No. 739,580. PATENTED SEPT. 22, 1903.

R. BORAL & A. KYMER.

APPARATUS FOR MERCERIZING.

APPLICATION FILED AUG. 8, 1899.

NO MODEL.

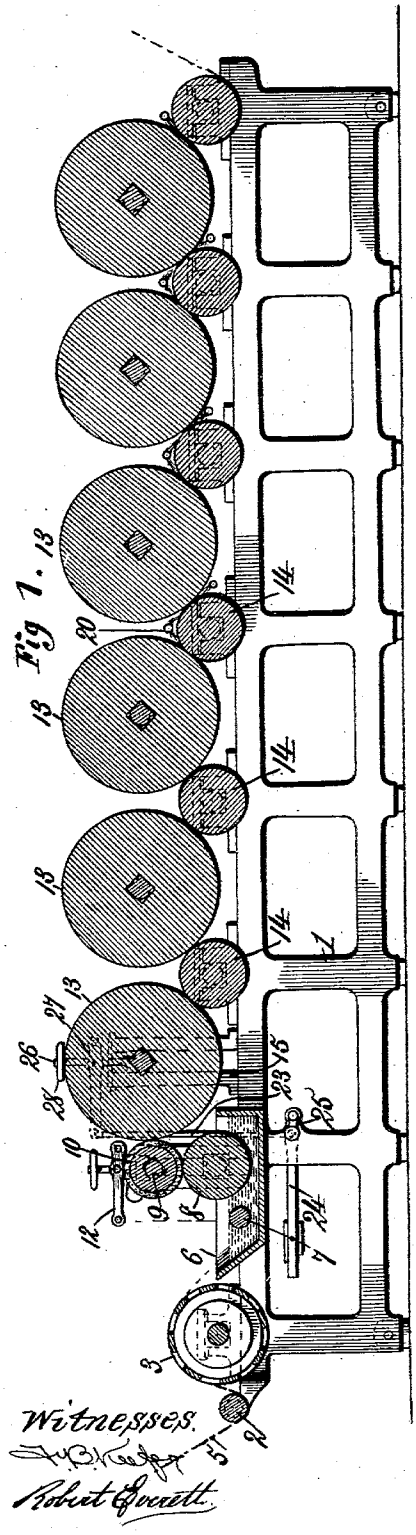


Fig. 1.

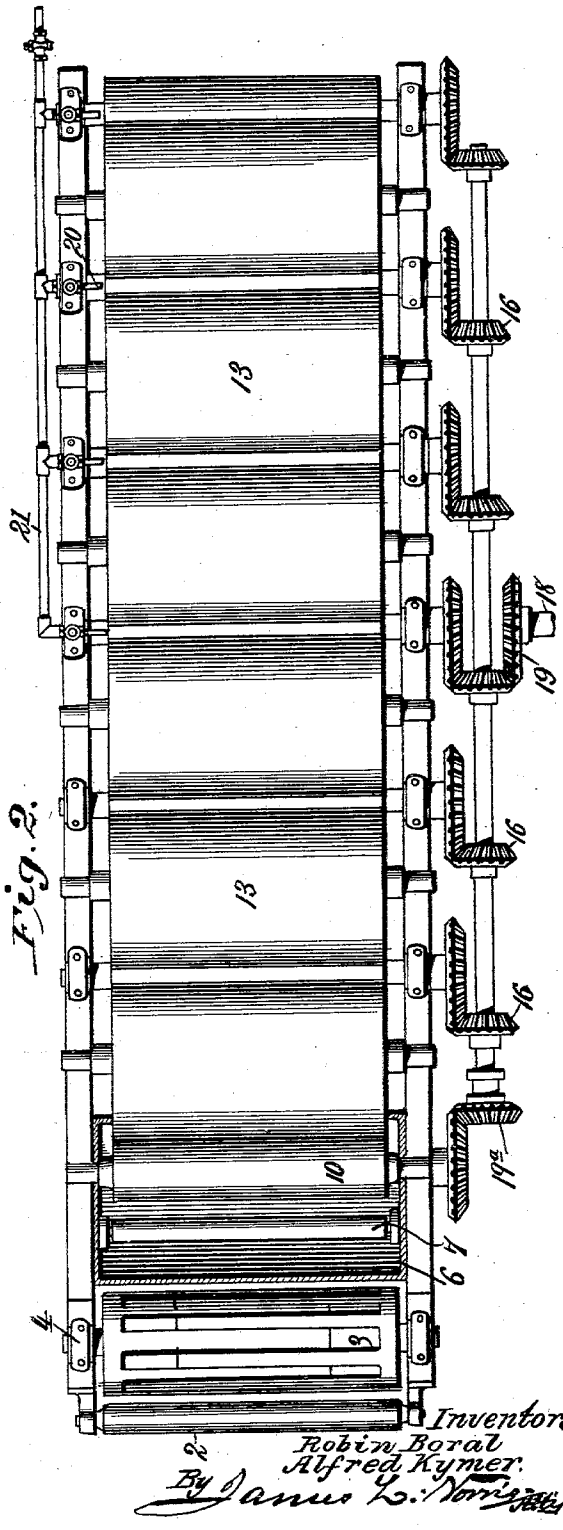


Fig. 2.

