July 26, 1949. L. ROSEMAN 2,477,422

BOBBIN WINDING AND THREAD TREATING APPARATUS

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Fig. 6

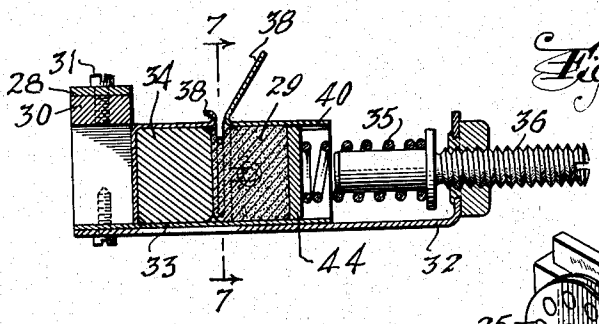


Fig. 1

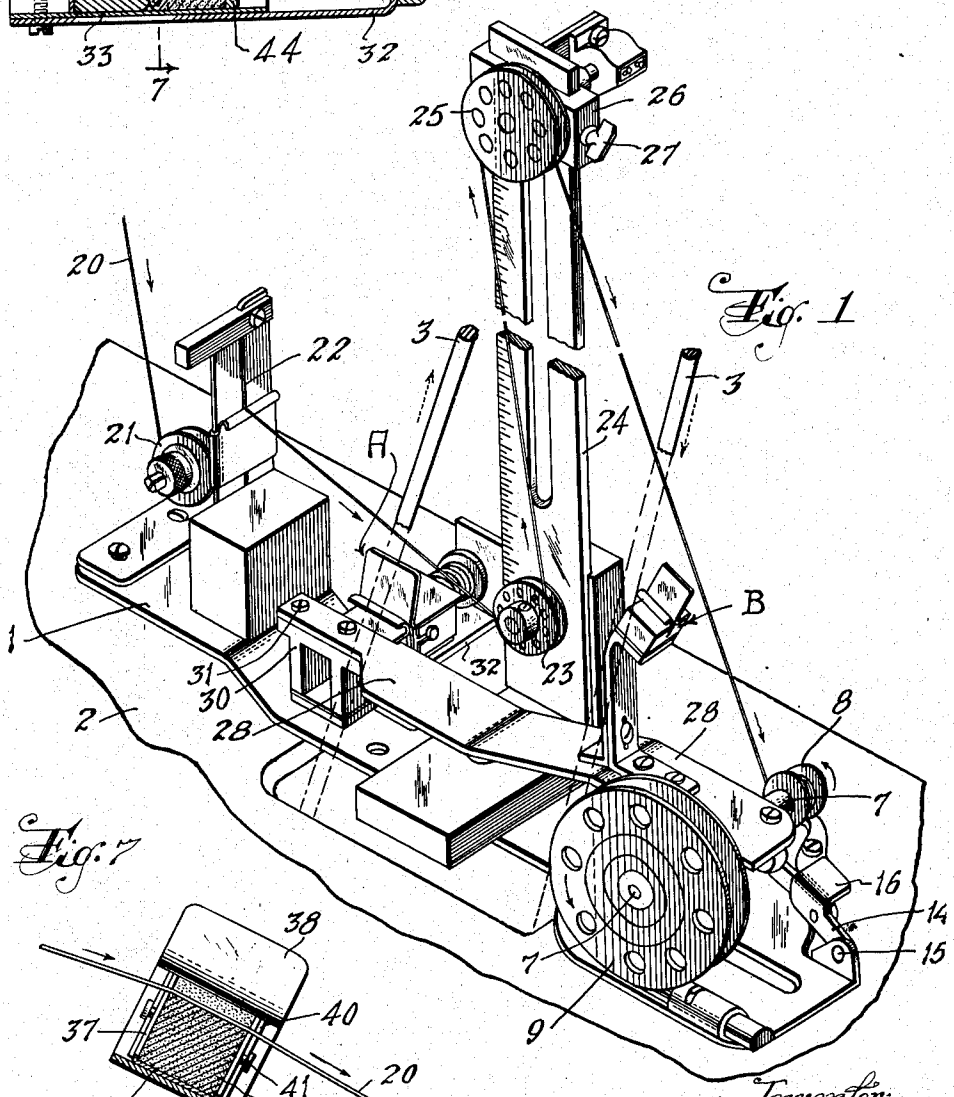


Fig. 7

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BOBBIN