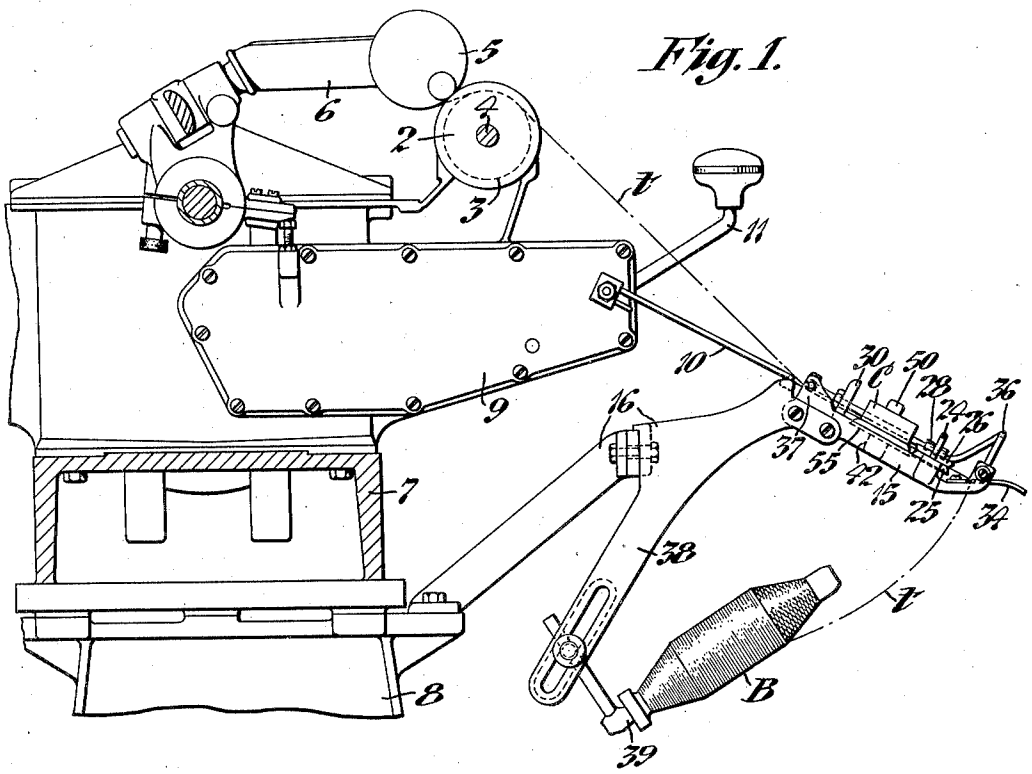
Nov. 19, 1940. H. W. HITCHCOCK 2,222,228

THREAD-WAXING DEVICE

Filed May 5, 1939 2 Sheets-Sheet 1

Fig. 1.



