March 25, 1924. 1,488,299

G. T. THOMAYER

YARN DYEING DEVICE

Filed Feb. 15, 1923

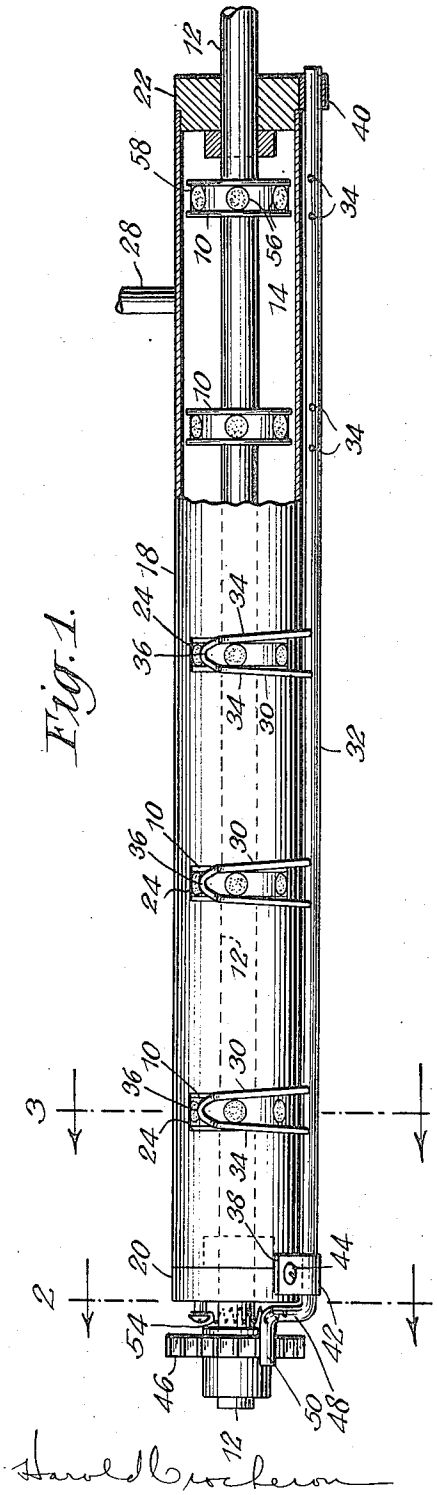


Fig. 1.

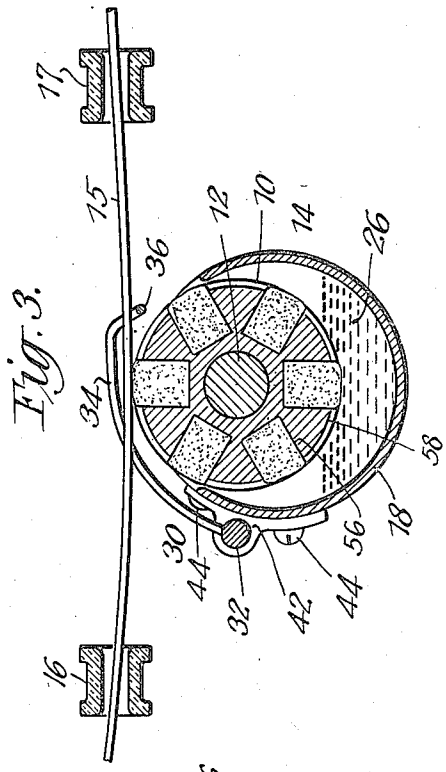


Fig. 3.

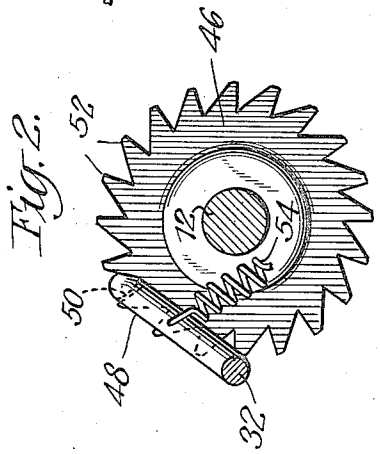


Fig. 2.

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UNITED STATES PATENT OFFICE.

GEORGE T. THOMAYER, OF ALBANY, NEW YORK, ASSIGNOR TO FULD AND HATCH KNITTING COMPANY, A CORPORATION OF NEW YORK.

YARN-DYEING DEVICE.

Application filed February 15, 1923. Serial No. 619,097.

To all whom it may concern:

Be it known that I, GEORGE T. THOMAYER, a citizen of the United States, and a resident of Albany, county of Albany, State of New York, have invented certain new and useful Improvements in Yarn-Dyeing Devices, of which the following is a specification.

