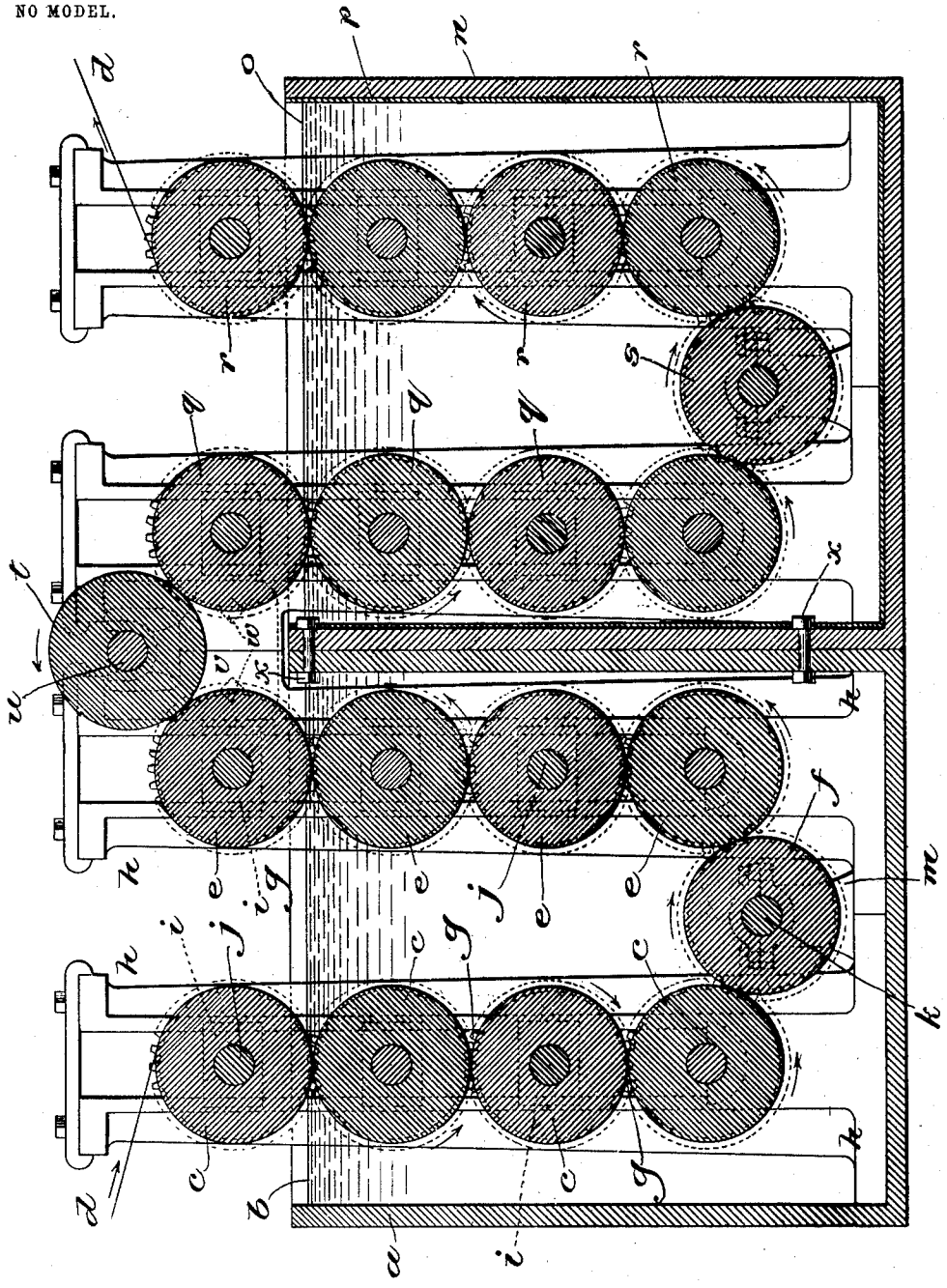
No. 737,374. PATENTED AUG. 25, 1903.

J. R. ECOB.

APPARATUS FOR USE IN MERCERIZING.

APPLICATION FILED APR. 17, 1899.

NO MODEL.



Witnesses.
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No. 737,374. Patented August 25, 1903.

UNITED STATES PATENT OFFICE.

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APPARATUS FOR USE IN MERCERIZING.

SPECIFICATION forming part of Letters Patent No. 737,374, dated August 25, 1903.

Application filed April 17, 1899. Serial No. 713,237. (No model.)

