

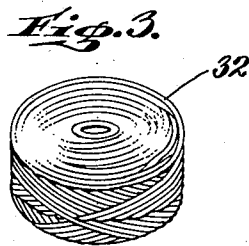
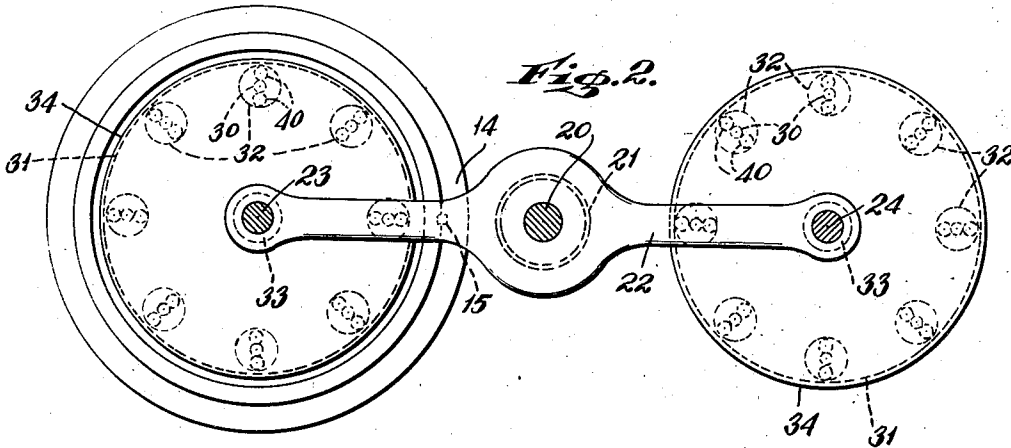
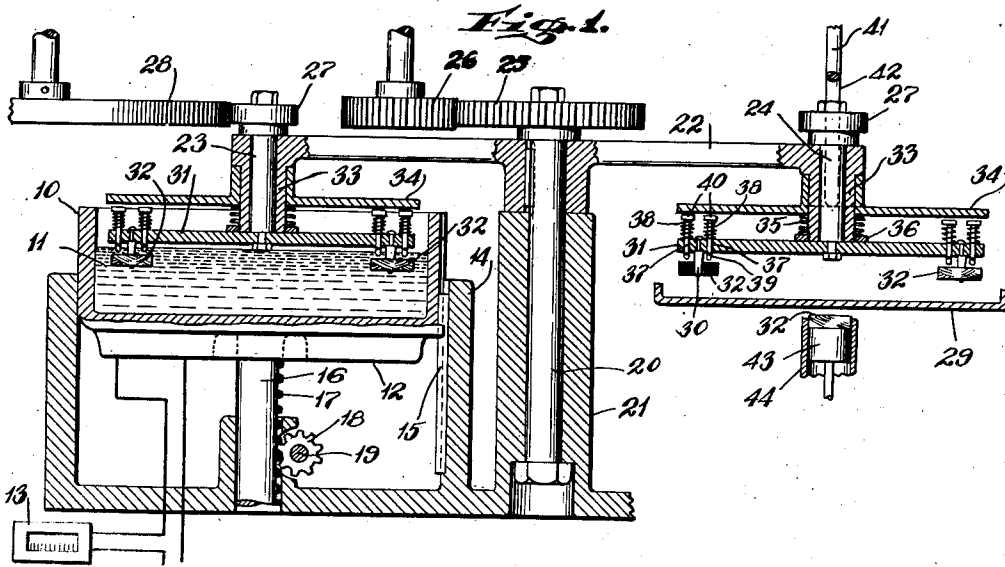
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2,369,155

METHOD OF CONDITIONING WOUND STRAND BODIES

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# UNITED STATES PATENT OFFICE

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## METHOD OF CONDITIONING WOUND STRAND BODIES

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This invention relates to thread spools or bobbins such as used in connection with the shuttles of sewing machines or devices of this type and kind supporting threads, lines, cords and the like. More particularly, the invention relates to the method of treating wound devices of this kind to maintain the strands of the spool like body against displacement or against accidental or undesirable unwinding, while at the same time, adding lubricating properties to the strand. The novel features of the invention will be best understood from the following description when taken together with the accompanying drawing in which certain embodiments of the invention are disclosed and in which the separate parts are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a diagrammatic sectional view illustrating one manner of carrying the method into effect.

Fig. 2 is a diagrammatic sectional plan view of the structure as seen in Fig. 1 and,

Fig. 3 is a perspective view of a bobbin made according to the invention.