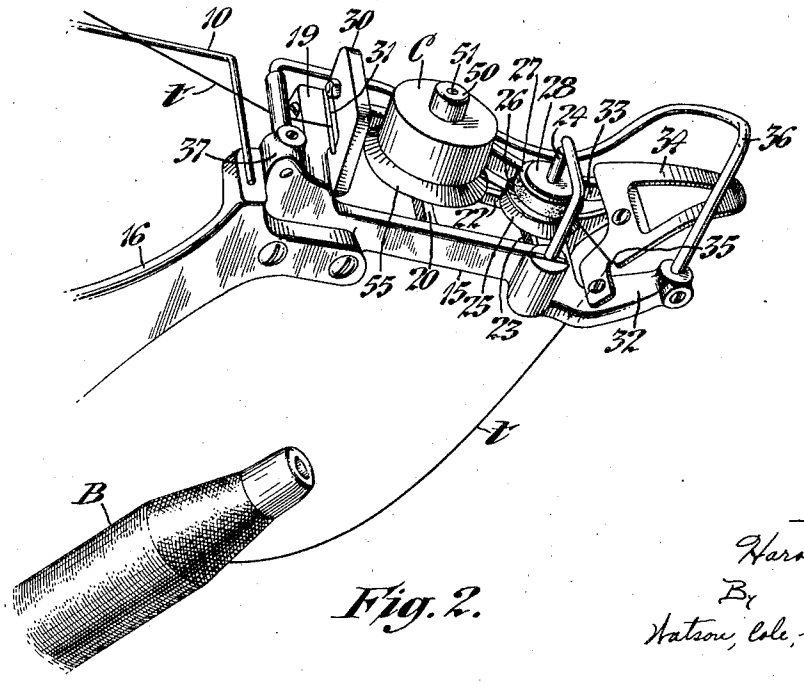


Fig. 2.

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Nov. 19, 1940. H. W. HITCHCOCK 2,222,228

THREAD-WAXING DEVICE

Filed May 5, 1939 2 Sheets-Sheet 2

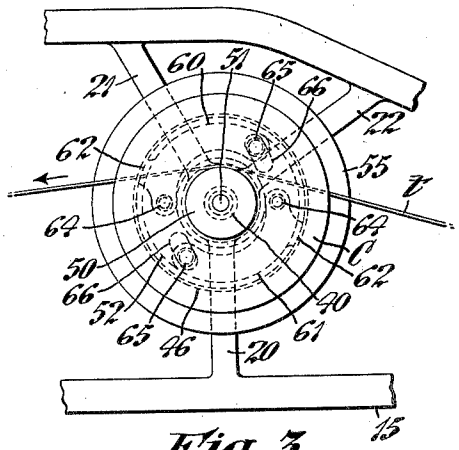


Fig. 3.

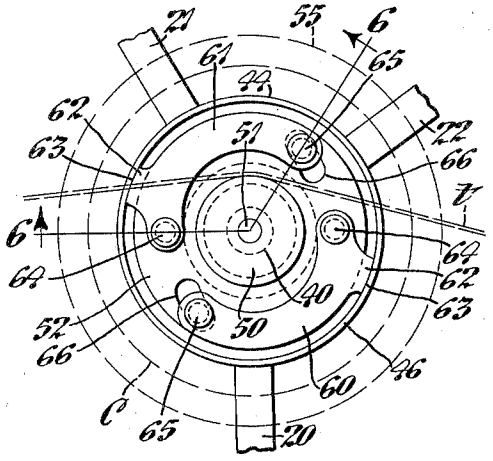


Fig. 4.

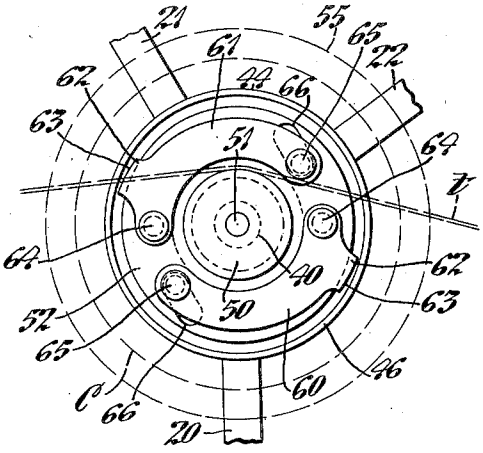


Fig. 5.

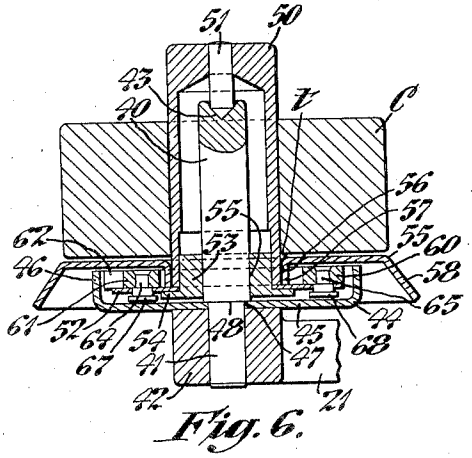


Fig. 6.

