

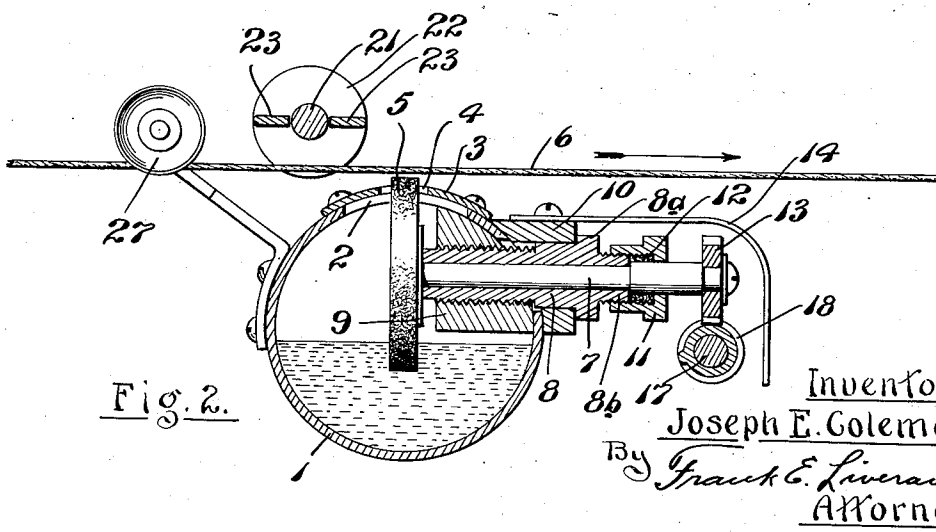
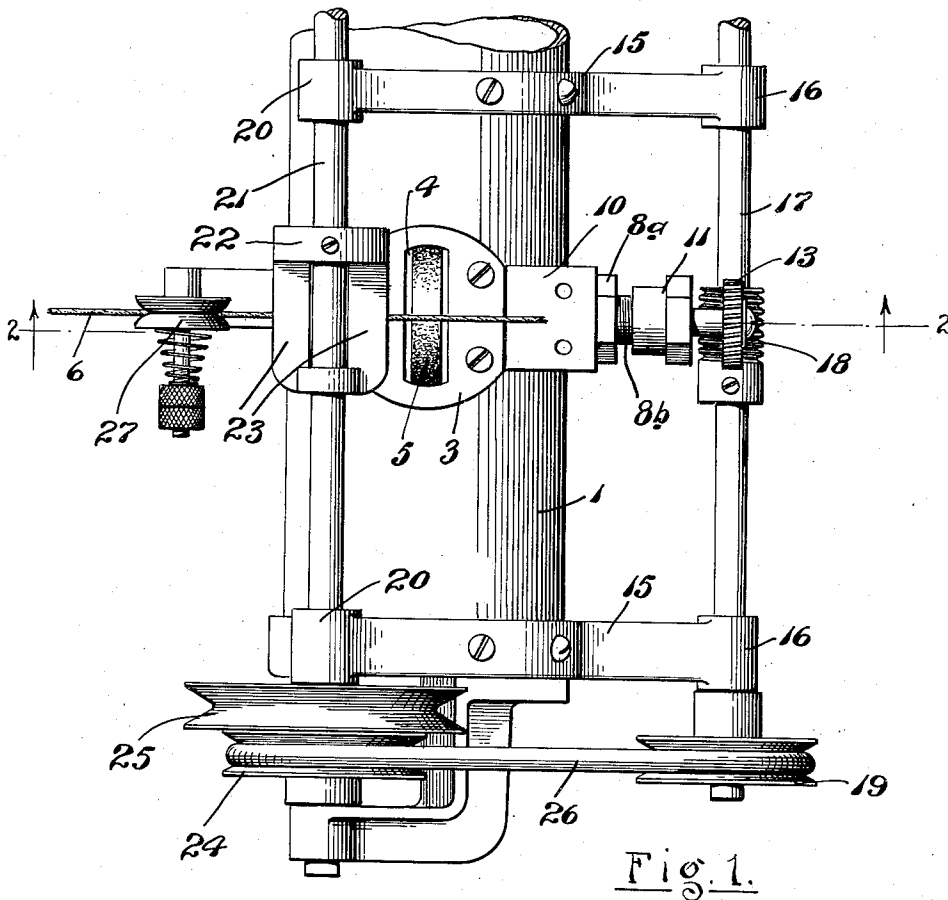
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J. E. COLEMAN

YARN DYEING MACHINE

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UNITED STATES PATENT OFFICE.

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YARN-DYEING MACHINE.

Application filed August 27, 1923. Serial No. 659,484.

