E. J. WILKINSON.

METHOD OF AND MEANS FOR DYEING FABRICS AND THE LIKE.

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1,287,543. Patented Dec. 10, 1918.

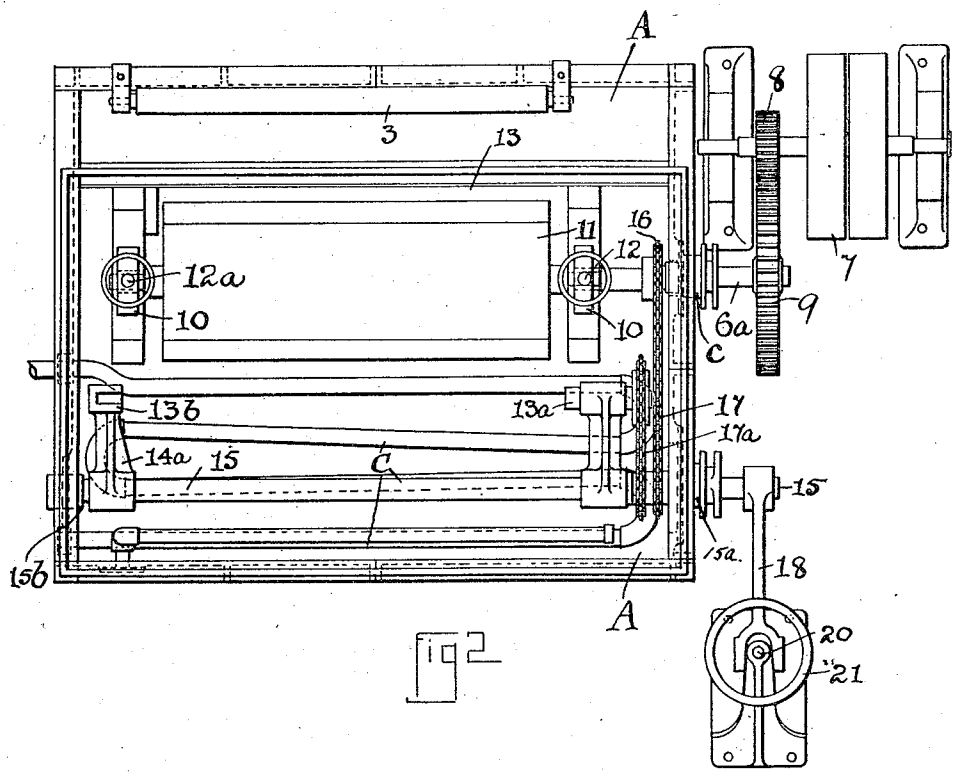


Fig 2

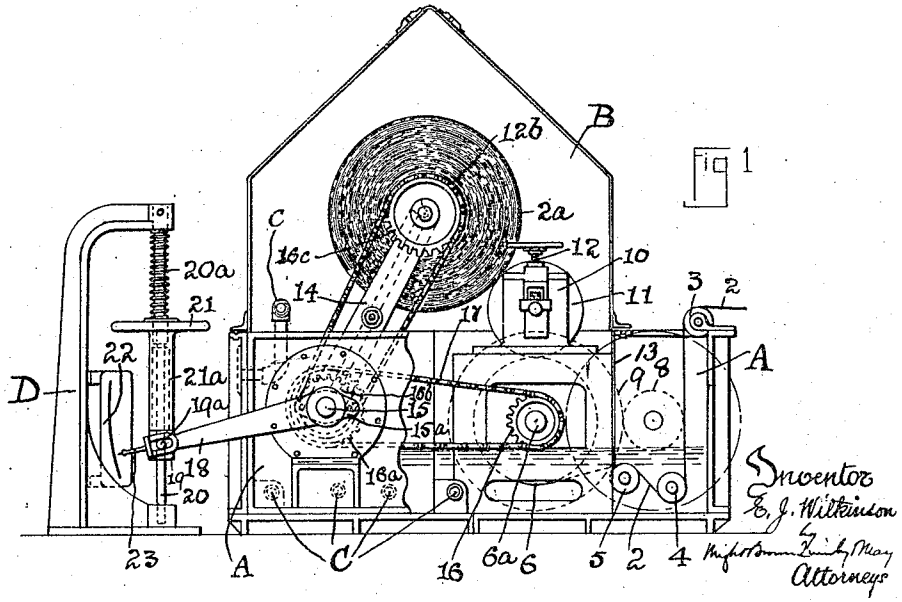


Fig 1

Inventor
E. J. Wilkinson
by Wright Brown Quinby & May
Attorneys

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UNITED STATES PATENT OFFICE.

