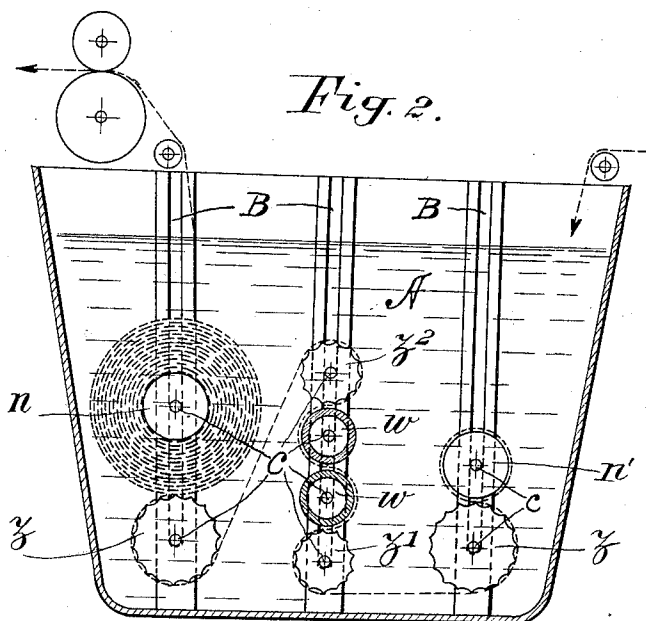
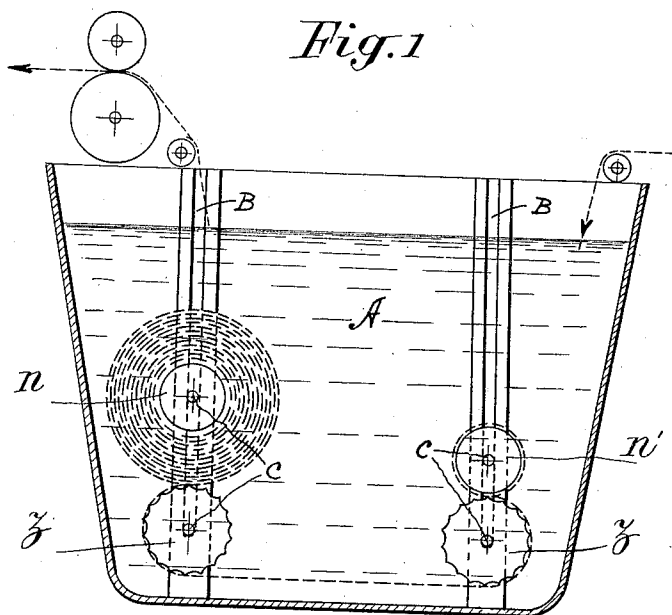


H. EICKEN.
LIQUID DYEING APPARATUS.
APPLICATION FILED MAY 4, 1910.

1,006,471.

Patented Oct. 24, 1911.



Witnesses:
and
L. E. Barkley.

Inventor:
Hubert Eicken
by Frank A. Anderson,
Attorney.

UNITED STATES PATENT OFFICE.

HUBERT EICKEN, OF GREVENBROICH, GERMANY.

LIQUID-DYEING APPARATUS.

1,006,471.

Specification of Letters Patent.

Patented Oct. 24, 1911.

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To all whom it may concern:

Be it known that I, HUBERT EICKEN, a subject of the German Emperor, residing at Grevenbroich, Germany, have invented certain new and useful Improvements in Liquid-Dyeing Apparatus, of which the following is a specification.

My invention relates to the class of dyeing apparatus in which the fabric to be dyed is passed between rollers, submerged in the dyeing liquid.

This invention relates to apparatus for dyeing fabric, and especially to the class of dyeing apparatus comprising a tank containing the dyeing liquid, and means in the tank for holding rotatable rolls of fabric to be dyed.

An object of the invention is to provide means whereby the fabric moves with uniform motion through the dye liquid and thereby receives a uniform shade of color.

A further object is to provide means for pressing the dyeing liquid into the fabric; and a still further object is to accomplish the foregoing objects in the most convenient and economical manner.

The dyeing machines known until now, for dyeing pieces of fabric, work in such a manner that the fabric is unwound from one roller and wound on a second roller. During this operation the speed of travel of the fabric is not uniform, as the winding roller has a slower speed at the beginning, and owing to the lesser circumference, this speed increases continuously as the layers of fabric increase on the roller. The fabric being dyed is consequently impregnated by the dye in an irregular manner and this result is especially noticeable when the goods are passed only once through the dye.

