No. 842,122. PATENTED JAN. 22, 1907.

E. SPATZ.

PROCESS OF DYEING TEXTILE FABRICS.

APPLICATION FILED DEC. 26, 1905

Fig. 1.

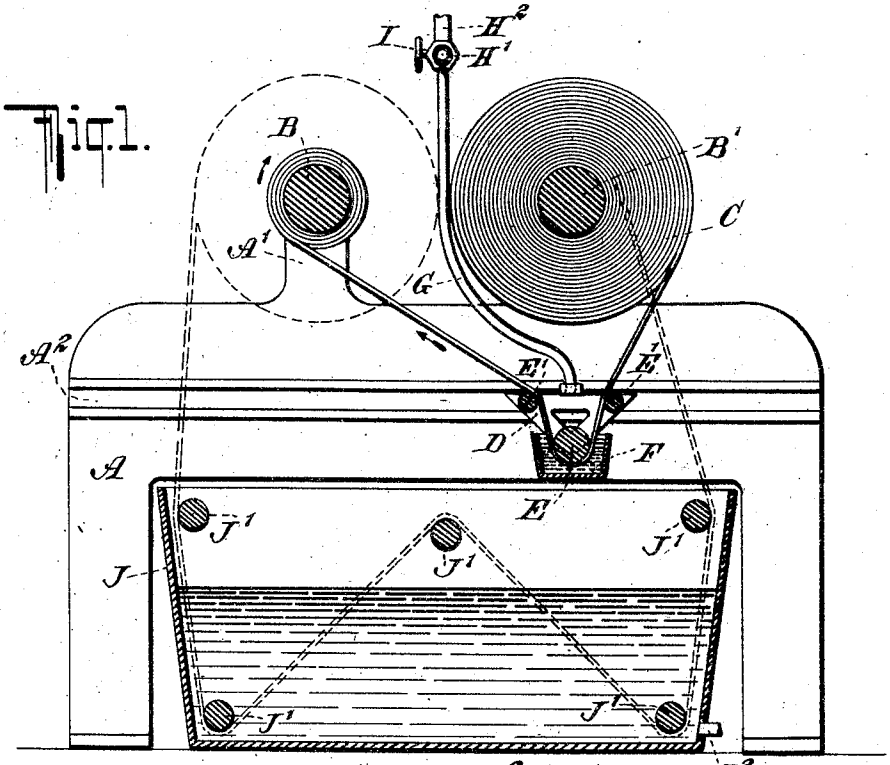
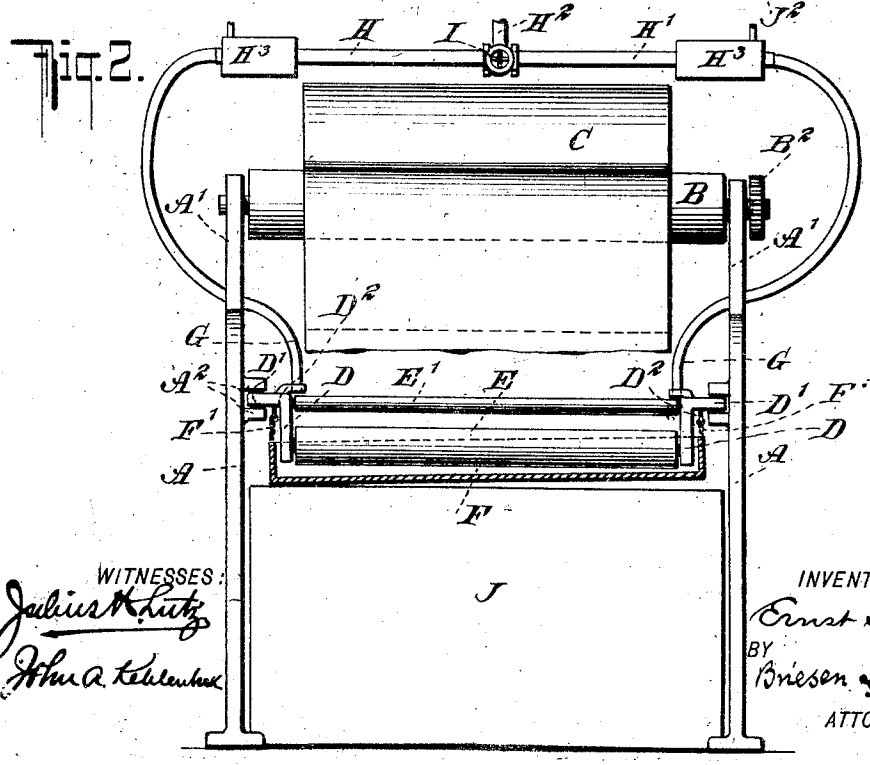


Fig. 2.



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PROCESS OF DYEING TEXTILE FABRICS.

No. 842,122. Specification of Letters Patent. Patented Jan. 22, 1907.

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To all whom it may concern:

Be it known that I, ERNST SPATZ, a subject of the German Emperor, and a resident of Hackensack, county of Bergen, State of New Jersey, have invented certain new and useful Improvements in Processes of Dyeing Textile Fabrics, of which the following is a specification.

My invention relates to the dyeing of materials in the nature of strips, bands, or sheets, and particularly to the dyeing of textile material, and has for its object to accomplish a uniform dyeing of the material from end to end and from one side to the other.