WINDING AND THREAD TREATING APPARATUS

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Fig. 3

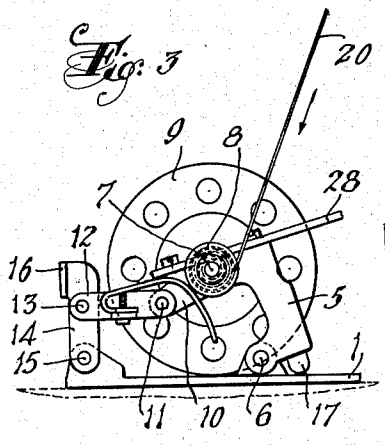


Fig. 2

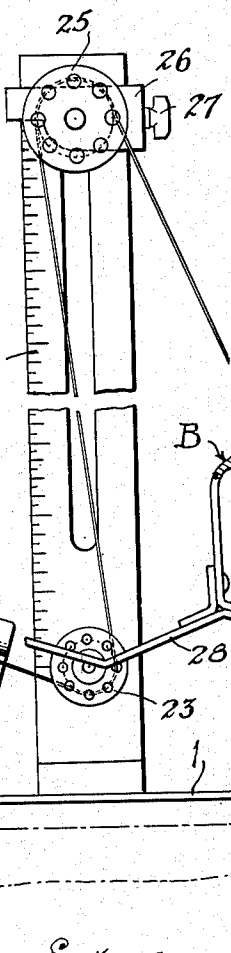


Fig. 4

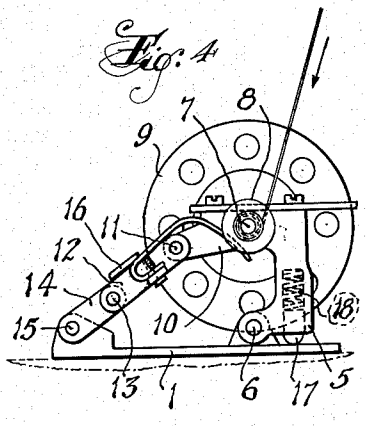
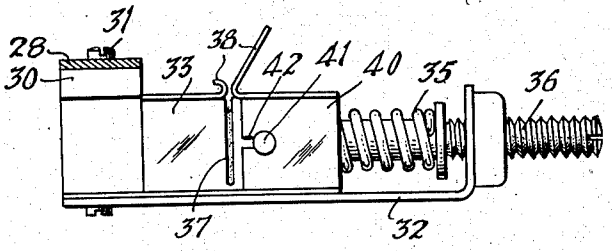