EDWARD JOHN WILKINSON, OF MANCHESTER, ENGLAND, ASSIGNOR TO BRADFORD DYERS' ASSOCIATION LIMITED, OF BRADFORD, ENGLAND.

METHOD OF AND MEANS FOR DYEING FABRICS AND THE LIKE.

1,287,543. Specification of Letters Patent. Patented Dec. 10, 1918.

Application filed July 7, 1915. Serial No. 38,446.

To all whom it may concern:

Be it known that I, EDWARD JOHN WILKINSON, a subject of the King of Great Britain, and resident of 6 Hanover Gardens, Higher Broughton, Manchester, in the county of Lancaster, England, have invented a certain new or Improved Method of and Means for Dyeing Fabrics and the like, of which the following description, having reference to the accompanying sheet of drawings, is a specification.

In the process of dyeing it is usual to pass the fabric or the like being treated through the dye liquor either continuously in one direction as in the case of the ordinary type of dye vessel and wince-pit for woolen and worsted fabrics or as in the case of the continuous dyeing machine for dyeing direct black on cotton piece goods; or repeatedly in one direction as on the ordinary type of dyeing pad; or alternately backward and forward as on the ordinary dye jigger, in order that such fabrics may take up the desired quantity of dye stuff or have sufficient of same "fixed" upon them.

In carrying out these well-known methods of dyeing much time and labor are expended which I considerably reduce by making use of the apparatus and following the method of treatment which are the subject of my present invention.

According to my invention I pass the material to be treated through the liquor and preferably between squeezing rollers and in the case of piece goods in the "open width" state, in order that same may uniformly absorb such an amount of color or such other substances dissolved or suspended in water or other suitable medium, as may be necessary to effect the desired result. After leaving the liquor the fabric is carried into a chamber or inclosed space in which it wholly remains and where it is kept at the requisite temperature for the length of time necessary to permit of the actions of the substances thereon being carried out to the desired extent, during such time the fabric is kept in such a state of motion as will retain or distribute in an evenly diffused condition throughout the whole mass, the moisture and substances which it has taken up. When required the air in this chamber may be expelled and replaced by the admission of steam or other gas or gases in order to prevent undesirable or detrimental effects.

I find that the carrying of the fabrics and the like through the liquor may be efficiently performed by the employment of guiding and winding rollers, and that the desired state of motion in which the same is kept after having passed through the liquor is a continuation of the revolving motions of the roller upon which the fabric is wound.

In referring to the treatment of goods other than fabric I have especially in view the treatment of warps and yarns.

The apparatus for carrying my process into effect may be varied to meet the particular requirements of the goods being treated, hence I only give a description of such an example of said apparatus as will disclose the essential features of my invention since I am aware that same may be varied in many directions without departing from the nature of my said invention.

The apparatus I make use of is of the character hereinafter described, the same being illustrated by the accompanying sheets of drawings, wherein:—

Figure 1 is a side elevation, part of the apparatus being shown in section, so that the parts within might be clearly illustrated.

Fig. 2 is a plan of the parts shown by Fig. 1.

A is a vat or vessel formed to contain the dyeing or other liquor (as hereinafter described) to the treatment of which the fabrics or the like have to be subjected.

B is a cover which is removable and which forms a joint upon the edges of the tank A said joint being sufficiently air-tight to enable the space inclosed by the cover to contain the necessary steam or other gases for heating the interior thereof.

C are coils of pipes through which steam may be passed for heating purposes.

The fabrics 2 that have to be treated are conducted through the vessel A by first passing over the roller 3 and descending beneath a guide roller 4 and over another roller 5 to reach a roller 6 which forms one of a pair of pressing rollers and to which roller 6 rotary motion is transmitted by appropriate gearing such as driving pulleys 7 and spur wheels 8 and 9 the latter of which are secured upon the shaft 6^a upon which the roller 6 is fixed. As the shaft 6^a has to reach to the exterior of the vat A a gland *c* is employed to render same air-

tight. Mounted in appropriate bearings 10 is the upper pressing roller 11 which is arranged to rest upon and receive its rotary motion from and by frictional contact with the roller 6 beneath, while hand wheels for actuating screws 12 and 12^a (which press upon springs) may impart more or less pressure to the roller 11 as occasion may require. The fabric 2 as it passes from the roller 11 and any superfluous moisture which it may have taken up, is squeezed out of it at the line of contact of said rollers 11 and 6, while the fabric 2 still extends over said roller 11 to be wound in coils 2^a upon the roller 12^b.