This invention relates to a dyeing machine and, more particularly to apparatus for bringing yarn into and out of contact with a dye applying medium at rapid intervals, while being wound in a winding machine such, for example, as that shown in the patent to Huse No. 348,561, dated September 7th, 1886, or in dyeing and winding machines such as those disclosed in my copending application Serial No. 591,475, filed September 30th, 1922, or in winding or spinning machines of other types in which the yarn may pass either at a uniform or at a varying rate of speed.

An object of the invention is to provide a simple and unitary device by which yarn may be vibrated into and out of contact with a dye applying means.

Another object of the invention is to provide a dyeing device in which a yarn vibrating device is driven from the driving means for dye applying wheels.

A further object of the invention is to provide a vibrating mechanism for bringing the passing yarn into and out of contact with the dye applying wheel which is not liable to get out of order and which may be quickly and easily taken apart for repairs or the replacement of parts.

With these and other objects in view, the invention comprises the apparatus described and set forth in the following specification and claims.

The various features of the invention are illustrated in the accompanying drawings in which;

Fig. 1 is a top plan view of a dyeing tank and vibrating mechanism embodying a preferred form of the invention, structure partly broken away.

Fig. 2 is a view of the apparatus taken on line 2—2 of Fig. 1, and

Fig. 3 is a vertical section of the apparatus taken on line 3—3 of Fig. 1 showing the position of the yarn in taking up dye from the dye wheel, the position of the yarn being exaggerated.

In the present invention a film of dye liquor is carried on the periphery of a rotating disc or wheel from a body of the liquor in which the wheel dips to a position in which the passing yarn touches the wetted disc and absorbs or soaks up the film of liquor. The yarn is vibrated to and from the discs by means of guide fingers mounted on a rock shaft which is rapidly rocked to cause the fingers to strike the yarn in a rapid succession of impulses adjacent the dye applying wheels. The rock shaft may be given a suitable rocking motion by means of an arm rigidly mounted on the rock shaft and resiliently pressed against a toothed wheel rigidly mounted on and rotated with the dye wheel shaft in such a manner as to be struck a succession of rapid blows by the revolving teeth.

Referring, more particularly to the accompanying drawings, a number of dye applying wheels 10 are mounted in spaced relation on a shaft 12 within a dye tank 14 and the threads of yarn 15 to be dyed are passed through guides 16 and 17 in position to lightly touch the upper surface of the wheels or discs. The tank 14 is preferably formed of a length of pipe 18 positioned horizontally, having its ends closed by plates 20 and 22 through which the ends of the shaft 12 project, and is provided in the upper portion of its periphery with suitably spaced slots 24 through which the upper portions of the dye applying discs or wheels project. A body of dye liquor 26 is maintained in the lower portion of the tank at a level sufficient to wet the edges of the discs 10, the dye carried on the wheels to the yarn being continually replaced by dye liquor supplied through a supply pipe 28. The dye liquor is thus nearly enclosed in the tank thereby avoiding an excessive evaporation loss of the liquor. The shaft 12 is driven preferably in such a direction that the upper portions of the dye applying wheels or discs travel in the same direction as the yarn and the wheels may be rotated either at a constant or variable speed relatively to the yarn. Any suitable driving means may be provided for the shaft 12.

As the yarn passes over the wheel 10 it is vibrated up and down in such a position as to alternately touch and soak up dye liquor and to pass above the wheel out of contact with the dye liquor to form a succession of dyed and undyed lengths of yarn. The de-

sired vibrator motion is provided by means of fingers 30, one over each wheel 10, which are mounted on a single rock shaft 32 to strike the yarn upwardly at frequent intervals and permit it to fall into contact with the wheels 10. The fingers may be formed of wire bent to provide a pair of supporting arms 34 soldered or otherwise mounted on the shaft 32 at one end and a depressed connecting portion 36 through which the yarn 16 passes. The shaft may be mounted on the tank 14 by means of straps 38 and 40 bent to form suitable bearings 42 and removably mounted on the tank 16 by means of screws 44.

The rock shaft 32 is driven from the dye wheel shaft 12 by means of a transmission mechanism for transforming rotary motion into oscillatory or reciprocatory motion. To this end a toothed or ratchet wheel 46 is rigidly mounted on the shaft 12 to rotate with the dye wheels 10 and the rock shaft 32 is provided with a ratchet arm 48 rigidly mounted thereon and provided with a projecting member 50 adapted to lie in the path of the teeth 52 of the wheel 46. The ratchet arm 48 is drawn toward the teeth 52 by means of a spring 54 attached at one end to the crank arm and at the other end to the end plate 20 of the tank 14. The edges of the teeth 52 against which the member 50 bears are sloped so as to raise the member and rock the shaft 32 as the wheel 46 rotates and, as the member 50 clears the edges of the teeth, the spring 54 draws the crank arm and rock shaft back to its original position against the succeeding tooth to be again rocked. In this manner a rapid rocking motion is imparted to the shaft 32 and a corresponding rapid vibratory motion imparted to the yarn 16 through the fingers 30.