Fig. 5



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BOBBIN WINDING AND THREAD TREATING APPARATUS

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Fig. 8

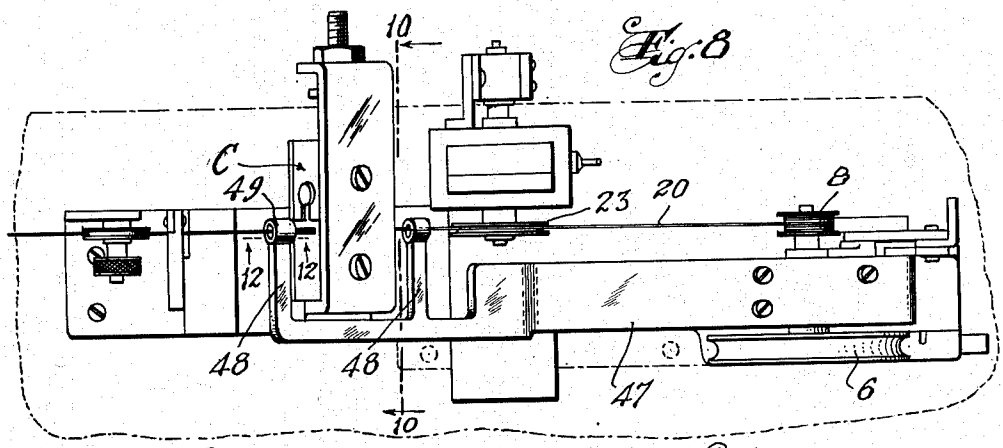


Fig. 10

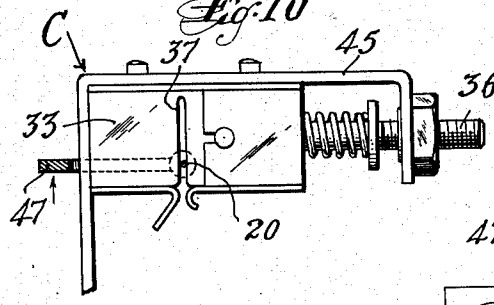


Fig. 11

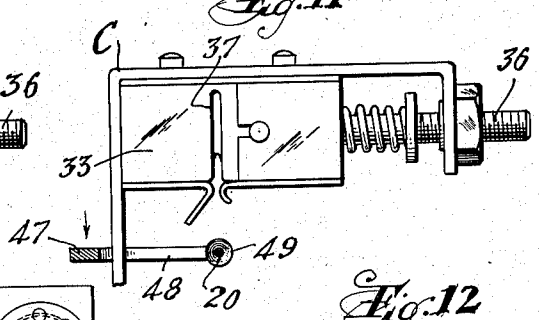


Fig. 12

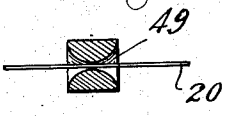


Fig. 9

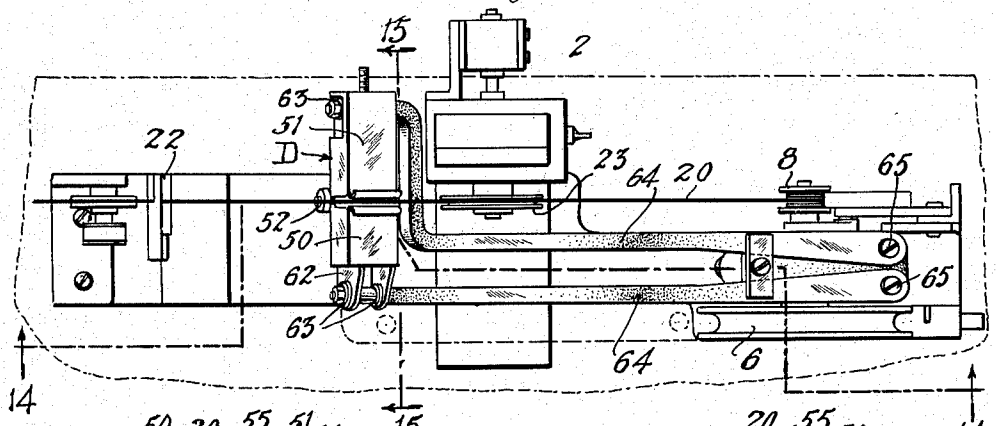
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BOBBIN WINDING AND THREAD TREATING APPARATUS

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Fig. 13



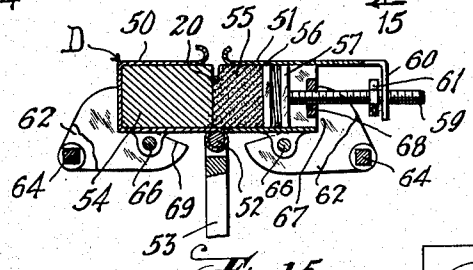


Fig. 15

Fig. 16

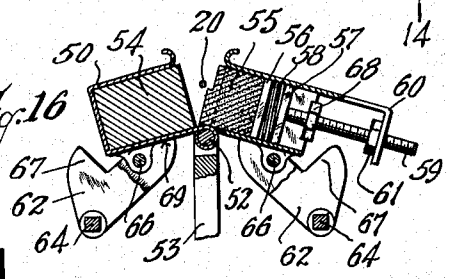


Fig. 17

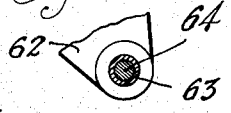


Fig. 14

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UNITED STATES PATENT OFFICE

2,477,422

BOBBIN WINDING AND THREAD TREATING APPARATUS

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Application January 17, 1948, Serial No. 2,906