To all whom it may concern:

Be it known that I, JOSEPH E. COLEMAN, a citizen of the United States of America, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Yarn-Dyeing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improvement in winding and dyeing machines of the character shown in the United States patent to Ainsworth, No. 1,348,974, issued Aug. 10, 1920. In machines of this character, a long tubular reservoir or holder for dye is used in which at spaced apart intervals openings are made in the upper side, and a rotatably mounted and dye absorbing member is used at each of said openings, to extend at its lower edge into the dye in the reservoir and at its upper edge to pass through the opening above the upper side of the reservoir. This reservoir and members therein in practice is mounted at a side of a yarn winding machine such as is used in knitting mills to wind the yarn onto proper bobbins for use with the knitting machines. One of the dye absorbing members is mounted in the reservoir for each bobbin wound and as the yarn passes to the bobbin it is guided to move over the dye absorbing member and mechanism is provided for periodically moving the yarn into contact engagement with said member as it moves past the member, making a wiping contact during the time the yarn and member are in engagement, the yarn being in this manner intermittently or random dyed.

The present invention is directed to a novel method of continuously driving the dye absorbing members so as to continuously change their position and is an improvement over the earlier construction shown in the Ainsworth patent above noted. With my invention, the driving mechanism is located entirely outside of the dye holding reservoir, there are no gears or other mechanical parts in the reservoir and no liability of the yarn or thread which is being dyed getting caught in gears or other parts of the machine, as has happened when the yarn has broken and an end been drawn into the res-

ervoir by the rotating dye absorbing member, being carried thereby to moving mechanical parts and winding therearound with a resultant clogging of the mechanism and necessitating stopping the entire winding machine for cleaning and repairing the parts stopped.

My invention obviates these disadvantages and in addition the driving parts are all outside of the dye holding reservoir making the same easy of access for repair or replacement. Various other advantages will appear as understanding of the invention is had from the following description taken in connection with the accompanying drawing in which,

Fig. 1 is a fragmentary plan view showing one end of the dye holding reservoir and one of the devices mounted therein for dyeing yarn at intervals in the length thereof, and

Fig. 2 is a vertical transverse section taken substantially on the plane of line 2-2, of Fig. 1.

Like reference characters refer to like parts in the different figures of the drawing.

The dye holding reservoir is an elongated tube 1 of a length substantially equal to the length of the winding machine with which it is used and in the upper side thereof openings 2 are made at spaced apart intervals corresponding to the number of bobbins that the machine can wind on a side of the machine. But one of the openings is shown, as all others are duplicates, as well as the mechanisms used for driving the dye absorbing members. The ends of the tube are closed and the tube is partly filled with a dyeing composition. Over the opening 2 a plate 3 is placed and permanently secured by screws, in which plate a slot 4 is cut paralleling the length of the reservoir tube 1. The dye absorbing member 5 is a disk around which a length of felt or other absorbent fabric is secured, the lower edge portion extending into the dye, and at its upper edge passing through the slot 4 and slightly above the upper surface of the plate 3. The yarn 6 is designed to pass over the said member 5 and normally pass above it and out of contact engagement therewith.

The dye absorbing member 5 is fixed at the inner end of a shaft 7 which passes through a sleeve member 8, the inner portion of

which is threaded through a block 9 located inside of the tube 1 and shaped at one side to conform to the inner walls of the tube. The sleeve 8 has an annular collar 8^a thereon between which and the outside of the tube a second block 10 is located, it at its inner end being shaped to fit against the outer side of the tube, it being evident that when the sleeve 8 is threaded through the block 9 and shoulder 8^a brought against the block 10, the parts are securely attached together. The outer end of the sleeve member 8 is reduced in size and threaded making a stem 8^b on to which a cap 11 is threaded with packing 12 around the shaft between the cap and the stem 8^b, thereby making a stuffing box which prevents any seepage of dye out along the shaft 7. At the outer end of the shaft 7 a small worm wheel 13 is secured, as shown. A guard plate 14 of sheet metal is attached at one end to the block 10, extends out horizontally over the wheel 13 and is then bent downwardly so as to cover the wheel and the worm which drives the same as will be later described.

Brackets 15 are secured at spaced apart intervals in the length of the tube 1 and at the ends thereof having arms extending outwardly from the tube in the ends of which bearings 16 are formed. A shaft 17 is mounted for rotation in said bearings and is located parallel to the tube 1. A worm 18 is fastened to the shaft under each worm wheel 13, meshing with and driving the same. All of the worms 18 are operated at the same time as all are attached to the shaft 17 and all of the members 5 are simultaneously and equally driven.