This roller 12^b I preferably arrange to press freely upon the roller 11 so that its contact therewith shall be of such a nature that the rotary motions of the roller 11 may be transmitted to the roller 12^b at the desired surface speed to wind thereon the fabrics 2 to form the coils 2^a. Thus it will be seen that the fabric 2 after passing over the roller 3 descends into the liquor contained by the tank A and that it is conducted through said liquor by passing under the roller 4 and over the roller 5 (which may be of the type known as a "scroll" roller for the purpose of keeping the fabric stretched laterally) to reach the roller 6 as above described, care being taken that said fabric 2 does not rise out of said liquor until it is within the inclosed part of the apparatus. This said inclosed portion of the tank A is secured by the partition 13 reaching down into the liquor within the vat A as shown by Fig. 1.

On the apparatus thus produced being put into action by the driving belt being on the fixed driving pulley, the rollers 6, 11 and 12^b, commence their rotary motions and the fabric is wound upon the roller 12^b until the end of the fabric is reached, after which, the rotary motions are continued (by the roller 12^b and its coils of fabric still resting against the roller 11 when said roller 12^b is not driven by devices hereinafter described) for the desired period to enable the actions of the substances taken up by the fabric to be effected or carried out.

During these rotary motions the interior of the chamber is kept at the desired temperature and the steam which heats the liquor (or additional steam) may be employed for heating the interior of said parts to effect the results desired. When this process is completed the cover B is removed so that the coils of fabrics upon the roller 12^b together with said roller 12^b may be removed to continue their subsequent treatment in manner well known.

In cases where it has been found desirable that the "batch" or coils of fabrics 2^a after being wound upon the roller 12^b should be removed clear of the roller 11, and still have the necessary rotary motions transmitted to them, I mount the roller 12^b upon appropriate bearings 13^a and 13^b carried by lever arms 14, 14^a which I mount upon a cross shaft 15 which extends from the outside of the vat A sufficiently within same so that a gland 15^a may form its bearing at one end while a simple bearing 15^b may form its support at the other end.

One form of convenient mechanism for transmitting motion to the roller 12^b consists of sprocket wheels 16, 16^a, 16^b and 16^c, over which take chains 17 and 17^a, and these I arrange to be driven from the shaft 6^a of the roller 6 in such manner that the number of revolutions made by the wheel 16^c in any given time shall be fewer than the number of revolutions transmitted to the roller 12^b by the roller 11 when the largest diameter of coils 2^a are wound on said roller 12^b and this relative speed I make use of for the purposes hereinafter described.

The sprocket wheel 16 is fixed upon the shaft 6^a while the two sprocket wheels 16^a and 16^b revolve together loosely upon the shaft 15 which supports the lever arms 14, 14^a upon which the roller 12^b is mounted. The motion transmitted to the roller 12^b by the sprocket wheel 16^c is effected in a known manner by said wheel 16^c carrying ratchets which engage with the teeth of a ratchet wheel fixed upon the shaft 13^a; thus by the motion of the wheel 16^c being slower than the motion transmitted to the "batch" on the roller 12^b when the speed of the roller 12^b exceeds that of the ratchet wheel fixed upon the shaft 13^a the ratchets carried by the sprocket 16^c will slide freely over the teeth of the ratchet wheel within, whereas when the roller 12^b and its coils of fabric 2^a are raised clear of the roller 11 then the rotary motions of the sprocket wheel 16^c will be transmitted to the roller 12^b, because the ratchets will then engage with the teeth of the rachet wheel.

The means I employ for raising the roller 12^b and its "batch" 2^a from contact with the roller 11, consist of a lever 18 fixed upon the shaft 15 and arranged to reach so that its slotted end may take over extending pins 19^a from a sliding block 19 which will slide freely upon the vertical shaft or guide 20. Upon the upper end of the shaft 20 a screw 20^a is formed so that a hand wheel 21 having a screwed internal opening to mesh with the threads 20^a may be made to ascend and descend over said shaft 20 as will be understood. The hand wheel 21 has a sleeve 21^a which reaches into contact with the sliding block 19, so that as the hand wheel 21 moves over the screwed part 20^a the sliding block will be actuated as desired.

The shaft 20 is supported in bearings D upon which an index 22 may be formed so that the pointer 23 may indicate the diame-

ter or quantity of material wound upon the roller 12^b.

In this arrangement of mechanism when the attendant has observed that the end of the fabric has passed within the vat A he may then actuate the hand wheel 21 and raise the "batch" clear of the roller 11 as will be understood, and after that the rotary motions of the roller carrying the "batch" may be continued for the desired length of time.