Witnesses.
Robert Gorrett.

Inventors
Robin Boral
Alfred Kymer.
By James L. Norris
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 739,580. Patented September 22, 1903.

UNITED STATES PATENT OFFICE.

ROBIN BORAL AND ALFRED KYMER, OF MIDDLETON, NEAR MANCHESTER, ENGLAND, ASSIGNORS TO THE WINDSOR COMPANY, OF NEW YORK, N. Y., A CORPORATION OF MASSACHUSETTS.

APPARATUS FOR MERCERIZING.

SPECIFICATION forming part of Letters Patent No. 739,580, dated September 22, 1903.

Application filed August 8, 1899. Serial No. 726,554. (No model.)

To all whom it may concern:

Be it known that we, ROBIN BORAL and ALFRED KYMER, both subjects of the Queen of Great Britain, residing at Rhodes Works, Middleton, near Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Mercerizing Textile Fabrics, of which the following is a specification.

This invention relates to an improved, simple, and economical machine for mercerizing textile fabrics; and it consists in features of construction and novel combination of devices in mercerizing mechanism, as hereinafter described and claimed.

Figure 1 is a vertical longitudinal section of a machine in which our invention is incorporated. Fig. 2 is a plan view of the complete mechanism.

The reference-numeral 1 in said drawings indicates the supporting-frame of the machine, upon one end of which is journaled a guide-roll 2, adjacent to but not in contact with an expander 3 of any suitable form, the function of the latter being to open or stretch the fabric that is to be treated to its full width. The expander is journaled in bearings 4 of any suitable construction.

The fabric, which is denoted in the drawings by the numeral 5, is led under the guide-roll 2 and over the expander, passing from the latter into a trough or tank 6, containing the solution with which the fabric is to be impregnated. To subject it to the action of the solution, it is caused to pass under a guide-roll 7, which is arranged in the trough below or partly below the surface of the solution. From the under side of said guide-roll the fabric passes upward and forward and between squeezing-rolls 8 and 9, arranged over and partly within said trough, the lower roll 8 being of a material, such as iron, which will properly resist the action of the solution, and the upper roll 9 being provided, preferably, with a surface covering of rubber, 10, or other suitable material. The lower roll 8 is driven positively by means presently to be described; but the upper roll 9 revolves by frictional contact only. To regulate this contact, we may provide levers 12, which are arranged to bear upon the journal-boxes of the upper roll, their pressure being regulated by weights or other suitable means. After passing between the squeezing-rolls 8 and 9 the fabric is carried over a cylinder 13 of comparatively large diameter and passes between said cylinder and a smaller cylindrical roll 14, then beneath the latter, and then over a second cylinder similar in all substantial respects to the cylinder 13 and denoted by a like reference-numeral. It then passes beneath a second cylindrical roll 14, over a third cylinder 13, beneath a third cylindrical roll 14, and so in like manner over a cylinder 13 and under a small cylindrical roll 14 alternately until it reaches the end of the series. The cylinders 13 may be made of iron or other metal faced with rubber, or they may simply be formed of wood or other suitable material. The cylindrical rolls 14 are preferably constructed of iron, but may be of other material.

The cylinders 13 are revolved by their frictional contact with the rolls 14, the journals of said cylinders being guided by open bearings 15, mounted on the framework 1. The rolls 14 are driven positively by bevel-gears 16, carried by a shaft 17, arranged at one side of the machine and operated by a driving-shaft 18, having a bevel-gear 19, that meshes with one of the bevel-gears 16. A bevel-gear 19^a on the shaft 17 meshes with and drives the lower squeezing-roll 8, as shown in Fig. 2. While passing over the latter part of the series of cylinders 13 and under the corresponding cylindrical rolls 14 the fabric is washed with clear water, for which purpose we arrange spraying-pipes 20 directly over certain of the rolls 14, said pipes having communication with a pipe 21, arranged alongside the machine and supplied with water from any suitable source and under whatever degree of pressure or head may be best adapted to the purpose in view. The spraying-pipes 20 are preferably provided with openings so formed as to direct the water upon the fabrics at or near the points where it passes between each cylindrical roll 14 and the two cylinders 13 adjacent to and in contact with said roll, as illustrated in Fig. 1.

The surface-pressure of the cylinder 13 upon the cylindrical rolls 14 is by preference regulated by levers 22, fulcrumed on the bearings 15, their ends being connected by rods 23 with weighted levers 24, fulcrumed on brackets 25 on the frame 1. The levers 22 are usually provided with some means for varying their pressure—such, for example, as screws 26, tapped through blocks mounted on pivots 27 and bearing on the boxes supporting the journals of the cylinders. Said screws are provided with hand-wheels 28 or other means, by which they may be operated. It should be noted, however, that these parts, as well as the gearing of the rolls 14 and the means for washing the fabrics, may be varied widely without departing from the invention.

