at once dissolved in a clear condition with formation of a mass of a syrup-like or more or less solid tough consistency, which can be readily dissolved to form a clear liquid solution. If yarn or woven fabric be impregnated in any suitable manner with this liquid while in a uniformly-spread-out condition and when using concentrated soda-lye under some tension in order to prevent the shrinking of the fibers and the material be then rinsed with water, it will be found that the material so treated will be more or less stiff, with a silky luster, this condition varying according to the quantity of starch and the degree of concentration of the alkali employed.

If dilute solutions are employed, materials soft to the touch are obtained, while when using concentrated solutions products are obtained having the stiffness of the hard wire-like thread known in Germany as "Eisengarn."

When using concentrated soda-lye, the yarn or fabric can also be saturated with the alkaline starch, glue, or gelatin solutions in an unstretched condition and then be spread out and stretched to its original dimensions and finally washed in stretched condition.

In order, for example, to render the material hard to the touch and impart a silky luster thereto, about three hundred grams of starch are dissolved in ten liters of soda-lye of 20° Baumé. The yarn or thread is then immersed in the solution for about ten minutes in a slightly-stretched condition and is then washed with water, dilute acid, and again with water.

The main advantage of the above-described new process consists in that a product is obtained thereby which, owing to its properties, can entirely replace the wire-like threads or yarns manufactured in the usual way.

The yarns prepared according to the present invention offer considerable advantages as compared with the wire-like threads or yarns heretofore produced, both as regards the process of manufacture and the appearance and properties of the product. The advantage in the mode of manufacture consists in that no brushing-machines are required, such as are necessary in the manufacture of wire-like threads or yarn.

The appearance of the lustrous threads or yarns produced according to the present invention has the advantage over that of the wire-like threads or yarns that in place of the glassy luster of the latter they have a silk-like appearance.

Of great importance is the property of the yarns or threads prepared by the new process that they can be subsequently bleached and dyed without losing their luster and stiffness. The process of dyeing can, however, be carried out before the above-described treatment, provided dyes be used that will withstand the action of alkalies, or the dyeing operation can be carried out simultaneously with the lustering and stiffening.

A further advantage of the yarns or threads prepared according to this invention consists in a considerable increase in the strength and weight of the fibers, whether of vegetable or of animal origin.

Yarns for weaving treated according to this invention can be used as warps without requiring to be sized.

As before stated, the new process can be applied not only to yarns or threads, but also to woven fabrics of vegetable fiber. The fabric can by this means receive a very strong dressing combined with a silk-like luster. Lastly, the process can also be applied to cops and in dyeing warp-threads.

The new process can also be employed in combination with the process described in the specification to the English Patent No.

17,302, of July 22, 1897, by treating the yarns or fabrics with an alkaline solution of nitrocellulose and starch, glue, or gelatin, or the yarns or fabrics may be first treated with a starch or glue solution and then with an alkaline solution of nitrocellulose.

What I claim is—

1. The herein-described method of treating vegetable fibrous materials, which consists in immersing them, while in a stretched condition, in an alkaline solution of a colloid, and then washing them, substantially as set forth.

2. The herein-described method of treating vegetable fibrous materials, which consists in immersing them while in a stretched condition in an alkaline solution of a colloid and then, while still under tension, washing them, substantially as set forth.

3. The herein-described method of treating vegetable fibrous materials, which consists in immersing them, while in a stretched condition, in an alkaline solution of a colloid containing nitrocellulose, and then washing them, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

EDUARD HEBERLEIN.

Witnesses:
JOSEPH SIMON,
JOHANN SCHMID.