Should it be found that the actions of the squeezing rollers 6 and 11 do not press out sufficient of the moisture from the fabric or material being treated, it is obvious that I may mount pressing rollers to act upon the roller 6 between the top of the liquor and the roller 11.

I have hereinbefore described my apparatus as having the cover part B simply placed on jointing material carried by the upper edges of the vat A yet I am aware that provided better joints than these are required where a pressure of steam or gases within the inclosed cover and inclosed part of the vat have to be used, and which would more readily escape through such joints than through the head of liquor above the lower edge of the division plate 13, then other forms of steam-tight joints may be made use of.

As is hereinbefore stated the apparatus I have described may be modified to meet any particular requirements that circumstances may necessitate, such as by arranging the driving mechanism for the squeezing rollers to be disengaged when the end of the fabric is reached in order that the roll of fabric may be moved for its driving gear to be coupled to separate driving mechanism. Or again, it may be possible for my said apparatus to be arranged to act automatically on the end of the fabric being reached in order to carry out the subsequent movements.

I have also discovered that for malting, bleaching, mordanting and otherwise treating certain classes of fabrics, or for stripping or de-coloring fabrics my said apparatus and process may be advantageously brought into use.

Such being the nature and object of my said invention, what I claim is:—

1. The method or process of subjecting fabrics or the like to the actions of dyeing or other liquids, consisting of passing said fabrics through the liquor by which they have to be treated, receiving the fabrics within a suitably prepared chamber or inclosed space out of and clear of the liquid by which they have been treated, and keeping the fabrics in a state of motion wholly therein to evenly diffuse the absorbed matter, substantially as herein specified.

2. The method or process of subjecting a fabric or the like to the actions of dyeing or other liquor consisting of passing said fabric or the like through said liquor, winding the whole batch of same on a roll in a suitable chamber out of and clear of the liquid by which it has been treated, and continuing the revolving of the entire mass when thus wound to evenly diffuse the absorbed matter, substantially as herein specified.

3. In carrying out the method or process of subjecting fabrics and the like to the actions of dyeing or other liquors a vat or vessel for containing said dyeing or other liquor, means for causing the fabric to be treated to pass through said liquor, a chamber or inclosed space, means on which said fabrics may be wrapped in said chamber out of and clear of the liquid by which said fabric has been treated, and means for affecting the temperature in said chamber.

4. In carrying out the method or process of subjecting fabrics and the like to the actions of dyeing or other liquors, a vat or vessel for containing said dyeing or other liquor, means for causing the fabrics to be treated to pass through said liquor, means whereby said fabric may be wound into coils, a chamber in which said fabrics are thus coiled out of and clear of the liquid by which they have been treated and means whereby said chamber may be maintained at a desired temperature, substantially as herein specified.

5. In carrying out the method or process of subjecting fabrics and the like to the actions of dyeing or other liquors a vat or vessel for containing said liquors, devices whereby said fabric may be caused to travel through liquor, means by which said fabric is wound upon a roll after same has passed through said liquor, a chamber within which said roll of fabric is wound out of and clear of the liquid by which said fabric has been treated, and means whereby the rotary motions of the roll may be continued when the roll is not acted upon by said fabric-winding means, substantially as herein specified.

6. In carrying out the method or process of subjecting fabrics and the like to the actions of dyeing or other liquors, a vat or vessel for containing said liquors, devices whereby said fabrics may be caused to travel through said liquor, means by which said fabric is wound upon a roll after same has passed through said liquor, a chamber within which said roll of fabric is wound out of and clear of the liquid by which said fabric has been treated, means whereby the rotary motions of the fabric-carrying roll may be continued after the roll has been moved out of contact with a roll-rotating member of said fabric-winding means and movable arms mounted upon a shaft for supporting said roll, substantially as herein specified.

7. In apparatus for carrying out the

method or process of subjecting fabrics and the like to the actions of dyeing or other liquors, as herein described, the employment of a fabric carrying roller mounted upon bearings so that it may rest upon a driving roller, and driving means through which motion may be transmitted to the first-said roller, upon which the coils of fabrics are wound, independently of the rotary motion transmitted thereto by the said driving roller, substantially as herein specified.

8. In apparatus for carrying out the method or process of subjecting fabrics and the like to the actions of dyeing or other liquors, as herein described, the employment of a roller mounted upon bearings so that it may rest upon a driving roller, lever arms for supporting said driven roller upon which the fabrics are wound, driving gear for transmitting motion to said roller, and screw and lever devices for moving said roller from contact with the driving roller, substantially as herein specified.

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

EDWARD JOHN WILKINSON.

Witnesses:

CHARLES JOHN ROSE,

SAMUEL HEY.

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