10 Claims. (Cl. 242—18)

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This invention relates in particular to apparatus for winding bobbins for use in sewing machines and for treating the bobbin thread at a predetermined point in its length, for example, to coat or impregnate the thread with wax or any one of numerous substances, although the invention may be utilized for treating threads or similar strands or cords for other purposes than use in sewing machines.

In my copending applications Serial No. 555,534, filed September 23, 1944, and Serial No. 783,251, filed October 31, 1947, I have described and claimed mechanism responsive to changes in the character of the thread such as thickness, color, friction-producing properties, or changes in tension of the bobbin thread in a sewing machine to indicate the approaching exhaustion of the bobbin thread, and according to one form of the invention a friction-producing substance, such as soap or wax, is applied to the thread at a predetermined distance from the terminal end of the thread on the bobbin to cooperate with a part of the mechanism so as to increase the thread tension and cause actuation of an indicator such as an electric signal.

A prime object of the present invention is to provide novel and improved mechanism for winding the bobbin thread and for automatically treating the thread, for example, by application of a wax, at one or more predetermined points in the length of the thread during the winding operation.

For winding thread on a sewing machine bobbin, there is frequently used a device that comprises a shaft on one end of which the bobbin is detachably mounted and on the other end of which is a pulley that can be moved selectively into and out of contact with the driving belt of a sewing machine for rotating and stopping rotation of the bobbin, respectively, said device also including means for positively holding the pulley in contact with the driving belt until the desired amount of thread has been wound on the bobbin. In beginning the winding operation, generally the operator manually winds a few turns of thread on the bobbin before starting the winding device, the thread being under tension between the bobbin and the source of supply.

Therefore, another object of my invention is to provide novel and improved means for coating or impregnating a portion of the length of the thread at a predetermined distance in advance of the bobbin on completion of winding of the previous bobbin or during this manual winding operation, and for stopping said treatment of the thread automatically upon starting of operation of the winding mechanism, whereby only a small amount of the thread will be treated at a predetermined distance from the terminal end of the thread on the bobbin.

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A further object is to provide a novel and improved device for applying a friction-producing substance to the thread, whereby the thread may be treated by simply pulling it through the friction-producing substance, and said substance shall be automatically presented for treating the thread at the proper time.

Other objects of the invention are to provide in such mechanism, novel and improved means for varying the amount of thread between the terminal end thereof and the zone of treatment; and to obtain other advantages and results that will be brought out by the following description in conjunction with the accompanying drawings, in which

Figure 1 is a perspective view of bobbin winding and thread treating mechanism embodying my invention, showing the position of the parts during the automatic winding operation;

Figure 2 is a front elevational view of the mechanism, showing the parts in the thread treating position and prior to the automatic winding operation, illustrating the holders for the thread treating substance in transverse section with portions broken away;

Figure 3 is a fragmentary rear elevational view of the bobbin winding spindle and driving pulley in the positions shown in Figure 2;

Figure 4 is a similar view, illustrating the parts in the positions shown in Figure 1;

Figure 5 is an enlarged side elevational view of the holder for the thread treating substance;

Figure 6 is a vertical longitudinal sectional view through said holder;

Figure 7 is a transverse vertical sectional view, approximately on the plane of the line 7—7 of Figure 6;

Figure 8 is a top plan view of a modified form of the invention;

Figure 9 is a front elevational view of the mechanism shown in Figure 8, with the parts in thread treating position and prior to the automatic winding operation;