In the construction of spools, bobbins and like products of manufacture, it has been the common practice to provide a core on which the particular strand is wound, and further to provide on the ends of the core or upon side surfaces of the wound strand body flanges for retaining the strands from displacement. In some instances, metal, paper or cardboard flanges have been used. In other instances, side facings of plastic or similar materials have been employed. Still further, and as set forth in our prior Patents 2,200,720 and 2,200,721 both of May 14, 1940, wax or paraffin film coatings have been applied to side surfaces of a wound strand body in forming film like retaining flanges which were removed or broken down automatically in the unwinding of the strand.

It is the purpose of our present invention to provide a wound spool like body, such for example as a bobbin, with means maintaining the strands of the body against accidental displacement or undesirable unwinding without the necessity of using side flanges or other mediums to retain the strands against lateral displacement. It is the further purpose of our invention to provide a simple, economical and practical manner of producing products of the kind under consideration, as well as, to provide on the resulting strand removed from the spool or bobbin, lubricating properties.

In the accompanying drawing we have shown

for illustrative purposes one adaptation of the invention. The illustrations in Figs. 1 and 2 of the drawing are entirely diagrammatic and serve only to indicate a method of procedure. In these figures, 10 represents a vat or tank containing, for example, wax or paraffin as indicated at 11. Any suitable means, such for example as an electric heater 12 will be employed for maintaining the material 11 in a melted fluid state, the temperature being preferably controlled by a thermostat or other control device indicated at 13.

In the construction shown, the vat 10 is arranged to move vertically in a support 14, the vat being preferably keyed to the support as indicated at 15. Projecting centrally from the bottom of the vat is a plunger 16 having a tooth rack surface 17 adapted to be engaged by a tooth wheel 18 arranged upon a suitable shaft 19. Means will be provided to intermittently rotate this shaft in both directions to lower and raise the vat as later described.

A vertically arranged shaft 20 is suitably supported, as seen at 21, and secured to the upper end of the shaft is a cross beam 22, in the terminal ends of which are supported other vertical shafts 23 and 24. On the upper end of the shaft 20 is also arranged a gear 25 meshing with a drive gear 26 actuated by any suitable means to intermittently rotate the beam 22 a half revolution, in order to successively bring the shafts 23 and 24 centrally over the vat 10.

The upper end of each shaft 23 and 24 has a friction disc 27 adapted to be brought into mesh with a large friction drive wheel 28 rotatable by suitable means at high speed. The wheel 28 is disposed above and at one side of the vat 10. Arranged opposite the vat 10 is a movable tray or pan 29. A plurality of spindles 30 are spaced circumferentially on and protrude below the lower surface of heads 31 arranged upon the lower ends of the shafts 23 and 24.

At this time, it will be understood that any desired number of the spindles 30 may be arranged circumferentially of each head depending entirely upon the diameter of the bobbins or spools 32 mounted thereon with respect to the size of the heads 31.

In this connection, it will be also apparent that instead of using a single cross beam 22, that a spider having several arms may be employed, in which latter event the intermittent rotation of the head and the number of vat stations and applicator and ejector stations will be correspondingly increased. The present illustration is simply to show one possible adaptation of the inven-

tion and in fact individual workpieces 32 may be produced. In our construction it is intended to revolve the entire head at high speeds, while maintaining the spindles 30 relatively stationary. In other adaptations of the invention, means may be provided for individually rotating the spindles.

For purposes of this description, the vat station will be termed the fluid applicator station and the other station will be defined as the ejector and mounting station, the latter station being shown at the right of Fig. 1. The ends of the beam 22 have long bearings 33 and slidably mounted on these bearings are ejector discs 34 normally held in raised position by a spring 35 seating upon a nut 36.

Arranged on each head 31 and at opposite sides of the spindles 30 is a pair of ejector pins 37. On these pins are arranged springs 38 which normally support the pins in raised position, and stop pins 39 are employed to limit upward movement of the pins 37. The heads 40 of the pins 37 are normally disposed adjacent the lower surface of the disc 34 so that upon the depression of this disc all of the pins 37 will be moved downwardly and all of the bobbins 32 simultaneously ejected and dropped upon the tray or pan 29. A plunger 41 having a forked end 42 large enough to span the ends of the arm 22 including the friction discs 27, is adapted to be lowered into engagement with the disc 34 as indicated in Fig. 1 and then further depressed in the ejection operation.

After the bobbins have been ejected onto the tray or pan 29, the pan is moved out of alignment with the lower portion of the head 31 and a series of untreated bobbins are then applied to the spindles 30 by the operation of a feed plunger 43 arranged in a suitable guide 44, the head 31 being intermittently rotated to bring successive spindles into alignment with the plunger 43. Any suitable means may be provided to accomplish this result and in some instances intermittent rotation of the heads may be performed by hand.

