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L. A. STEAD

METHOD OF MERCERIZING YARNS

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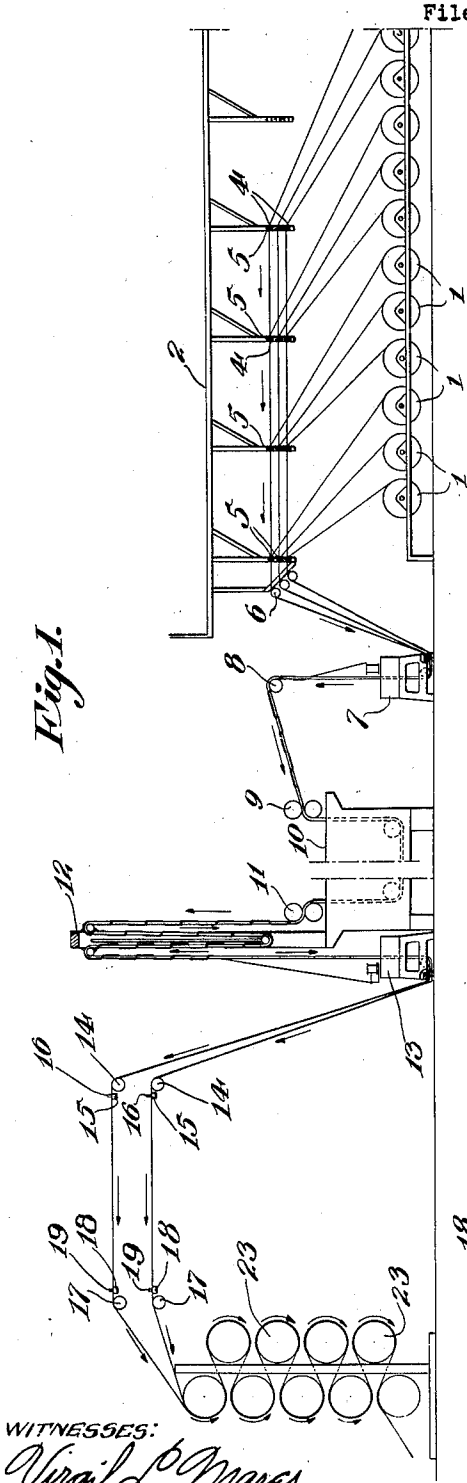


Fig. 1.

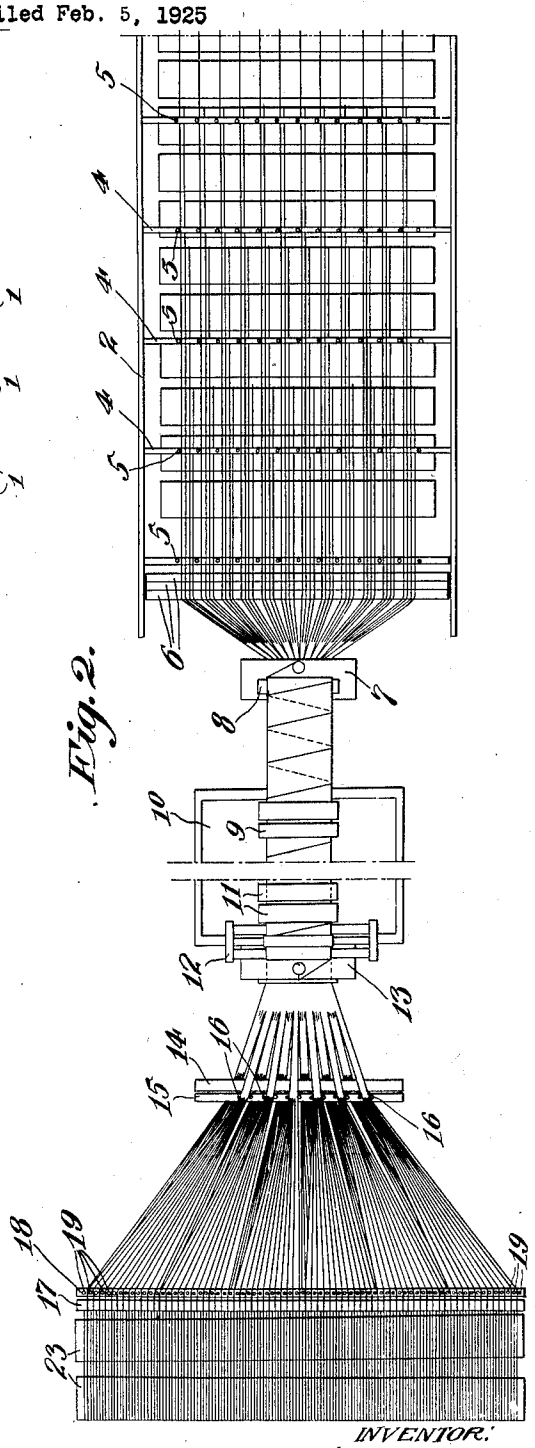


Fig. 2.

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UNITED STATES PATENT OFFICE.

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METHOD OF MERCERIZING YARNS.

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To all whom it may concern:

Be it known that I, LAWRENCE A. STEAD, a citizen of the United States, residing at Chester, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Methods of Mercerizing Yarns, of which the following is a specification.

