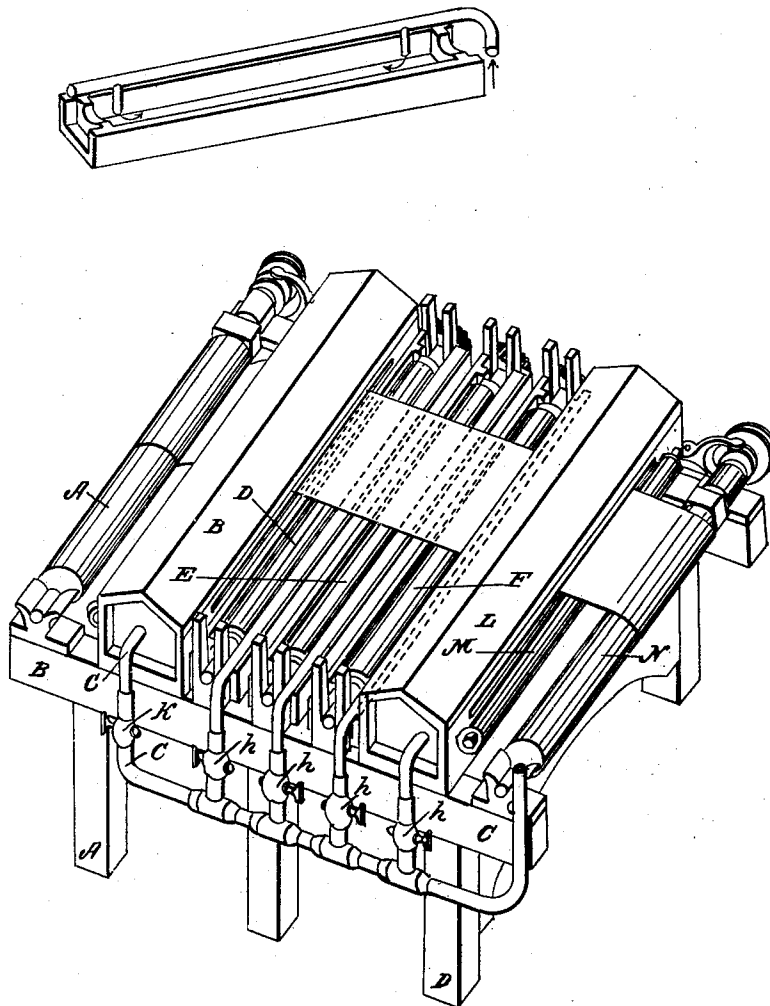


N. MARY, Sr.
Dyeing Process.

No. 19,036.

Patented Jan'y 5, 1858.



Witnesses:
J. H. B. Jenkins
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UNITED STATES PATENT OFFICE.

NICHOLAS MARY, AÎNÉ, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS OF DYEING SILK. &c.

Specification of Letters Patent No. 19,036, dated January 5, 1858.

To all whom it may concern:

Be it known that I, NICHOLAS MARY, Aîné, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Processes for Dyeing; and I do hereby declare the following to be a full and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 in the accompanying drawing is a perspective view of a machine for dyeing, according to my improved process. Fig. 2 is a detached view of one of the parts of Fig. 1.

It has long been a great desideratum to dye silk goods in the piece, and at the same time to preserve the original brilliancy and softness of the fabric. Various attempts have been heretofore made to dye silk fabric in the piece; but they have all been found unsatisfactory, because in the process of immersing the fabric into the dye, the fabric lost its brilliancy of surface, and its softness, and at the same time creases were made in the material, which creases or breaks were preserved and disfigured the goods. For these reasons, it has been customary to dye silk in the skein before it is woven; and silk after having been woven and then dyed has never presented the same brilliancy and softness, as when the material was first dyed in the skein.

By my improved process, I am enabled to dye the silk fabrics which have been woven in the gray, or natural color, or to re-dye silks which have been dyed in the skein and then woven, and at the same time to retain or give to the fabric so dyed all its original brilliancy and softness.

My improvement consists in first submitting the silk in the piece to the action of steam, and then passing it over a series of rollers covered with felt, which revolve partially immersed in troughs, and which contain the solution of dye heated by steam, and then passing the goods into or through a chamber where it will be submitted to the action of steam again. The piece of goods is kept distended or stretched laterally during the entire operation, by rollers, and the felt covered rollers are given such a velocity of revolution that they shall rub against the goods at a velocity from 2 to 4 or 5 times greater than the velocity at which the fabric or piece of silk moves. In the accompany-

ing figures is shown one form of the machine for carrying out in a convenient manner my process.