Figure 10 is an enlarged fragmentary vertical sectional view, approximately on the plane of the line 10—10 of Figure 8;

Figure 11 is a similar view, showing the thread moved out of contact with the thread treating substance during the bobbin winding operation;

Figure 12 is an enlarged transverse vertical sectional view, approximately on the plane of the line 12—12 of Figure 8;

Figure 13 is a top plan view of another modification of the invention;

Figure 14 is a front elevational view of the mechanism shown in Figure 13, illustrating the parts in thread treating position and the holders for the thread treating substance in longitudinal vertical section approximately on the plane of the line 14—14 of Figure 13;

Figure 15 is an enlarged transverse vertical sectional view, approximately on the plane of the line 15—15 of Figure 13;

Figure 16 is a similar view, showing the position of the parts during the bobbin winding operation, and

Figure 17 is a fragmentary transverse vertical sectional view, approximately on the plane of the line 17—17 of Figure 14.

For the purpose of illustrating the principles of the invention, I have shown it as embodied in a generally known type of bobbin winder which includes a base plate 1 that is secured to a table or bench 2 on which is mounted a sewing machine that has the usual drive shaft carrying a pulley (not shown) which is driven by a belt 3 from a power driven main drive shaft. A bobbin spindle 4 is journaled in one end of a bearing member 5, the other end of which is pivotally connected at 6 to the base plate 1, one end of the spindle having a portion 7 on which the bobbin 8 to be wound may be separably mounted. The other end of the spindle has a pulley 9 to engage one reach of the drive belt 3 for rotating the spindle. For moving the drive pulley into and out of engagement with the drive belt, the bearing member 5 has a lateral arm 10 which is pivotally connected at 11 to one end of a link 12, the other end of which is pivotally connected at 13 to one end of a second link 14, the other end of which is pivotally connected at 15 to the base plate. The links and arm 10 are so related that when they are in substantial longitudinal alinement with each other the pulley 9 is forced into frictional contact with the drive belt. For holding the drive pulley in this position, the end of the link 14 has a lateral lug 16 to overlie and abut the link 12 when the pivotal connection 13 between the links 12 and 14 passes dead center or moves to one side of the common imaginary line passing through both the pivots 11 and 15, as best shown in Figure 4.

To disengage the pulley from the drive belt, the link 14 is swung upwardly to move the pivot 13 to the other side of said imaginary line between the pivots 15 and 11, as shown in Figure 3, and for holding the parts in this position with the pulley disengaged from the drive belt, a pusher 17 is mounted in the bearing member 5 to engage the base plate 1 and is normally actuated against the base plate by a spring 18.

The thread 20 to be wound on the bobbin 8 may be drawn from any suitable source, such as a large spool, and is passed through a suitable tension device 21, a guide 22, and around a pulley 23 which is journaled on a vertical standard 24 which is secured to the base plate 1. From the pulley 23 the thread passes upwardly and around a pulley 25 that is journaled on a bearing block 26 that is vertically adjustable on the standard 24 and is held in adjusted position by a set screw 27. From the pulley 25 the end of the thread is passed to the bobbin 8.

The parts are shown in Figure 2 in their normal or "at rest" positions before starting the winding of the bobbin by the pulley 9. In starting the winding operation, the bobbin is first placed on the spindle, after which the free end portion of the thread is manually wound several times around the bobbin, and then the lever 12 is actuated to force the pulley 9 into contact with the drive belt 3, whereupon the winding of the bobbin continues under power.

It is during the manual winding of the thread on the bobbin that the treatment of the thread

in accordance with my invention is effected. For the purpose, a holder A for the thread treating substance is mounted on a bracket arm 28 which is in turn secured to the bearing member 5 and extends therefrom toward the thread supply, said holder A being located by the bracket 28 while the winding mechanism is at rest so that the thread passing from the guide 22 to the pulley 23 is drawn over or through the thread treating substance in the holder. Thus, when the thread is manually wound on the bobbin, a portion thereof at a predetermined distance from the wound end of the thread is treated, i. e., coated or impregnated with the substance in the holder A. Then, when the pulley 9 is pushed into contact with the drive belt 3 to start the power winding operation, the holder A is actuated by the bracket 28 so as to move the thread treating substance out of contact with the thread, as shown in Figure 1.

