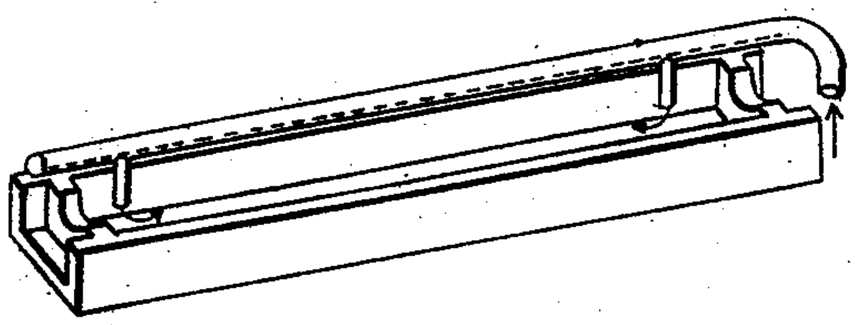
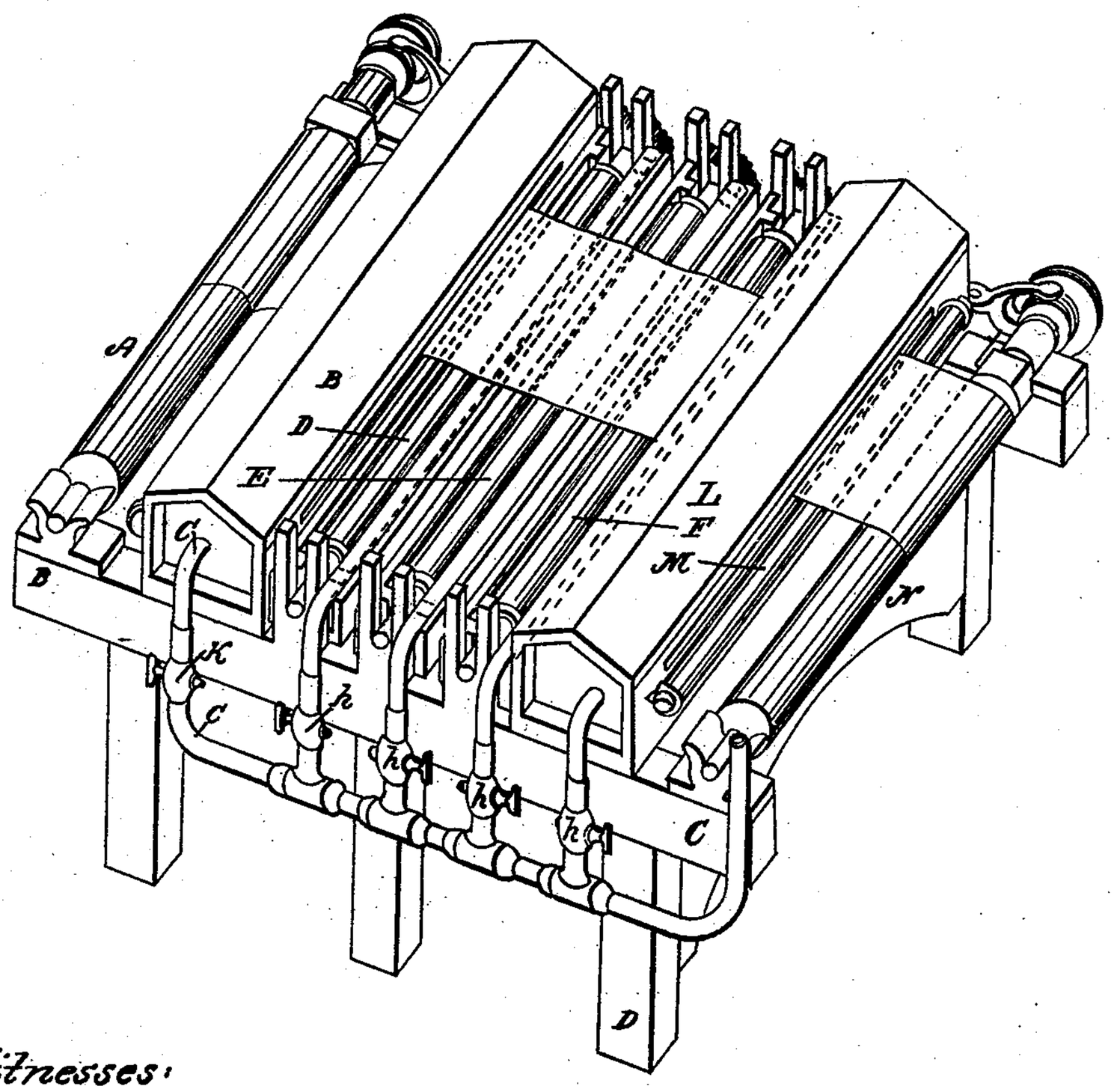
N. MARY, Sr.

Press Dyeing.

No. 17,974. Patented Aug. 11, 1857.





Witnesses:

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NICHOLAS MARY, SR., OF PHILADELPHIA, PENNSYLVANIA.

SILK-DYEING MACHINE.

Specification of Letters Patent No. 17,974, dated August 11, 1857.

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 Machinery 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 my new machine for dyeing. 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 improvement, I am enabled to dye silk fabrics which have been woven in the gray or natural color, or to redye silks which have been dyed in the skein, and then woven, and at the same time to retain in 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 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 runs.

In the accompanying figures is shown my new machine.

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 on each side for the entrance and passage 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 eight inches deep, and the rollers, D, E, and F, are so suspended that about $\frac{1}{2}$ 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'' 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 presses 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, F, are revolved with a velocity from two to four times as great as the velocity with which the fabric travels. The directions of revolution of all the rollers can be changed by altering the direction of the application of motion to the main driving shaft.

The operation of my improved machine is 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 with 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 effect of smoothing or polishing the surface of the material, 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 forces 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. 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 function of L and B are changed, L preparing the fabric for a second dyeing and friction, and B fixing the color subsequently. 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 this machine are, that silk goods preserve their brilliancy, softness, and luster. The color is uniformly applied. The operation is effected with great rapidity and economy.

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

The combination of the steam chambers, B and L, with the friction surface rollers, D, E, and F, for preparing and dyeing the material, the whole being arranged and operating substantially as above described.

NICHOLAS MARY, AÎNÉ.

Witnesses:

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