Feb. 24, 1931. M. SCHOENFELD 1,793,562

METHOD OF AND APPARATUS FOR FLUID TREATMENT OF TEXTILE THREADS

Filed Dec. 13, 1927

Fig. 1.

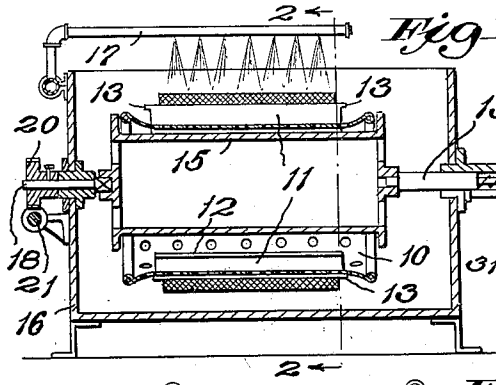


Fig. 8.

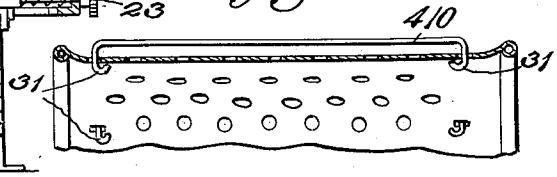


Fig. 2.

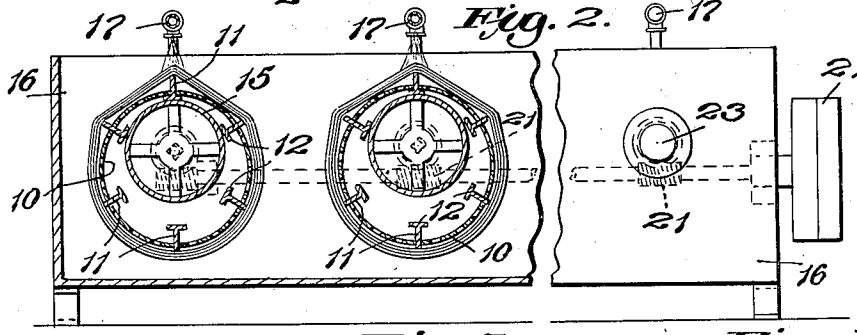


Fig. 3.

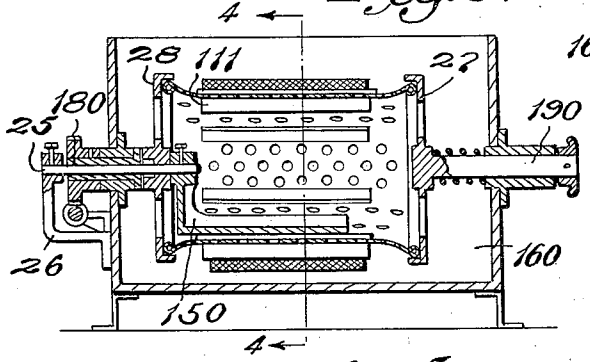


Fig. 4.

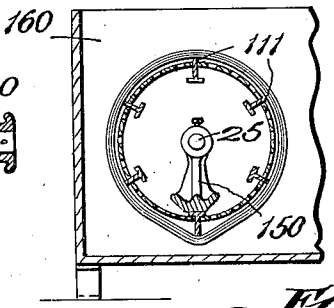


Fig. 6.

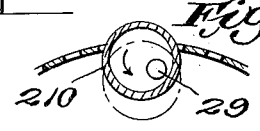


Fig. 5.

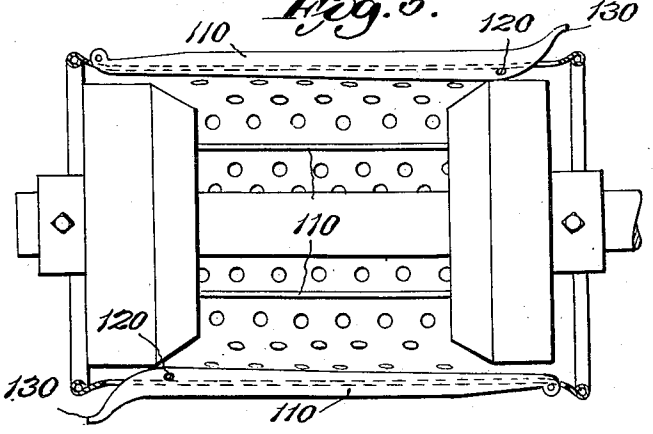
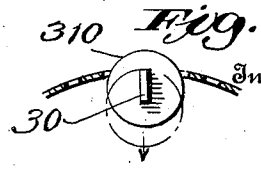


Fig. 7.



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UNITED STATES PATENT OFFICE

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METHOD OF AND APPARATUS FOR FLUID TREATMENT OF TEXTILE THREADS

Application filed December 13, 1927, Serial No. 239,744, and in Germany March 3, 1927.