The length of the dyed and undyed sections of yarn is determined by the number of teeth on the wheel 46 and the speed of rotation of the dye wheel shaft 12. The dye applying wheel and the vibrating mechanism may be driven at any desired speed relative to the passing yarn by a corresponding adjustment of the speed at which the shaft 12 is driven.

Any suitable type of dye applying wheel or disc may be employed. The type of wheel illustrated in the drawings is preferred to provide a film of dye liquor which may be readily taken up by the yarn without abrading the surface of the yarn. This wheel is constructed of a solid disc of metal having radial holes 56 in which are positioned wads of felt or other fibrous material for holding a supply of dye liquor. A groove 58 is preferably formed on the periphery of the wheel in which the yarn 15 passes as it touches the wheel.

Through the above device the yarn passing over the dye applying wheels is given a vertical vibratory motion to lightly touch and absorb the dye liquor without the necessity of a rubbing or wiping action against the dye applying wheel while absorbing the dye. All of the vibrating mechanism is outside of the dye tank in position where it is readily accessible for adjustment or repair. The entire mechanism may be driven from a single driving mechanism.

As changes of construction could be made within the scope of my invention, it is intended that all matter contained in the above description or shown in the accompanying drawings be interpreted as illustrative and not in a limiting sense.

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

1. A device of the type described which comprises, a dye tank, a shaft extending through said tank, dye applying wheels on said shaft, a toothed wheel on said shaft, a rock shaft mounted on the outer surface of said tank, yarn guiding fingers extending from said rock shaft over said dye applying wheels and a ratchet arm on said rock shaft bearing against and vibrated by the teeth of said toothed wheel.

2. A device of the type described which comprises, a dye tank, a shaft extending through said tank, dye applying wheels mounted on said shaft, a rock shaft extending lengthwise of said tank and dye wheel shaft, fingers mounted on said rock shaft to guide yarn over said dye wheels and means driven by said dye wheels and means driven by said dye wheel shaft for rocking said rock shaft.

3. A device of the type described which comprises a dye tank, a shaft extending longitudinally through said tank, dye applying wheels mounted at spaced distances on said shaft, a rock shaft extending longitudinally of said dye wheel shaft outside of said tank, a toothed wheel on said dye wheel shaft, yarn guide fingers on said rock shaft to guide yarn over said dye applying wheels, and means on said rock shaft bearing against said toothed wheel to give said rock shaft a rocking motion as said dye wheel shaft is rotated.

4. A device of the type described which comprises a tubular dye tank having slots in its upper periphery, a shaft mounted longitudinally in said tank and extending through the end walls thereof, dye applying wheels mounted on said shaft at spaces to project through said slots, a rock shaft mounted longitudinally of and outside of said tank, yarn guiding fingers mounted on said rock shaft and extending over said slots, and means driven from said dye wheel shaft for imparting a rocking motion to said rock shaft.

5. A device of the type described which

comprises, a horizontal tubular dye tank having slots in the upper portion of its wall, a shaft mounted longitudinally in said tank and projecting through the end walls thereof, dye applying wheels mounted on said shaft at spaced intervals to project through said slots, a rock shaft mounted longitudinally of, and outside of, said tank, yarn guiding fingers mounted on said rock shaft and extending over said dye wheels, a toothed wheel on the projecting portion of said dye wheel shaft and a rocker arm on said rock shaft bearing against the teeth of said toothed wheel.

6. A device of the type described which comprises a horizontal tubular dye tank having slots spaced in its upper wall, a shaft mounted longitudinally in said tank and projecting through the end walls thereof, dye applying wheels mounted on said shaft at spaced intervals to project upwardly through said slots, a rock shaft mounted longitudinally of and outside of said tank, a toothed wheel mounted on the projecting portion of said dye wheel shaft, a rocker arm mounted on said rock shaft and bearing against the teeth of said wheel, and yarn guiding fingers mounted on said rock shaft and extending over said dye wheels, said fingers being formed of wire having its ends mounted in said rock shaft, portions extending substantially radially outward at each side of the dye wheel and a downwardly bent connecting portion connecting the outer ends of said extending portions.

7. A device of the type described which comprises a dye tank, a shaft mounted in said tank, dye applying wheels mounted at spaced intervals in said tank, a rock shaft mounted outside of said tank, yarn guiding fingers mounted on said rock shaft, and means outside of said tank driven by said dye wheel shaft for giving said rock shaft a rocking movement.

Signed this 9th day of February, 1923.

GEORGE T. THOMAYER.