To all whom it may concern:

Be it known that I, JOHN ROBERTS ECOB, a subject of the Queen of Great Britain, residing at Lawrence, county of Essex, State of Massachusetts, have invented an Improvement in Apparatus for use in Mercerizing, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In the mercerization of fabrics, especially where a product of high luster is sought, great annoyance is experienced from the transverse shrinkage of the fabric and the consequent reduction in its marketable area. Attempts have been made to counteract this shrinkage by the use of tentering-machines; but these, unsatisfactory at best, have proved themselves particularly inadequate to the severe conditions of mercerization, and no suitable expedient has been advanced heretofore.

My present invention is directed toward the removal of this obstacle to the successful application of mercerization to fabrics, and in carrying it out I have adopted the novel principle of maintaining the material during the period of its liability to shrinkage in frictional contact throughout a substantial portion of its area with a suitable surface, and while thus in contact harmful contraction of the material is prevented. The process which I have invented for securing these ends is made the subject-matter of application Serial No. 6,669, filed on February 27, 1900, by me as a division of the present application in response to a requirement of the Patent Office. The said application describes in detail my process, and the present application relates to apparatus for carrying out the aforesaid process.

Use may be made of my method, above referred to, at any stage of mercerizing treatment, in which it may be utilized to advantage; but I consider that it is of greatest utility during the immersion of the material in alkaline solutions and until set, whether after neutralization by an acid or otherwise.

The surface with which the material is to be maintained in frictional contact may be of any suitable contour and presented by any suitable means; but I regard as preferable the use of rolls closely adjacent each other and immersed in the solution to treatment by which the material is being subjected. I prefer also to arrange these rolls in upright relation one above another to secure advantages of compactness and a desirable application of their weight to the material, and it will be found of considerable advantage to gear the rolls together and drive them positively; but a horizontal or other arrangement of such rolls and the use of means other than gravity to maintain them in proper relation to the material under treatment and each other would not be outside the scope of my invention.

A very high degree of efficiency may be obtained from an apparatus wherein the material is led to and fro between and in the most intimate peripheral contact with the respective members of a plurality of adjacent stacks of rolls, to the squeezing action of which the material is subjected preferably time after time while immersed in the fluid agent and preferably not released from the tenacious surfaces of the rolls throughout its period of immersion and until set or at such a stage that its contractile tendency shall have ceased to be harmful.

The various features of my invention will be illustrated and described fully in the accompanying drawing and specification and pointed out in the claims.

In the drawing the figure illustrates in vertical longitudinal section apparatus in the construction of which my improvements have been embodied.

To enable my invention of an apparatus for use in the art of mercerizing to be understood readily and thoroughly, I have selected for illustration, in connection with the following description, an apparatus constituting one convenient form of means by which my method above referred to may be carried into effect and which presents certain improvements of construction, to which reference will be made more at length hereinafter.

The reference-letter *a* designates a receptacle which may be of any suitable contour and material and in the instance illustrated takes the form of a rectangular tank, preferably of iron, when the fluid agent (indicated by the letter *b*) is to be an alkali, as caustic soda. The action of such a solution is pro-

ductive in very marked degree of the deleterious shrinkage, to the obviation of which my improvements are directed, and I have illustrated accordingly a construction adapted to yield an extraordinary resistance to the contractile tendency, leaving to the discretion of those skilled in the art the variation of construction proper to suit the exigencies of particular reagents and materials.

The surface in contact with which the material is to be maintained is presented in the instance illustrated by rolls *c*, which serve also to squeeze the material, being arranged in upright series to the number of four to suit the proportions of the tank illustrated and affording three regions of pressure upon the material *d* as it passes between adjacent rolls of the series. In passing from one such region to the next the material will hug the periphery of the roll which it is about to leave, and preferably the rolls used will approach in form with a considerable degree of nicety a true cylinder of unbroken continuity, although it will be understood that any surface which will prevent effectively deleterious shrinkage will fall within the scope of my invention. Where it is desirable to prolong the period of immersion in the fluid contained by the receptacle, an additional series may be provided, and in the instance illustrated this takes the form of another upright series composed of rolls *e*, and to effect the convenient transfer of the material *d* from one to the other of these series I have shown a roll *f* intermediate and preferably tangent through the material to the respectively lowest rolls *c e*, thus insuring perfect continuity in the treatment of the material, a feature which will be found of great advantage in many instances. The support and actuation of these rolls may be accomplished in any suitable manner, and as one convenient arrangement I have shown the rolls as geared each to its neighbor, as at *g*, and driven positively through the medium of the roll *f* from a suitable source of power. (Not shown.) Guide-frames or other suitable means *h* may be provided to maintain the rolls in upright relation, and bearing-blocks or the like *i* may be utilized for the journals *j* of the rolls, permitting, if desired, freedom of vertical movement, so that by gravity the respective members of each series will be maintained in tangency with neighboring rolls even down to the roll *f*, the axle *k* whereof may find its seat, if desired, in a stationary bearing *m*.