In my new device, which is shown in the accompanying drawings wherein Figure 1 is a vertical diagrammatic section of one form and Fig. 2 a similar section of a somewhat modified form, the fabric is wound, under the dyeing liquid, on two separate rollers n , which are rotatably mounted on the tank A and which receive their motion by contact with two driver rollers z .

Since the circumferential speed of the rolls of fabric is dependent entirely upon the speed of the driver rollers z , the motion of the fabric being wound or unwound is uniform and the fabric passes through the dyeing liquid in the same proportion at the beginning of the piece as at the end thereof.

Now in order to effect in a rapid and uniform manner the through dyeing of the goods passing over the rollers z , the latter are provided at their circumference with longitudinal flutings or contiguous concaved surfaces in which the dyeing liquid is carried about during the rotary motion of the roller and is thereafter impressed into the fabric by the weight of the roller n which rests thereupon and whereby a complete and through dyeing of the fabric is accomplished in the shortest possible space of time. The flutings of the driver rollers may be arranged longitudinally as well as in any other suitable manner, as the fabric, on the roller n owing to its softness always presses the outer layers of the goods into the flutings.

In order to further reduce the time necessary for through dyeing heavy goods, one may provide other roller w between the driver roller z and fabric rollers n as shown by Fig. 2. In this arrangement the fabric after leaving the roller n passes first over the roller z and z^2 and then over two rollers w , w which are covered with a soft coating, and thereafter over the roller z' which is provided with depressions. Owing to the fact that the two rollers w , w are arranged between the rollers z' and z^2 the dyeing liquid is pressed first from one side and thereafter from the other side into the fabric.

The rollers are carried by the shafts c which are preferably of uniform size, so that their ends may fit into the grooves B, which constitute guides in which the shafts have vertical and rotating movement and by this means, a continual pressure is maintained, by gravity, between the rollers z and the fabric. The fabric receives a double application of pressed-in dye, as follows:—As the fabric begins to leave the unwinding roll n it is pressed by the weight of the full roll, and as it is wound on the winding roll n' the pressure is slight at first; but the pressure increases as the pressure on the unwinding roll decreases, until finally, the full weight is imparted by the winding roll; and the pressure of the unwinding roll is reduced to a minimum. It is obvious, therefore, that the mean of pressure, exerted upon the fabric, has been equally distributed over the entire piece of fabric, because of the similarly constructed and similarly located winding and unwinding rolls, and because of their relation to the fluted driver z .

Having now fully described my said invention, what I claim and desire to secure by Letters Patent, is:—

1. In a device for dyeing fabric under the level of the dyeing liquid, the combination with a tank for the liquid, of a winding roller, an unwinding roller, two driver rollers adapted to drive the two winding rollers and flutings provided in said driver rollers and adapted to carry around the dyeing liquid during the rotation of the rollers and to cause the liquid to be pressed into the fabric by the weight of the winding rollers bearing thereupon, substantially as described.
2. In a device for dyeing fabric under the level of the dyeing liquid, the combination with a tank for the liquid, of a winding roller, an unwinding roller, two driver rollers adapted to drive the said winding rollers and longitudinal flutings provided in said driver rollers and adapted to carry around dyeing liquid during their rotation and to cause it to be pressed into the fabric by the weight of the winding roller bearing thereupon, substantially as described.
3. In a device for dyeing fabric under the level of the dyeing liquid, the combination with the tank for the dyeing liquid, of a winding roller, an unwinding roller, two driver rollers adapted to drive the said rollers, depressions in the said tractional rollers, two supplemental presser rollers provided with depressions and arranged above each other at a certain interval between said

driver rollers, and two rollers covered with a soft coating and arranged in vertical alignment between the said supplemental presser rollers, substantially as and for the purpose set forth.

4. In a device for dyeing fabric under the level of the dyeing liquid the combination with the tank for the dyeing liquid of a winding roller, an unwinding roller, two driver rollers adapted to drive the said winding and unwinding rollers, two supplemental presser rollers positioned between the said driver rollers, two presser rollers covered with soft coating and positioned between the said supplemental presser rollers and longitudinal depressions or flutings in the said tractional rollers, substantially as and for the purpose set forth.

5. In a dyeing apparatus, the combination with a tank for containing dyeing liquid, a driver roller having longitudinal flutings in its periphery, said fluted roller being rotatably seated in the tank, and a fabric-carrying roller vertically and rotatably movable over the driver roller and adapted to press constantly on the flutings and thereby cause the fabric carrying roller to rotate and to press the dyeing liquid into the fabric.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

HUBERT EICKEN.

Witnesses:

WM. VANDORN,
GERTRUD BONA.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."