Any suitable thread treating substance may be utilized, but I have shown a block of wax 29, for example, beeswax, which may be mounted in any suitable type of holder. As shown, the holder includes a yoke 30 which is secured to the bracket 28 by screws 31 and has a laterally projecting arm 32 disposed beneath the normal path of travel of the thread from the guide 22 to the pulley 23. On this arm 32 is a box-like container 33 in which the wax block 29 is slidably mounted and pressed against an abutment block 34 by a spring 35 which is adjustable by a screw 36 threaded in the arm 32. The top and side walls of the container 33 have slots 37 disposed in approximately a common vertical plane with the reach of the thread that runs from the guide 22 to the pulley 23 to permit the thread to contact with the wax block as the holder is swung upwardly into the position shown in Figure 2. Guide lips 38 are provided at opposite sides of the slots 37 on the top wall of the holder to guide the thread into the slots. As shown, one of these lips is carried by a cover 40 which is removably attached to the container 33 to facilitate insertion of the wax block into the container, the cover being held in position by studs 41 mounted in the side walls of the container 33, which are received in slots 42 in the edge of the cover 40. Preferably, a follower block 44 is interposed between the spring and the wax block.

In operation, as the thread is pulled across the wax block, some of the wax is picked up by the thread so as to form a slight groove in the top of the block, but this groove is closed within a short time by the pressure exerted on the wax block between the abutment block 34 and the spring 35.

It will be observed that the amount of thread between the end thereof on the bobbin and the zone of application of the thread treating substance may be varied by adjusting the pulley 25 on the vertical standard, the amounts of thread being increased and decreased by respectively raising and lowering the pulley on the standard.

In some instances it may be desirable to treat the thread at several points, and accordingly, if desired, a second holder B for the thread treating substance may be mounted on the bracket arm 28 to apply the thread treating substance to the thread at a point closer to the terminal end of the thread, the holder being mounted so that it will engage and disengage the thread simultaneously with the engagement and disengagement of the thread by the holder A. The holder B may be of any suitable construction, for ex-

ample, like the holder A, although it is only schematically shown as including a suitable container 33a for the thread treating substance 28a.

The manual winding of the thread is generally made in a direction reverse to that of the power winding, and sometimes when the thread has been unwound during a sewing operation to the manually wound portion, the thread breaks; and it will be seen that the second holder B might be so located as to indicate the approach of the manually wound portion of the thread.

Instead of applying the wax or a similar thread treating substance to the thread, the device A might be modified to attach to the thread a bead or other medium for increasing the thickness of the thread.

In Figures 8–12, inclusive, I have shown a modification of the invention wherein the thread is moved into and out of contact with the thread treating substance instead of said substance being moved into and out of contact with the thread, as shown in Figures 1–7, inclusive. In this form of the invention, the structure is in general the same as that shown in Figures 1–7, inclusive, the main differences being that the holder C for the thread treating substance has its supporting arm 45, which corresponds to the arm 32, secured to the base plate 1, as indicated at 46, so that the container 33 for the thread treating substance is disposed above the thread 20 between the guide pulley 23 and the guide 22 with the thread receiving slot 37 opening downwardly as shown in Figures 10 and 11, instead of upwardly as shown in Figure 5. The bracket 47 which corresponds to the bracket 28 has two lateral thread guiding arms 48 that have alined thread guiding openings 49 so that as the bracket 47 is swung upwardly and downwardly the portion of the thread between the guides 49 will be moved into and out of the slots 37 of the container for the thread treating substance.

When the drive pulley 9 of the automatic winding apparatus is thrown out of engagement with the driving belt, as shown in Figure 9, the bracket 47 simultaneously will elevate the thread into contact with the thread treating substance, as shown in Figure 10, but immediately upon the beginning of the automatic winding operation, that is, when the drive pulley is thrown into contact with the belt, the bracket 47 will move the thread out of contact with the thread treating substance, as shown in Figure 11.