The operations of ejecting the bobbins and then applying new bobbins on the spindles are performed while the other companion head 31 maintains all of the bobbins supported thereon in submerged position in the fluid 11 of the vat 10. After the bobbins have been submerged a sufficient length of time, the vat 10 is then partially lowered to maintain the bobbins 32 within the upper portion of the vat above the fluid 10 therein. While in this position the head 31 is rotated at high speed so that all surplus of the fluid will be removed from the bobbins through the action of centrifugal force. When this operation has been completed, the vat is lowered still further to clear all of the bobbins supported on the head 31 and by this time the other head will have all of the untreated bobbins applied to its spindles and the beam is then rotated to reverse the positions of the heads and the above cycle of operation is then again repeated.

The bobbins picked upon the tray 29 may be delivered in any suitable means to a drying or cooling station for quickly setting the material employed, after which the bobbins may be packed in any desired manner for shipment.

It will be apparent that a bobbin or other wound strand body, processed in the manner defined, will have the strands thereof adhere to each other to a slight degree, sufficient only to retain the strands against accidental displace-

ment and unwinding, particularly the undesirable unwinding which takes place with ordinary threads when used on high speed sewing machines. Further the application of the wax or paraffin coating also gives to the thread or strand a lubricating property which is desirable in the use thereof.

In some instances and in processing strands of this type and kind various other materials or compounds may be used other than wax or paraffin as herein specifically defined. From this standpoint it will be understood that the method herein defined consists primarily in the complete submersion of a wound strand body in a suitable fluid, then in rotating the thread strand body at high speed to throw off all surplus of the material and then to fix the fluid material upon the strands in producing the resulting product.

It will be apparent that the strand body produced according to the method herein defined may be wound in any desired manner and many of these bodies have cross windings as in the bobbin illustrated. This type of winding maintains the strands against collapse or displacement. With the present method of coating or impregnating the strands with the material which establishes a slight adhesion between contacting portions of a cross wound strand, the body is further maintained in its wound condition in the absence of retaining discs, whereas a light tension pull on the strand will readily unwind the same from the body and yet the strand is kept from accidental unwinding.

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

1. A method of treating a bobbin body including a strand of thread cross wound on a core for retaining the thread against inadvertent unwinding and for retaining the mass of wound thread on the core in the absence of retaining discs, which comprises completely submerging said body in a fluid, retaining the body in the fluid for a predetermined period to permit penetration of said fluid to all windings of said body, then removing the body from the fluid and revolving the body at high speed to dispense excess fluid from the strand and all fluid intervening the strand windings by the action of centrifugal force, and then drying the body to harden the fluid applied to the strand thereof, producing in the resulting wound body slight adhesion of the contacting intersecting portions only of the strand for maintaining the strand against inadvertent displacement and unwinding.

2. A method of treating a bobbin body including a strand of thread cross wound on a core for retaining the thread against inadvertent unwinding and for retaining the mass of wound thread on the core in the absence of retaining discs; which comprises completely submerging the wound strand body in a heated fluid maintained at a predetermined temperature, retaining the body submerged for a predetermined period of time to permit penetration of said fluid to all windings of said body, then removing the body from said fluid and revolving the same at high speed to remove surplus fluid from the strand and all fluid intervening the cross windings by the action of centrifugal force, and then drying the body to set the fluid on the strand producing, in the finished product, a wound strand body wherein the strand is retained against accidental displacement and unwinding by slight

adhesion between contacting portions only of adjacent strand windings.

3. A method of treating a bobbin body including a strand of thread cross wound on a core for retaining the thread against inadvertent unwinding and for retaining the mass of wound thread on the core in the absence of retaining discs; which comprises the application of a fluid having slight adhesive properties to all of the windings of the strand on said body, removing all fluid intervening cross windings of the strand by action of centrifugal force and setting said fluid to establish slight adhesion between contacting portions only of the strand windings on said body to retain the strand against accidental displacement and unwinding while permitting unwinding of the strand without reeling off an excessive length thereof.

4. A method of treating bobbin bodies each including a strand of thread cross wound on a core for retaining the thread against inadvertent unwinding and for retaining the wound thread mass on the core in the absence of retaining discs; which comprises the step of arranging two groups of bodies on movable mounting members in spaced relation to each other, successively moving said members to a submerging station and a dispensing and applicator station, simultaneously submerging all of the strand bodies on one member at the first station in a fluid, then removing said bodies from the fluid and revolving said member at high speed to dispense surplus fluid from said bodies by the action of centrifugal force, then moving said member to the second station and the other member to the first station and simultaneously stripping the processed bodies from said first member, applying unprocessed bodies thereto while the bodies of the second member are processed at the first station, and then drying the thread bodies to harden the fluid applied to the strands thereof, producing in the resulting wound bodies slight adhesion of the contacting intersecting portions only of the strands for maintaining the strands against inadvertent displacement and unwinding.