A, B, C, D, Fig. 1, represents one side of a frame for supporting the rollers and parts of my apparatus. A, is a roller on which the piece of silk is wound previous to passing through the machine to be submitted to the dyeing operation. B is a small housing or box, closed on all sides, except a narrow slit in each side, for the entrance and passing out of the fabric. This box is about a foot high and a foot wide, and about 36 inches long. A steam pipe, C, C, enters at one extremity of the box B, and keeps this box always full of steam. The condensed steam escapes through a small aperture below.

D, E, and F are three wooden rollers, covered with felt, of about 6 inches diameter each, and each revolving partly immersed in a trough, such as is shown detached in Fig. 2. This trough is made of wood, is water-tight, and is about 8 inches deep, and the rollers, D, E, and F, are so suspended, that about one-half of the roller is always immersed in the liquid dye. These boxes are filled and kept filled with the dyeing solution, and a steam pipe C', C'', or C''', enters into each box, and passes along its whole length. There are numerous apertures in this pipe, through which the steam escapes into, and heats the troughs, and by means of the cocks, h, h, h, the temperature of the dyeing solution can be maintained at any desired point, from the temperature of the boiling point down.

L is a box or housing, similar precisely to B, and is kept filled with steam. The fabric passes into and through this box.

M is a small roller for supporting the goods until it is finally wound on the roller N. The rollers are driven by ordinary cog gearing.

The rollers A and N are revolved with a uniform velocity, and the rollers, D, E, and F, are revolved with a velocity from two to four times as great as the velocity with which the fabric travels. The deduction of revolution of all the rollers can be changed by altering the direction of the application of motion to the main driving shaft.

My improved process is carried out in this particular form of machine as follows. The goods having been rolled up on the roller

A, are slowly unwound, and pass through the steam-box B, with a slow velocity, say of about 60 feet per minute. In passing through this box, the fabric becomes slightly dampened by the steam, and the fiber or texture of the fabric is expanded or opened. The fabric then passes over the surface of the three felt covered rollers, D, E, F. The surface of these rollers revolves from 2 to 4 times faster than the velocity at which the fabric travels over the machine. These rollers, by constantly revolving in the dye, carry up a quantity of the dyeing material, and rub it against the silk, thus applying the color, and having the very important effect of producing a friction or rubbing against the fabric, thus smoothing or polishing the surface of the material, and imparting thereto, luster or brilliancy. After the goods pass from the last roller F, it enters into the housing or box L, where it is subjected to the action of the steam which diffuses the color thoroughly and uniformly through the material, and fixes it in the body of the fabric, and any excess of coloring matter, which does not so combine with the fabric, falls off into the box L. This last steaming also contributes greatly to improve its luster. The goods then pass on, and are wound upon the roller N. When an entire piece, say of about 60 to 100 yards, has been passed over the machine, the direction of revolution of the entire machine is changed and the goods are passed back from N, through L, over the rollers, D, E, and F, and through B, and are wound upon A. In this case the functions of L and B are changed, L preparing the fabric, for a second dyeing, and friction, and B fixing the color, and imparting luster and brilliancy to the goods. The goods may be thus passed

backward and forward until the requisite depth of color has been imparted to the goods, when they are washed, and gummed or sized, by passing them through a machine in which the gum is applied, and they are then dried.

The advantages of my improved process of dyeing are, that silk fabrics preserve, or have imparted to them, a brilliancy, softness, and luster, equal to that originally possessed by it; the color is uniformly applied; the operation is effected with great rapidity and economy.

The smoothing or polishing effect of the felt covered rollers might be attained to some extent by dyeing the goods in the ordinary manner, and then passing them over rollers covered with felt, of similar substance; but the surface of the rollers should always travel faster than the surface of the fabric, in order to impart by friction, the requisite luster to the surface. So, also, after goods have been dyed in the ordinary mode, their luster and brilliancy would be much improved by submitting them to the action of steam upon their surfaces.

Other fabrics besides silk might be advantageously dyed by my improved process, although intended mainly for silk fabrics.

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

Submitting the fabric to the combined action of steaming, and to that of friction rollers, during or after the dyeing process, as above described.

NICHOLAS MARY, Aîné.

Witnesses:

J. H. B. JENKINS,
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