At one end of the shaft 17 a pulley 19 is secured. Each of the brackets 15 at its end opposite where the bearing 16 is located is formed with a second bearing 20 located above the tube 1, through which bearings a second shaft 21 passes for rotatable mounting. At a number of places in the length of the shaft 21 devices for depressing the yarn 6 are located, each device including a collar 22 from which wings 23 extend in parallel relation to the shaft 21, as shown. At one end of the shaft 21 two pulleys 24 and 25 are secured and an endless belt 26 passes around the pulley 24 and the pulley 19 on the shaft 17. Shaft 21 may be driven by a belt from any suitable source of power or from any suitable driven wheel in the winding machine passing over the pulley 25.

The yarn normally passing in a substantially horizontal line over the member 5 and under the wings 23 is maintained at a desired tension by any suitable tension device as shown at 27 in Fig. 1. The rotation of the shaft 21 causes the collar 22 and wings 23 thereon to turn and the wings periodically come against the yarn 6 and depress the same so that it is brought against the dye soaked

exterior of the member 5, wiping across the same and taking up dye during its time of contact. The yarn is thus intermittently dyed or random dyed, as it is known. If the member 5 remained stationary, the yarn in a short time would cut through the fabric and it is to obviate this that the member 5 is turned. The shaft 17 being rotated continuously turns the shaft 7 at low speed so that there is a continuous change of position of the part against which the yarn comes when it is depressed.

The construction described is simple but very practical. The driving mechanism for the members 5 is wholly outside of the tube 1 and easy of access for inspection, repair or replacement. There is no danger of a broken end of the yarn being caught on and fouled with mechanism inside of the reservoir tube with a consequent stopping of the entire machine until the one unit is cleared again. The invention is exceptionally valuable in eliminating sources of possible delay in the operation of the machine. While I have shown one dyeing unit only, it is evident that a large number may be placed in the length of the tube, winding machines many times having from twenty to forty bobbins or "ends," as they are known on a side. The appended claims define the invention and it is to be considered as comprehending all forms of structure coming within their scope.

I claim:

1. In a device of the class described, a horizontally located tubular reservoir formed at its upper side with a slot paralleling the length of the reservoir, a member having a liquid absorbent face located in the reservoir with its upper portion projecting through the slot, means for mounting said member for rotation about an axis perpendicular to the axis of the reservoir, and means for driving said member from outside of the reservoir including a shaft located outside of the reservoir and gearing connections located outside the reservoir between the shaft and said member.

2. In a device of the character described, a horizontally located tubular reservoir having an elongated slot in its upper side paralleling the length of the reservoir, a disk provided with a liquid absorbent edge portion located in the reservoir with the upper portion thereof projecting through the slot, a shaft to which the disk is connected extending through a side of the reservoir, a block provided with an interiorly threaded opening therethrough located on the inside of the reservoir, a threaded sleeve passing through the block and through which the shaft passes, a second block on the outside of the reservoir through which the sleeve freely passes, said sleeve having a collar to press the second block against the reservoir,

and means for driving the shaft at the outer end thereof, substantially as described.

3. In a device of the character described, a horizontally located tubular reservoir, an opening in the upper side thereof, a disk provided with a liquid absorbent edge portion located in the reservoir with the upper portion thereof projecting through said opening, a shaft to which the disk is attached at the inner end thereof, said shaft extending through a side of the reservoir, means for mounting the shaft for rotation, a worm gear on the outer end of the shaft, a second shaft paralleling the reservoir, a worm thereon in mesh with the worm gear, and means for continuously driving said second shaft, substantially as described.

4. In a device of the character described, a horizontally located tubular reservoir having an opening in the upper side thereof, a disk provided with a liquid absorbent edge portion located in the reservoir with the upper portion thereof projecting through the opening, a shaft passing through a side of the reservoir and having its axis perpendicular to the axis of the reservoir on the inner end of which the disk is secured, and means engaging with the outer end of the shaft

to drive the same continuously, substantially as described.

5. In a device of the character described, a horizontally located tubular reservoir having an elongated slot in its upper side paralleling the length of the reservoir, a disk provided with a liquid absorbent edge portion located in the reservoir with the upper portion thereof projecting through the slot, a shaft to which the disk is connected extending through a side of the reservoir, a block formed with an interiorly threaded opening therethrough located on the inner side of the reservoir, a threaded sleeve passing through the block and through which said shaft passes, a second block on the outside of the reservoir through which said sleeve freely passes, said sleeve having a collar to press the second block against the reservoir, a gear on the outer end of the shaft, a second shaft paralleling the reservoir, and a gear on the shaft in mesh with and driving the gear on the first shaft, substantially as described.

In testimony whereof I affix my signature.

JOSEPH E. COLEMAN.