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UNITED STATES PATENT OFFICE

2,222,228

THREAD-WAXING DEVICE

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Application May 5, 1939, Serial No. 272,034

12 Claims. (Cl. 91—36)

This invention relates to devices for waxing or similarly treating thread and the like and more particularly to improvements in waxing devices of the type illustrated and described in United States Letters Patent No. 1,856,198 issued to E. R. Swanson on May 3, 1932.

It is to be understood that the term "wax" as used in the following specification and claims applies broadly to paraffin or any other suitable material or compound for treating the thread, and that the term "thread" is employed in a generic sense to indicate all varieties of strand material.

One of the objects of the present invention is to provide a device of the type indicated adapted to quickly decelerate the rotation of a wax-cake when the thread breaks to prevent the thread from winding on or accumulating in the device.

Another object of the invention is to provide a device of the type indicated having means for governing the rotation of the wax-cake to maintain a differential in the velocity of the thread and the wax-cake at the point of contact therebetween.

Another object of the invention is to provide a device of the type indicated having centrifugally-operated braking means for continuously applying a braking force on the rotatable holder or support for the wax-cake.

Still another object of the invention is to provide governing means of the type indicated which is of simple and compact construction to adapt it for economical manufacture and one which is entirely automatic in its operation to control the rotative speed of the wax-cake holder.

Further objects of the invention are set forth in the following specification which describes a preferred form of construction of the waxing device, by way of example, as illustrated by the accompanying drawings. In the drawings:

Fig. 1 is a view illustrating a portion of a conventional type of winding machine and showing the present improved waxing device as applied to use therewith;

Fig. 2 is an enlarged perspective view of the waxing device showing the manner in which the thread feeds between the wax-cake and holder on which it is mounted;

Fig. 3 is a plan view of the waxing device showing the relationship of the running strand and the holder for the wax-cake to cause the latter to rotate;

Fig. 4 is a plan view similar to Fig. 3 with the disk for supporting the wax-cake indicated in dash lines and showing the speed-responsive brake-elements on the holder in engagement with the brake-drum on the support;

Fig. 5 is a view similar to Fig. 4 showing the brake-elements moved radially inwardly away from the brake-drum; and

Fig. 6 is a sectional view taken on line 6—6 of Fig. 4 showing the construction and arrangement of the several elements of the waxing device.

Waxing devices commonly used in the present art comprise a freely rotatable holder on which a wax-cake is mounted to adapt a running thread feeding to a winding machine or the like to draw across the under side of the wax-cake and effect rotation of the cake and its holder. Considerable difficulty has been experienced with such waxing devices due to the fact that when the thread breaks the wax-cake continues to rotate, due to its momentum, causing the thread to be wound around the holder or snarled in an accumulation thereon. Moreover, it is desirable to maintain a differential between the linear speed of the running thread and the velocity of rotation of the wax-cake at the point of contact of the latter with the thread.

It has heretofore been proposed to avoid these faults in waxing devices by providing an eccentrically-weighted washer on which a wax-cake is supported and mounting the washer to rotate and rock freely about its axis of rotation. In operation, the rotation of the washer causes its eccentrically-weighted portion to intermittently engage a fixed abutment arranged tangentially of the washer. With such a construction the washer and wax-cake mounted thereon oscillate or wabble during their rotation and their speed of rotation is intermittently decelerated causing a variation in the tension applied to the running thread.

The present improved waxing device comprises, in general, a holder mounted to rotate about a fixed axis and adapted to support an annularly-shaped wax-cake. A brake-shoe on the holder is adapted to be shifted radially thereof and arranged to cooperate with a stationary brake-drum to apply continuous resistance to rotation of the holder. The braking means is speed-responsive and acts as a governor to control the turning of the wax-cake holder and to cause the rotation of the latter to be quickly decelerated and arrested when the thread breaks.