The object of my invention, generally stated, is to assure the access of fluids to threads used in the textile art, such for example as artificial silk threads preparatory or preliminary to making fabric therefrom, while the threads are on spools or bobbins upon which they are wound. My invention is a method or process and apparatus or means for practicing the process and such invention consists in whatever is described by or is included within the terms or scope of the appended claims.

Briefly described, my invention involves the winding of the thread before the fluid treatment upon a spool or bobbin and thereafter relaxing or removing the circumferential strain or tension existing in the wound thread by diminishing the diameter of the effective bobbin supporting surface so that the threads wound upon the bobbin will be relaxed or loose circumferentially thereof, and then by outward radial movement of the strands of thread at a selected portion of the bobbin periphery providing a space between the thread and the bobbin periphery into which the treating fluid, whatever it may be may fully flow besides having access to the outer side of the strands of thread and thoroughly entering the spaces between adjacent threads with the result that the very desirable complete fluid action or soaking of the threads may be accomplished. Successive portions of the thread wound upon the spool or bobbin are thus spaced from the spool or bobbin periphery so that the winding entirely around the spool is subjected to the liquid treatment. The fluids used may be for washing, bleaching, dyeing, etc.

In the drawings:

Fig. 1 is a vertical longitudinal section of apparatus embodying or for the practice of my invention;

Fig. 2 is a view partly in section on the line II—II of Fig. 1, and partly in side elevation;

Fig. 3 is a view similar to Fig. 1 illustrating a different embodiment of my invention;

Fig. 4 is a section on the line IV—IV of Fig. 3;

Fig. 5 is a detail view in longitudinal section showing a different bobbin construction that may be used;

Figs. 6 and 7 are respectively detail views in transverse section illustrating different bobbin constructions that may be used.

Fig. 8 is a longitudinal section of a portion of still another bobbin construction that may be used.

The bobbin used in the practice of my invention comprises a cylindrical shell or drum of sheet metal and a plurality of equi-distant, thin rods or bars, mounted upon the drum so that they may be moved radially thereof to project their thin or narrow outer edges above or beyond the drum periphery, so that the textile thread or yarn, A, may be wound on the bobbin and have contact and be supported by the raised, thin edges of said rods or bars. After being so wound and supported then by the inward radial movement of the rods or bars towards the drum periphery, the coils will relax or become loose, and will loosely encircle the bobbin, so that if while in this loose or relaxed state the rods or bars in succession, or one after another, are moved radially outward, the portion of the coils engaged thereby will be lifted a substantial distance beyond the drum periphery and provide on either side of the rod or bar a substantial space for the freest access of fluid between the drum periphery and the lifted coils.

Describing in detail what is shown in the drawings, and referring first to Figs. 1 and 2, the bobbin includes a drum or hollow cylinder 10, of sheet metal with numerous perforations for the passage of fluid or liquid and at equi-distant points circumferentially there are longitudinally extending rods or bars, 11, which are situated in slots in the drum periphery so as to be movable radially outward and inward therein. Outward movement of the bars, 11, is limited by a flange or foot, 12, on the inner end of each bar which strikes against the inner periphery of the drum, and inward movement is limited by a stop projection, 13, at the end of each bar which strikes the outer surface of the drum.

Still referring to Figs. 1 and 2, it will be seen that the bobbin with the thread wound

or coiled thereon is placed over a cylinder, 15, whose external diameter is much less than the internal diameter of the bobbin drum which cylinder is supported to rotate in a box or tank, 16, in which the liquid treating operation takes place, so that as clearly shown in Fig. 2, the bobbin and said cylinder are eccentric, with the inner periphery of the bobbin drum or the foot, 12, of the bars adapted to contact with and rest upon the upper side of the cylinder, so that when the cylinder is rotated there will be enough friction to rotate the bobbin and cause the successive engagement with the cylinder periphery of the foot ends of the bars, 11, with the result that one after another the bars, 11, will be moved radially outward, and thus stretch or lift the thread coils a substantial distance above the adjacent peripheral surface of the drum, and on both sides of the bar a large substantially triangular space will be provided between the thread coils and the drum. With the thread coils thus spaced away from the drum, a liquid may be delivered or applied thereto, by means of a horizontal pipe, 17, connected at one end with a source of supply of liquid, having in its underside perforations that discharge streams of liquid downward. It is thus assured that the treating liquid shall have thoroughly ample access to the thread carried by the bobbin, and thus soaking or saturation of every strand or filament thereof with the liquid will be effected.

The bobbin supporting and rotating cylinder, 15, which is hollow, is supported at each end by spindles, 18 and 19, mounted in bearings in the tank sides, the spindle, 18, having outside the tank a worm gear, 20, which meshes with a worm, 21, on a horizontal shaft adapted to be rotated by a pulley, 22. The spindles, 18 and 19 are detachably engaged with the ends of the cylinder, 15, to enable the bobbin readily to be placed over the cylinder and removed therefrom. The spindle, 19, is longitudinally movable and has on its outer end a knob, 23, for pulling the spindle outward against the inward pressure of a coil spring, 24, to disengage the inner end of the spindle from the cylinder head.