Great difficulty has been experienced hitherto in dyeing fabrics uniformly on account of the strength of the bath varying during the operation of dyeing. To overcome this difficulty, I employ a procedure, such as hereinafter described in detail, which practically assures a constant strength of the bath, and I further cause the dyeing liquor to be applied in such a manner as to produce a uniform action on all the portions of the fabric.

In the accompanying drawings I have illustrated an apparatus such as may be used in carrying out my improved process, Figure 1 being a longitudinal sectional elevation of such apparatus, and Fig. 2 an end view with parts in section.

The apparatus shown comprises a suitable frame A, provided with brackets A′, in which are journaled the rollers B B′, on which the fabric C is adapted to be wound. Any suitable mechanism is employed for rotating one roller on the other, a pinion B^2 being indicated in Fig. 2. The frame A is provided with suitable guideways A^2, extending transversely with respect to the axes of the rollers B B′, and in these guideways are adapted to move flanges D′ of a suitable carriage D, which is provided with three rollers E E′, over which the fabric C is adapted to pass, as indicated in Fig. 1. The lower roller E is partly or entirely within a trough F, secured to the carriage D, so as to travel therewith. The particular way of attaching the trough shown in the drawings consists of chains F′, adapted to be fastened to hooks D^2 on the carriage, and with this construction, as will be readily understood, the trough can be inclined to one side or the other by simply varying the connection of the hooks D^2 with the several links of the chains F′. In Fig. 2 the trough is shown inclined downwardly from right to left; but the opposite inclination may be given the trough just as readily. With the carriage D are also connected supply-pipes G G′ of a flexible nature, so that they may follow the movement of the carriage, said pipes being connected to stationary pipes H H′, the connection of which with the main supply-pipe H^2 is connected by a valve I. This valve is so constructed that either the branch H or the branch H′ may be connected with the main supply-pipe H^2. A steam-jacket H^3 or other heating means is preferably applied to keep the dye liquor at the proper temperature. Below the trough F is disposed a tank or vat J of such a width that any liquid overflowing from the trough F will be received in said vat. The vat is provided with rods or rollers J′, which form guides for the fabric C, and also has an outlet J^2 for withdrawing the liquor at the end of the operation.

At the beginning of the operation the material to be dyed is entirely on one of the rollers—for instance, the roller B′. The outer end of the material is then engaged with the rollers E E′ and fastened to the roller B, as indicated in Fig. 1. The roller B is then rotated in the direction indicated by the arrow, so as to cause the fabric to unwind from the roller B′. At this time the carriage D should be at the right-hand end of the apparatus—that is, about directly below the roller B′. The trough F is inclined to one side, and the valve I is opened in such a manner that the dye liquor will flow in at the upper end of the trough. The liquor which has been prepared previously flows continuously into the trough F, while the fabric travels therethrough, and also continuously overflows at the lower end of the trough, such overflow being received in the vat J. Owing to this continuous supply of the liquor and the continuous overflow from the trough F, the strength of the bath in the trough is practically constant, and a substantially uniform dyeing action is obtained. Inasmuch, however, as the fresh liquor reaches first one edge portion of the fabric and then travels to the other edge portion transversely of the fabric, that edge portion which is in contact with the dye liquor first will natu-

rally be dyed somewhat more deeply than the opposite edge portion. In order to compensate for this unequal action, I employ the following procedure: When the fabric has been wound fully on the roller B, I shift the carriage D to the opposite end of the apparatus—that is, I bring it under the roller B—and I then reverse the direction in which the fabric travels, so as to cause it to wind back onto the roller B'. At the same time I reverse the inclination of the trough F and the position of the valve I so that the dye liquor will during this stage of operation be admitted to the other end of the trough F and flow down in the same transversely of the fabric in a direction opposite to that of its flow during the first stage of the process. The reversal of the direction in which the fabric travels also compensates for an inequality in the action of the dye which is due to the fact that with a constant rate of revolution of the roller on which the fabric winds the fabric travels faster and faster as the diameter of the portion wound on such roller increases. Therefore certain portions of the fabric remain in the trough F a shorter length of time than other portions as the fabric winds on the roller B; but when the direction is reversed and the fabric winds on the roller B' those portions which traveled fast will travel slowly, and the result is that each portion of the fabric is subjected to the action of the dye in the trough F the same length of time if we add the two periods of time that such portion is within the trough. When the fabric has thus been given a preliminary dyeing in the trough F and a sufficient amount of overflow dye has collected in the vat J, the supply of dye is interrupted and the fabric is unfastened from one of the rollers B or B', removed from the trough, and passed through the vat J in engagement with the rods J', so as to take the position indicated by dotted lines in Fig. 1. The operation is then repeated in a manner analogous to that first described—that is, the fabric is first wound on one of the rollers B or B' and then on the other, reversing the direction of the travel so as to secure a practically even action of the dye. The amount of dye liquor in the trough F is constant during the entire operation, and likewise the amount of liquor in the vat J is constant during the time that the fabric is passed through such vat.

I claim as my invention—

The herein-described improvement in the dyeing of fabrics, which consists in causing the fabric to travel first in one direction and then in the opposite direction through a constantly renewed and overflowing bath of dyeing liquor, collecting the overflow, and then passing the fabric back and forth through the collected overflow.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERNST SPATZ.

Witnesses:
HANS V. BRIESEN,
JOHN LOTKA.