The waxing device of the present invention is

adapted for use with different kinds of textile apparatus and particularly on winding machines in which the thread is wound into various forms of supply packages such as spools, cops, bobbins or the like. In the present drawings the waxing device is illustrated as applied to a winding machine of the so-called surface- or drum-driven type wherein the cop or package is rotated by peripheral contact with a drive-roll or drum and the thread traversed thereon in opposite helical grooves on the surface of the drum. It is to be understood, however, that the present invention is not restricted as to its use on any particular type of machine as it may have many different applications.

Fig. 1 of the drawings illustrates a conventional type of winding machine and 2 designates a rotary drum or drive-roll having helical grooves 3 on its periphery for traversing the thread to-and-fro on the package. The drive-roll 2 is driven from a horizontal shaft 4 and arranged to rotate a cop-holder or yarn-receiver 5, herein illustrated in the form of a truncated cone. For this purpose the cop-holder 5 may be rotatably mounted at the end of a swinging arm 6, a portion of which is shown in Fig. 1 of the drawings. The details of the winding machine shown are illustrated and described in United States Letters Patent No. 2,144,192 issued to D. E. Mills on January 17, 1939. Suffice it to state herein that the machine comprises a bed 7 carrying bearings for the drive-shaft 4 and arms 6 of a series of winding heads with legs 8 for supporting the bed. A stopping mechanism for each winding head is provided in a hollow casing 9 on the bed 7, being arranged to swing the arm 6 away from the drive-roll 2 to disengage the package therefrom. The stopping mechanism is controlled automatically by a thread-bail 10 and adapted to be manually reset by a handle 11 to initiate the winding operation.

It is usual in winding machines of the present type to employ a tension-device to apply resistance to the draft of the thread *t* as it feeds to the winding package in order that the coils of thread may be laid firmly in place to build up a mass of the required density. A slub-catcher is also usually provided on such winding machines to clean the thread of slubs, motes and other foreign matter. In the winding machine herein shown the tension-device and slub-catcher are carried on a skeleton frame 15 mounted on a two-piece bracket 16 bolted to the front of the machine. The skeleton frame 15 is set at an angle substantially corresponding to the line of travel of the thread *t* and has a rearward bridge-like support 19, intermediate cross-webs 20, 21 and 22 and a forward support 23. Projecting upwardly from the forward support 23 is a pin or spindle 24 on which a pair of tension-disks 25 and 26 are rotatably mounted. The tension disks 25 and 26 have opposed convex faces, between which the thread *t* feeds and arranged thereabove is a weight-holder 27 carrying weights 28 for forcing the discs toward each other to maintain them bearing against the thread. The slub-catcher is mounted on the rearward support 19 of the frame 15 and comprises a plate 30 having a gauge-slot 31 therein through which the thread *t* draws.

Projecting from the forward support 23 of the skeleton frame 15 are a pair of spaced-apart arms 32 and 33 on which are mounted the elements of a self-threading device. A curved guide or horn 34 is mounted on the spaced arms 32 and 33 by means of screws or the like and has a notch 35 at one side for guiding the thread *t*. A curved wire bail or guide 36 has one end attached to the arm 32 by means of a set-screw or the like and extends upwardly and forwardly and then downwardly and rearwardly across the guide 34 to form a crotch therebetween. The guide 36 extends rearwardly and then across the frame with its opposite rearward end attached to a bearing 37 by means of a set-screw or the like. Depending from the bracket 16 is an arm 38 for adjustably mounting a spindle or support 39 for a supply-bobbin B, and the thread from the bobbin may be automatically threaded between the tension-disks 25 and 26 and into the gauge-slot 31 of the slub-catcher 30 by drawing it between the curved guides 34 and 36 of the self-threading device.