5. A method of treating bobbin bodies each including a strand of thread cross wound on a core for retaining the thread against inadvertent unwinding and for retaining the wound thread mass on the core in the absence of retaining discs; which comprises the step of arranging two groups of bodies on movable mounting members in spaced relation to each other, successively moving said members to a submerging station and a dispensing and applicator station, simultaneously submerging all of the strand bodies on one member at the first station in a fluid, then removing said bodies from the fluid and revolving said member at high speed to dispense surplus fluid from said bodies by the action of centrifugal force, then moving said member to the second station and the other member to the first station and simultaneously stripping the processed bodies from said first member, applying unprocessed bodies thereto while the bodies of the second member are processed at the first station, arranging the fluid in a vat and intermittently raising and lowering said vat in controlling the submersion of said bodies, and then drying the treated bodies to harden the fluid applied to the strands thereof, producing in the resulting wound bodies slight adhesion of the contacting intersecting portions only of the

strands for maintaining the strands against inadvertent displacement and unwinding.

6. A method of treating bobbin bodies each including a strand of thread cross wound on a core for retaining the thread against inadvertent unwinding and for retaining the wound thread mass on the core in the absence of retaining discs; which comprises the step of arranging two groups of bodies on movable mounting members in spaced relation to each other, successively moving said members to a submerging station and a dispensing and applicator station, simultaneously submerging all of the strand bodies on one member at the first station in a fluid, then removing said bodies from the fluid and revolving said member at high speed to dispense surplus fluid from said bodies by the action of centrifugal force, then moving said member to the second station and the other member to the first station and simultaneously stripping the processed bodies from said first member, applying unprocessed bodies thereto while the bodies of the second member are processed at the first station, arranging the fluid in a vat and intermittently raising and lowering said vat in controlling the submersion of said bodies, heating the vat in controlling the temperature of the fluid therein, and then drying the treated bodies to harden the fluid applied to the strands thereof, producing in the resulting wound bodies slight adhesion of the contacting intersecting portions only of the strands for maintaining the strands against inadvertent displacement and unwinding.

7. The method of treating a wound strand body including a strand cross wound on a core for retaining the strand against inadvertent unwinding and for retaining the wound strand mass on the core in the absence of retaining discs; which comprises mounting a strand body on a rotatable member, moving a vat containing heated wax toward the body supported on said member to completely submerge the strand thereof in the heated wax, maintaining the strand body in the wax a sufficient time to allow the wax to penetrate all of the strand windings of said body, then moving the vat away from said strand body to remove the body from the wax while maintaining the same within boundary walls of the vat, then rotating said member at high speed to dispense excess wax therefrom by the action of centrifugal force, and then drying the body thus treated to harden the wax in producing on the resulting wound body slight adhesion of the contacting intersecting portions only of the strand for maintaining the strand against inadvertent displacement and unwinding.

8. A method of treating bobbin bodies each including a strand of thread cross wound on a core for retaining the thread against inadvertent unwinding and for retaining the wound thread mass on the core in the absence of retaining discs; which comprises arranging a plurality of said bodies on a mounting member, submerging all of said bodies in a fluid by movement of the member in the direction of said fluid, retaining the bodies submerged in the fluid for a predetermined period of time to permit penetration of said fluid to all windings of all of said bodies, then moving said member away from said fluid in removing the bodies from the fluid and revolving all of said bodies at high speed to remove excess fluid from the strand of each body and all fluid intervening the strand windings of said bodies by the action of centrifugal force, then re-

moving the bodies thus treated from said member, and then treating said bodies to set the fluid applied to the strands thereof to produce between contacting portions of the windings of each body slight adhesion retaining the strands of said bodies against accidental displacement and unwinding.

9. The method of treating a wound strand body including a strand cross wound on a core for retaining the strand against inadvertent unwinding and for retaining the wound strand mass on the core in the absence of retaining discs; which comprises establishing two stations, namely a loading and unloading station and a submerging station, loading a predetermined number of strand bodies on a carrier at the loading station, then moving the carrier to the submerging station and submerging all of the

bodies on the carrier in heated wax at said submerging station, maintaining said bodies submerged in the wax sufficiently to saturate all of the windings of said bodies, then removing the bodies from the heated wax while maintaining said bodies at said station and above the heated wax, then rotating the carrier at high speed to remove all surplus wax from said bodies by the action of centrifugal force, then returning the carrier to the first named station and unloading the treated bodies therefrom, and then drying said bodies to harden the wax and producing in each of the resulting bodies slight adhesion of the contacting intersecting portions only of the strand for maintaining the strand against inadvertent displacement and unwinding.

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