For the sake of illustrating the flexibility of my invention of an apparatus for use in the art of mercerizing *n* may be considered as a tank for acid *o*, with a protective cement lining *p* and stacks of rolls *q r*, which for the sake of convenience in illustration have been shown as similar in form and arrangement to those already described. When it is desired to maintain perfect continuity in contact of the material with neighboring roll-surfaces throughout its period of treatment, a roll *t* may be placed in position to coöperate with the uppermost rolls in the series *e* and *q*, respectively, and if thought wise it may have an axle *u*, journaled in bearings *v*, bolted, preferably, as at *w*, to the adjacent guide-frames and serving to prevent separation of the latter under the downward thrust of the roll *t*. Additional means to the same end may be provided, as the bolts *x*.

It will be readily apparent that mercerizing apparatus built upon the system above detailed is extremely flexible, inasmuch as variation may be had as desired in the number of receptacles, the number of stacks in a receptacle, and of rolls in a stack, so that from a single pair of rolls operating upon the material while it is immersed the series may be extended as desired and found suitable.

The resistance to the contractile tendency and the squeezing of the material will be found to result in a high degree of luster in the finished product with a minimum of attendance necessary, as will be easily understood from the close coöperation of the instrumentalities of the apparatus, few in number and lending themselves readily to strength of construction.

In the apparatus of this invention the frictional contact between the surface of the rolls or other suitable means and the material being mercerized serves alone to prevent shrinkage of the material induced by the powerful contractile influence of the mercerizing fluid, and yet this frictional contact is essentially of such a character that even the lightest and most distensible fabrics can be successfully mercerized without resultant harmful shrinkage.

Having thus fully disclosed my apparatus for use in the art of mercerizing, it will be understood that I do not limit myself to the exact means illustrated, nor with respect to the novel features of the apparatus to the exact materials, nor construction detailed, nor in general otherwise than as set forth in the claims.

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

1. Mercerizing apparatus; comprising a receptacle for a fluid used in one of the steps of mercerization; and means in said receptacle presenting below the region attained by the working level of said fluid a surface in frictional contact with which material being mercerized is maintained throughout its immersion to enable said material to resist contractile tendency.

2. Mercerizing apparatus; comprising a receptacle for a fluid used in one of the steps of mercerization; and means in said receptacle presenting below the region attained by the working level of said fluid a surface in frictional contact with which material being mercerized is maintained throughout its immersion to enable said material to resist contractile tendency; said means comprising a

series of tangent rolls, between which rolls, and around the peripheries whereof, said material may be led into and out of said fluid.

3. Mercerizing apparatus comprising a receptacle for a fluid used in one of the steps of mercerization, and a plurality of stacks of rolls between which rolls and around the peripheries thereof said material is led and maintained in continuous frictional contact from the point of entrance into said fluid up to the point of departure therefrom.

4. Mercerizing apparatus comprising a receptacle for a fluid used in one of the steps of mercerizing, a plurality of rolls in independent upright series, and an intermediate roll below, and connecting, said series.

5. Mercerizing apparatus comprising a receptacle for a fluid used in one of the steps of mercerization, and a plurality of stacks of rolls between which rolls and around the peripheries thereof said material is led and maintained in continuous frictional contact from the point of entrance into said fluid up to the point of departure therefrom, said rolls being geared together, and driven positively.

6. Mercerizing apparatus comprising a plurality of receptacles for fluids used in the steps of mercerizing, tangent rolls in series in said receptacles, said series being in tangent connection with each other to enable material to be led from one receptacle to another and be maintained in continuous contact with the peripheries of said rolls.

7. Mercerizing apparatus comprising a plurality of adjacent receptacles for fluids used in mercerizing, each receptacle having a double series of rolls with inferiorly-located connecting-rolls for the respective series, and a superior connecting-roll intermediate and coöperating with the uppermost rolls respectively of adjacent series in said respective tanks.

8. Mercerizing apparatus comprising a receptacle to contain mercerizing fluid, a series of tangent rolls, and means to actuate them to feed the material to be mercerized into, through and out from said receptacle, said rolls constituting a continuous support for said material in its travel through said receptacle, whereby the tendency of the material to contract in area is resisted.

9. A mercerizing apparatus including a trough to contain the mercerizing solution, and a series of cylindrical rolls with which a fabric may have continuous contact throughout the entire series, and constituting by themselves the only means for preventing shrinkage of the fabric.

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

JOHN ROBERTS ECOB.

Witnesses:
THOS. BEVINGTON,
HENRY TONGUE.