The present improved waxing device comprises a stationary support and a holder for the wax-cake rotatably mounted on the support. The support is in the form of a pivot-pin or post 40, see Fig. 6, having a reduced end 41 held fixedly in a hub 42 at the point of joinder of the three intermediate cross-webs 20, 21 and 22 of the skeleton frame 15. The upper end of the post 40 is recessed to provide a conical seat 43. A brake-drum 44, preferably formed of sheet-metal and having a flat circular portion 45 with a peripheral flanged rim 46 is mounted on the hub 42 of the bracket 15 with its rim concentric with the axis of the post. As illustrated in Fig. 6, the circular portion 45 of the brake-drum 44 has a central hole 47 through which the reduced end 41 of the post 40 extends and the shoulder 48 on the post clamps the drum fixedly in position on the hub 42 of the bracket 15.

The holder for mounting the wax-cake C comprises a thimble 50 having a depending axially-disposed pintle 51 at its upper end and a radially-extending flange 52 at its lower end. As illustrated in Fig. 6, the flange 52 is constructed as a separate part in the form of an annular disk, being mounted on the thimble 50 by means of a flanged bushing 53. The bushing 53 is forced into the open end of the thimble 50 and has a radial flange 54 which clamps the inner edge of the annular flange or disk 52 against the lower end of the thimble. The thimble 50 is telescoped over the post 40 with its depending pintle 51 seated in the conical seat 43 at the upper end of the post and the axial bore 55 of the bushing 53 closely fitting the post at the lower end of the holder to mount the latter for rotation about an axis coincident with the axis of the post.

Mounted on the wax-holder to rotate therewith is an annular disk 55 having an axial opening 56 of substantially the same diameter as the thimble 50 and a depending annular flange 57 at the edge of the opening adapted to seat on the radial flange 52 of the holder adjacent the thimble. A depending flange or skirt 58 is also provided at the outer peripheral edge of the disk 55 extending at an angle to the disk to provide a beveled or flaring rim for guiding the thread *t* between the disk and the wax-cake C mounted thereon. The depending annular flange 57 of the disk 55, being seated on the radial flange 52 of the holder, holds the disk spaced from the flange and above the edge of the flange 46 on the brake-drum 44. As illustrated in Fig. 2, the wax-cake C is of annular form and is adapted to be supported on the disk 55 with the thimble 50 extending through the central opening therein.

In accordance with the present invention

speed-responsive means are provided on the holder in the space between the disks **52** and **55** and arranged to cooperate with the brake-drum **44** to govern the rotation of the holder and wax-cake mounted thereon. As herein illustrated the speed-responsive means are in the form of arcuately-shaped members or arms **60** and **61**, each having a radially-projecting lug **62** adjacent one end with an arcuate face **63** of the same contour as the inner surface of the rim **46** of the brake-drum **44**, see Figs. 3, 4 and 5. The members **60** and **61** are arranged symetrically on the flange or disk **52** at opposite sides of the thimble **50**, being pivoted at their ends adjacent the lugs **62** by means of studs **64** projecting through holes in the flange. Depending studs **65** at the ends of the members **60** and **61** opposite their pivoted ends project through arcuate slots **66** in the flange **52** of the holder to guide the movement of the members. As illustrated in Fig. 6, the depending studs **64** and **65** have annular heads **67** and **68** at their free ends which underlie the flange **52** of the holder. The upper reduced portion of the studs **64** and **65** are riveted through holes in the members **60** and **61** to secure them fixedly thereto. A preferred embodiment of the invention having been described in detail the mode of operation of the device is explained as follows:

To prepare the machine for a winding operation a length of the thread *t* is drawn off from the supply-bobbin B and passed between the guides **34** and **36** of the self-threading device and through the slub-catcher **30**. The thread passes under the rearward end of the wire bail or guide **36** and is thence drawn across the bail **10** of the stopping mechanism, led up across the drive-roll **2** and its end attached to the core of the package to be wound. As the thread *t* is drawn through the self-threading device the guides **34** and **36** direct it into the notch **35** in the guide **34**, between the tension-disks **25** and **26**, also between the wax-cake C and its supporting disk **55** and into the slot **31** of the slub-catcher **30**.