My invention relates to mercerizing methods. The usual method is to group strands of yarn into continuous rolls, of rope form, commonly known as warp-chains, bind each group, pass the groups through the mercerizing vats, dry and bale the groups, unbind and bale the groups, then separate the strands of each group. The process is not unitary. The grouping, binding, mercerizing and drying mechanism are associated, but the unbinding, separating and baling units are distinct from the mercerizing group and from each other and the nature of the mechanism usually employed precludes close association. In practice the mercerizing, unbinding, separating and baling are distinct departments and sufficiently remote from each other to require transportation between the mercerizing and unbinding departments and the unbinding and separating departments, and any handling of the yarns under treatment is detrimental. The baling requires considerable mechanism and each baling machine occupies considerable space. A group includes 12 strands and the groups are bound in rope form. A binding unit and an unbinding machine is required for each group. If the grouping mechanism handles 12 groups, 12 binding units and 12 unbinding machines are required. If the grouping machine is to handle 24 groups, 24 binding units and 24 unbinding machines are required etc. The binding units and the unbinding machines also occupy much space. In the rope-formed groups the strands are too closely associated as they go through the mercerizing solutions, the difficulty in separating them is such as to require constant attention of an operator, and many of the yarns are strained and weakened by the separating step.

The object of my invention is to provide a method of mercerizing in which the several steps succeed each other consecutively and the yarns require no handling from the time they enter the grouping unit until they leave the separating unit as finished goods; a method whereby the strands will be grouped in sheet form and pass through the mercerizing vat in that form; a method which requires a single binding unit and a single unbinding unit for all the groups instead of a separate unit or machine for each group; a method in which the separation of the strands may be effected without injury to the yarns, a method which dispenses with baling except for the finished yarn, and a method which will produce a better and more uniform quality of goods than the method heretofore employed.

The mechanical steps of my method may be effected by various mechanisms but I have illustrated diagrammatically one form of mechanism adapted for that purpose in the accompanying drawing in which—

Figure 1 is a side elevation of the mechanism, and

Figure 2 a top plan view of the same.

The mechanism shown is adapted for handing 12 groups of strands but the number may be varied indefinitely.

The plan of operation involves grouping the strands so that they will enter the mercerizing process along side each other in single ply instead of grouping them in rope form, binding the strands in a single flat sheet, passing this sheet through the mercerizing vat, removing the binder thread, and separating the strands.

In the drawing, 1 indicates a series of reels, 12 in number, each wound with strands of yarns, 2 a suitable frame supporting a series of horizontal guide bars 4, each having a series of vertical guide pins 5 which keep groups of strands separate from each other, 6 rollers over which the groups pass from the horizontal guide bars to binding machine 7 which brings the groups together in sheet form and binds the sheet with a single binder thread, 8 a roll over which the sheet is led from the binding machine, 9 rolls through which the sheet passes to the mercerizing unit 10, 11 rolls through which the sheet passes as it comes from the mercerizing unit, and from which it passes through a tension device 12 to an unbinding machine 13, which removes the binder thread, and from which they pass to separating mecha-

nism. The group separating mechanism consists of a pair of rollers 14 and a pair of horizontal bars 15, each bar having a series of vertical guide pins 16 between which the groups pass. Alternate groups are led over the under roller and the upper roller and passed between the guide pins 16 thereby spacing the groups from each other. From the group separating mechanism the separated groups pass to strand separating mechanism which consists of a pair of rollers 17 and a pair of horizontal bars 18 having a series of vertical guide pins 19 between which the strands pass onto the rollers. From these rollers the separated strands pass to a series of drying drums 23 from which they pass as the finished product.

As shown, a group consists of 12 strands and there are 12 groups or 144 strands, hence the requirement of 73 guide pins in the strand separating mechanism.

The strands pass from the primary grouping mechanism in 3 superposed groups of 4 strands each of which are joined as they pass into the binding mechanism to form one group of 12 parallel strands.

By grouping the strands in sheet form as distinguished from rope or chain form, there is less coherence between the strands and the yarns, the strands are separated with less difficulty and less detriment to the yarns, the groups are more uniformly mercerized and the output is more uniform and of better quality. By use of my method, as compared with the old method, 2 baling steps are eliminated, the process is unitary from start to finish instead of consisting of a number of disassociated proceedings, and there is a large saving in space, time, labor, cost of machinery and consequently in cost of production.

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

1. A method of mercerizing yarn consisting in grouping strands of yarn side by side in sheet form and passing the sheets through the mercerizing unit.

2. A method of mercerizing yarn consisting in grouping strands of yarn side by side in sheet form, binding the strands in a single sheet, and passing the sheet through the mercerizing unit.

3. A method of mercerizing yarn consisting in grouping strands of yarn side by side in sheet form, binding the strands in a single sheet, passing the sheet through the mercerizing unit, and removing the binder.

4. A method of mercerizing yarn consisting in grouping strands of yarn side by side in sheet form, binding a series of groups into a single sheet, passing the sheet through the mercerizing unit, removing the binder, and separating the groups.

5. A method of mercerizing yarn consisting in grouping strands of yarn side by side in sheet form, binding a series of groups into a single sheet, passing the sheet through the mercerizing unit, removing the binder, separating the groups, and separating the strands.

6. A method of mercerizing yarn consisting in grouping strands of yarn side by side in sheet form, binding a series of groups into a single sheet, passing the sheet through the mercerizing unit, removing the binder, separating the groups, separating the strands, and drying the strands.

In testimony whereof I have signed my name to this specification.

LAWRENCE A. STEAD.