Another modification of the invention is shown in Figures 13–17, inclusive, where again the differences between the modification and the invention as shown in Figures 1–7, inclusive, reside in the mounting and operation of the holder for the thread treating substance. In all of the other forms of the invention illustrated, the thread is maintained in contact with the thread treating substance while the automatic winding apparatus is at rest, and under certain conditions or with certain thread treating substances, the thread might become embedded in the thread treating substance in such a manner that the thread would be broken upon pulling of the thread or upon movement of the holder for the thread treating substance in the direction to move the latter out of contact with the thread. The form of the invention shown in Figures 13–17, inclusive, primarily contemplates means for overcoming such breaking of the thread. As shown, the holder D for the thread treating substance comprises two box-like sections 50 and 51, one end of each of which is pivotally connected to a common pivot rod 52 that is rigidly supported by a standard 53 on the base plate 1, the sections being so related that their pivotally connected ends may swing toward and away from each other about the pivot 52 at opposite sides of the portion of the thread 20 between the guide pulley 23 and the guide 22, as shown in Figures 15 and 16.

These pivotally connected ends of the sections 50 and 51 open toward each other and have extending therethrough blocks 54 and 55 both of which may be a thread treating substance such as wax, although as shown, the block 54 is of wood while the block 55 is of wax. Either or both of these blocks may be slidable so that their juxtaposed surfaces will be forced into contact with each other when the ends of the sections are moved toward each other, but as shown, only the block 55 is slidably mounted and it has a backing plate 56 between which and a pusher plate 57 is interposed a light compression spring 58. The pusher plate 57 is carried by a screw rod 59 one end of which is slidable in an extension 60 on the section 51 and has an adjustable nut 61 for limiting movement of the pusher plate away from the block 55.

For swinging the sections 50 and 51 about a pivot 52, a rocker 62 for each section is pivotally connected at 63 on a bracket arm 64 one end of which is pivotally connected at 65 to the bearing member 5 for the bobbin winding shaft. Each rocker 62 is pivotally connected at 66 to the corresponding section 50 or 51. With this construction, when the bearing member 5 is located to hold the driving pulley 9 out of contact with the belt 3, as shown in Figures 13 and 14, the bracket arms 64 will tilt the rockers 62 so as to swing the sections 50 and 51 toward each other as shown in Figure 15. At least the rocker 62 corresponding to the section 51 has a lug 67 to engage an adjustable nut or collar 68 on the screw 59 when the bracket arms 64 are moved to swing the casing sections 50 and 51 together and thereby exert pressure on the presser plate 57 against the spring 58 to cause firm yielding contact of the block 55 with the block 54, as shown in Figure 15. Preferably, swinging of the sections 50 and 51 in both directions is positively limited, as by engagement of the lugs 67 with the ends of the casing sections and by engagement of abutment shoulders 69 on the rockers 62 with the bottom walls of the sections 50 and 51.

In operation, when the bobbin winding apparatus is a rest, the portion of the thread between the pulley 23 and the guide 22 is gripped between the blocks 54 and 55, as shown in Figure 15, so that when the thread is pulled as in winding the thread on the bobbin, some of the thread treating substance will be applied to the thread. However, upon starting of the automatic bobbin winding operation, when the drive pulley is thrown into engagement with the belt 3, the bracket arms 64 are actuated to swing the blocks 54 and 55 away from each other and out of contact with the thread, as best shown in Figure 16. At this time, also, the pressure on the block 55 from the presser plate 57 is released by disengagement of the lug 67 from the adjustable collar 68. Accordingly, there is no danger of the thread being broken upon disengagement of it from the thread treating substance because the blocks 54 and 55 of the thread treating mechanism are positively moved out of contact with the thread simultaneously with the starting of the automatic winding operation.