As shown in Fig. 2, there may be a series or group of cylinders in one tank or box, 16, so that a number of bobbins may be dealt with at the same time.

Referring to Figs. 3 and 4, the construction is similar to that shown in Figs. 1 and 2, in all substantial respects, excepting that in place of the bobbin supporting and rotating cylinder, a stationary arm, 150, is employed, which is supported sufficiently close to the inner surface of the bobbin drum, 10, that when the latter is rotated by worm gearing, similar to that shown in Fig. 1, for rotating the cylinder, 15, the radially movable rods or bars, 111, will successively engage and pass over the adjacent surface of said arm, and be moved outward precisely as in the case of the construction shown in Figs. 1 and 2. For the convenient support of the arm, 150, the gear driven spindle, 180, is made hollow to permit the passage through it longitudinally of a round rod or shaft, 25, to the inner end of which is fixedly secured the arm, 150, which, therefore, is supported cantilever-like, the outer end of the shaft, 25, being fixed to a bracket, 26, on the outside of the tank, 160. There is also the difference in the construction in Fig. 1 in that the bobbin drum, 15, at its opposite ends is engaged by discs, one of which, 27, is attached to the inner end of the longitudinally slidable spindle, 190, and the other disc, 28, is rotatably connected with the spindle, 180. The arm, 150, is shown in Figs. 3 and 4 as situated to act upon the rods or bars, 11, at the bottom of the bobbin at which location the thread on the bobbin is subjected to the action of the liquid which in such case will be placed in the lower part of the tank, 160. Of course, the arm, 150, may be placed at the top for use in connection with the supply of liquid by means of a perforated pipe, as shown in Figs. 1 and 2.

Referring to Figs. 5, 6, 7 and 8, I illustrate various other bobbin constructions that may be employed. In each of these figures the bobbin drum is essentially the same construction as in the other figures. In Fig. 5, the radially movable thread-engaging rods or bars, 110, are pivoted at one end, so that they have a swinging movement instead of a straight line movement and alternate rods or bars, as shown in Fig. 5, are pivoted at opposite ends of the bobbin, so that there will be no tendency to move the coils of thread lengthwise of the bobbin. The free end of each rod has a stop finger, 130, to limit inward radial movement of the rod by contact with the exterior of the drum, and a stop pin, 120, situated to engage the interior of the drum limits outward radial movement of the rod. In Fig. 6, the radially movable rods or bars are in the form of a tubular rod, 210, mounted on an eccentric pivot 29, so that it may swing between the outer position shown in full lines in Fig. 6, and the inner position shown in dotted lines in Fig. 6; while in Fig. 7, a solid round rod, 310, is shown which is slidable radially between the outer position shown in full lines and the dotted position shown in dotted lines, it being guided in its movements by a flat projection, 30, at each end which engages a correspondingly shaped guide provided on the drum. The rod shown in Fig. 8 is a wire, 410, bent at each end to form a reverse hook, 31, passing through guide holes in the drum periphery.

As will be evident, the rods or bars of Figs. 5 to 8 may be moved radially by an eccentric cylinder such as the cylinder, 15, or by an arm such as the arm, 150.

It will be evident from the few different

constructions which I have shown and described that my invention may be carried out or practiced by apparatus or mechanism widely differing in construction and arrangement.

What I claim is:

1. A method which consists in winding thread upon a bobbin, then providing a loose condition of the coils on the bobbin, and thereafter spacing the coils from the bobbin at selected points successively, and while such spaces exist subjecting the thread to fluid treatment.

2. The combination of a bobbin adapted to have thread wound thereon, thread engaging members on the bobbin spaced apart circumferentially and movable to alternately contract and enlarge the thread engaging diameter of the bobbin, and means to successively move said members outward to move adjacent portions of the thread coils a spaced distance and provide substantial spaces between the same and the adjacent portions of the bobbin about which the thread is wound.

3. Apparatus as in claim 2 having means for rotating the bobbin.

4. Apparatus as in claim 2 having means for subjecting the thread to fluid where the spaces exist.

5. Apparatus as in claim 2 having means for rotating the bobbin and means for subjecting the thread to fluid where the spaces exist.

6. A method which consists in winding thread upon a bobbin then providing a loose condition of the coils on the bobbin and thereafter spacing the coils from the bobbin, and while such spaces exist subjecting the thread to fluid treatment.

7. A method which consists of winding thread upon a bobbin then providing a loose condition of the coils on the bobbin and thereafter expanding the coils again, while still on the bobbin, and while this condition exists, subjecting the thread to fluid treatment.

8. A method which includes the acts of winding threads upon a bobbin, then providing a loose condition of the coils on the bobbin, and thereafter while the coils are still on the bobbin loosening the coils partly therefrom and while this condition exists subjecting the thread to fluid treatment.

In testimony whereof I hereunto affix my signature.

MORRIS SCHOENFELD.