The number of the cylinders 13 and cylindrical rolls 14 may also be increased or diminished, as circumstances may render desirable, and they may be varied in size, if desired.

The fabric is treated with a solution of caustic alkali or such other agent as may be suited for the purpose and for the particular kind of fabric to which it is to be applied, caustic soda being the substance usually employed. While mercerization of fabric in which this solution is employed imparts strength, gives a luster or gloss, and improves its appearance, it produces a great shrinking in the fabric, especially if the latter is spun or woven. It is our aim to prevent this shrinkage and at the same time largely reduce the time, labor, and expense of mercerizing the fabric. It will be observed that the fabric is stretched to its full width upon the expander 3 before it is subjected to the action of the solution in the trough 6. Immediately after coming in contact with said solution it is carried between the squeezing-rolls 8 and 9 and thence over the first cylinder 13, following thereafter the path already described. From the moment it comes upon the lower squeezing-roll 8 until it passes from beneath the last cylindrical roll 14 it never leaves the surface of said cylinders and rolls. At the point where the fabric leaves the last roll 14 the solution taken up or absorbed by the fabric has been so diluted by the washing process that it is incapable of producing any shrinkage. After contact with the solution the fabric is permitted to travel a suitable distance—as, for example, over one, two, or more cylinders 13 and cylindrical rolls 14—before the washing begins. It is then drenched repeatedly at regular intervals by water from the spraying-pipes, and by suitably varying the size or number of the latter the degree to which dilution of the alkaline fluid in the fabric is carried may be controlled with precision and uniformity. After passing beneath the last cylindrical roll 14 the fabric is taken away to receive further treatment, if desired.

By passing the fabric from the caustic solution directly to and continuously between a series of cylindrical surfaces that are in close frictional contact throughout the series and washing the cloth by spraying or otherwise toward the end of said series of cylindrical surfaces all shrinkage of the fabric is prevented, so that it does not need to be subsequently stretched or subjected to the action of the usual stentering devices. In this machine the cloth to be mercerized is not allowed to shrink at all, because it is always in close and continuous contact with the series of cylindrical surfaces provided by the large cylinders 13 and accompanying cylindrical rolls 14, and consequently the fabric does not have to be afterward stretched, as is required by the use of some other machines.

It is an important feature of this invention that instead of having to pass the cloth from the caustic solution onto more or less complicated mechanical devices designed to grasp the cloth and pull it out and retain it at about its original length and width we simply run the cloth directly onto large cylinders or drums in contact with smaller cylindrical rollers, whereby the cloth is held tightly by the hugging action of the drum or cylinder. In this machine the usual tendency of the cloth to shrink asserts itself in such manner as to become, in fact, an assistance in keeping the cloth stretched upon the cylinder instead of a serious matter to be guarded against, as in other machines, for by reason of the cloth hugging the drum or cylinder the more it tries to shrink the tighter it hugs the cylinder or drum, so that the very power exerted in any tendency to shrink is thus utilized to prevent the cloth from shrinking.

It will be observed that the elements described in the specification as cylinders and cylindrical rolls both constitute cylindrical rolls, the term "cylinder" being used for convenience to distinguish the larger from the smaller cylindrical rolls. We wish it understood, however, that our invention and the following clauses of claim are not restricted to a machine in which large and small cylindrical rolls are employed, having simply described in the specification and shown in the drawings the best-known embodiment of our said invention.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a machine for mercerizing fabric, the combination with a trough for containing the impregnating solution, of a series of cylindrical rolls with which a fabric may have continuous surface contact throughout the series, and a washing device arranged over one or more of said cylindrical surfaces at the end of the series.

2. In a machine for mercerizing fabric, the combination with a trough for containing the impregnating solution, and squeezing-rolls to act on the fabric immediately after contact with the solution, of a series of cylindrical rolls with which a fabric may have continuous surface contact throughout the series

and to the first of which the fabric passes direct from the squeezing-rolls, and a washing device arranged over one or more of said cylindrical surfaces at the end of the series.

3. In a machine for mercerizing fabric, the combination of a trough for the impregnating solution, a guide-roll in said trough, an expander on one side of the guide-roll, a pair of squeezing-rolls on the other side of the guide-roll, a series of cylindrical rolls with which a fabric may have continuous surface contact throughout the series and over the first of which the fabric passes directly from the squeezing-rolls, and a series of water-spraying pipes arranged over a number of said cylindrical rolls close to the end of the series.

4. In a machine for mercerizing fabric, the combination of a trough for the impregnating solution, a guide-roll in said trough, an expander on one side and squeezing-rolls on the other side of said guide-roll, a series of cylindrical rolls with which the fabric may have continuous surface contact throughout the series, means for positively driving the said cylinders, and spraying-pipes arranged at intervals toward the end of the series to discharge upon the traveling fabric as it passes between said rolls, substantially as described.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

ROBIN BORAL.
ALFRED KYMER.

Witnesses:
CHAS. J. COOPER,
HERBERT R. ABBEY.