It will be understood that while I have shown and described several now preferred embodiments of my invention, the details of construction of the mechanism can be widely modified and changed and the invention may be applied to other types of apparatus, within the spirit and scope of the invention. For example, the invention could be used with apparatus wherein the starting and stopping of the winding of the thread on the bobbin is controlled in any suitable manner, such as where the bobbin spindle is driven directly from an electric motor shaft which is started and stopped to start and stop the winding operation, respectively. Also, instead of applying a wax to the thread, the devices A or D might be modified to attach a bead or other medium for increasing the thickness of the thread.

Having thus described the invention, what I claim is:

1. In combination, a spindle for supporting a bobbin so that thread may be drawn from a source of supply and wound on a bobbin mounted on said spindle, means for starting and stopping winding of said thread on said bobbin, a device for treating said thread, and means for relatively moving said device and said thread into and out of contact between said source and a bobbin on said spindle when said winding is stopped and started respectively.

2. In combination, a spindle for supporting a bobbin so that thread may be drawn from a source of supply and wound on a bobbin mounted on said spindle, means for starting and stopping winding of said thread on said bobbin, a holder for a thread treating substance, and means for actuating said holder to move said thread treating substance into and out of contact with a portion of said thread between said source and a bobbin on said spindle in timed relation with the stopping and starting of said winding, respectively.

3. In combination, a spindle for supporting a bobbin so that thread may be drawn from a source of supply and wound on a bobbin mounted on said spindle, power-driven means for rotating said spindle, means mounting said spindle so that it is normally out of engagement with said power-driven means and thread may be manually wound on a bobbin mounted on the spindle, a thread treating device normally positioned in contact with a portion of the thread between said source and said bobbin during the manual winding of said thread, and means for moving said thread treating device out of contact with said thread and for simultaneously moving said spindle into operative engagement with said power-driven means to wind said bobbin.

4. In a combination as defined in claim 1, with the addition of means for varying the amount of the thread between said bobbin and the zone of contact of said thread treating means with the thread.

5. In a combination as defined in claim 1, with the addition of means for varying the amount of the thread between said bobbin and the zone of contact of said thread treating means with the thread, said means comprising a plurality of pulleys over which the thread is run, at least one of which is bodily movable.

6. In a combination as defined in claim 3, the thread treating device comprising a container having a block of thread treating substance therein, said block being pressed into contact with the thread so that the thread is drawn over the block during the manual winding of the thread.

7. In combination, a base, a spindle for a bobbin, a bearing member for said spindle pivotally mounted on said base so that thread from a source can be wound on a bobbin mounted on said spindle, power-driven means for rotating said spindle, means actuating said bearing member to move said spindle into and out of engagement with said power-driven means, and a thread treating device connected to said bearing member so as to be moved into and out of contact with a portion of said thread between said source and said bobbin simultaneously with movement of said spindle respectively out of and into engagement with said power-driven means.

8. In combination, a spindle for supporting a bobbin so that thread may be drawn from a source of supply and wound on a bobbin mounted on said spindle, means for connecting and disconnecting said spindle to and from a source of power for winding and stopping winding of said thread on said bobbin respectively, and means for treating said thread and movable into and out of contact with a portion of said thread between said source and a bobbin on said spindle when said winding is stopped and started respectively.

9. In combination, a spindle for supporting a bobbin so that thread may be drawn from a source of supply and wound on a bobbin mounted on said spindle, means for connecting and disconnecting said spindle to and from a source of power for winding and stopping winding of said thread on said bobbin respectively, a holder for a thread treating substance, and means for moving a portion of said thread between said source and a bobbin on said spindle into and out of contact with said thread treating substance in said holder simultaneously with the stopping and starting of said winding.

10. In combination, a spindle for supporting a bobbin so that thread may be drawn from a source of supply and wound on a bobbin mounted on said spindle, means for connecting and disconnecting said spindle to and from a source of power for winding and stopping winding of said thread on said bobbin respectively, a holder for a thread treating substance, a guide for a portion of thread between said source and a bobbin on said spindle, and means for actuating said guide to move said portion of thread out of and into contact with a thread treating substance in said holder simultaneously with the connection and disconnection of said spindle to and from said source of power respectively.

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