The starting handle **11** of the winding machine is then depressed to cause the thread-receiver **5** mounted on the end of the swinging arm **6** to be lowered into engagement with the drive-roll **2**. The rotation of the drive-roll causes the thread-receiver to be driven therefrom by contact therewith and the helical grooves **3** in the periphery of the drive-roll traverse the thread to-and-fro to form a cross-wound mass. The tension-disks **25** and **26** apply tension to the running thread *t* to build a firm package on the thread-receiver **5** and the slub-catcher **30** operates to clean the yarn by removing slubs, motes or other foreign material.

The running thread *t* passing between the wax-cake C and the supporting disk **55** causes the holder and wax-cake to rotate. Thus a new surface of the wax-cake C is continuously presented to the thread and the latter is coated and impregnated with the wax. As the holder rotates the arcuate members **60** and **61** on the flange **52** of the holder are subjected to the action of centrifugal force which causes them to swing on their pivot-studs **64** to engage their arcuate faces **63** with the rim **46** of the brake-drum **44**. The members **60** and **61** thus act as brake-shoes to apply resistance to the rotation of the wax-cake holder and, due to the fact that the braking force is applied directly in proportion to the speed of rotation of the holder the braking means constitute a governor for controlling the rotation of the holder. Thus, the running thread is caused to move relatively of the wax-cake at its point of contact with the latter due to the braking force applied to the holder by the speed-responsive members **60** and **61**. If for any reason the thread *t* breaks the brake-members **60** and **61** act promptly to arrest the rotation of the holder and wax-cake C mounted thereon to prevent the thread from winding around the thimble **50** or otherwise accumulating between the surface of the cake and the disk **55**.

It will be observed from the foregoing specification that the present invention provides for quickly arresting the rotation of the wax-cake if the thread breaks and also for governing the rotation of the wax-cake holder to provide for the efficient operation of the device.

While the invention is herein shown as embodied in a preferred form of construction, it is to be understood that modifications may be made in the structure and arrangement of the parts of the device without departing from the spirit or scope of the invention. Therefore, without limiting myself in this respect, I claim:

1. A device for waxing thread and like strand materials comprising a rotatable holder for mounting the wax-cake, means for drawing the thread across a surface of the wax-cake to rotate the latter, and means comprising a centrifugally-operated member mounted for movement relative to the holder to govern the rotation of the wax-cake.

2. A device for waxing thread and like strand materials comprising a rotatable holder for mounting the wax-cake, means for drawing the thread across a surface of the wax-cake to rotate the latter, and means comprising a speed-responsive member operated by the rotatable holder and movable by centrifugal force to govern the rotation of the holder.

3. A device for waxing thread and like strand materials comprising a rotatable holder for mounting a wax-cake, means for drawing the thread across a surface of the wax-cake to rotate the latter, speed-responsive means mounted for relative movement on the holder under the action of centrifugal force, and means cooperating with the last-named means to maintain the velocity of rotation of the wax-cake at its point of contact with the thread less than the velocity of the running thread.

4. A device for waxing thread and like strand materials comprising a rotatable holder for mounting a wax-cake, a relatively stationary element means for drawing the thread across a surface of the wax-cake to rotate the latter, and means mounted on the holder for movement relative thereto under the action of centrifugal force and cooperating with the stationary element to arrest the rotation of the wax-cake promptly when the thread breaks.

5. A device for waxing thread and like materials comprising a stationary brake-drum, a rotatable holder for mounting a wax-cake, means for drawing the thread across a surface of the wax-cake to rotate the latter to constantly present new surface to the thread, and a centrifugally-operated brake mounted on the holder for movement relative thereto and cooperating with the brake-drum to retard the rotation of the wax-cake.

6. A device for waxing thread and like materials comprising a stationary brake-drum, a rotatable holder for mounting a wax-cake, means for drawing the thread across a surface of the

wax-cake to rotate the latter to constantly present new surface to the thread, and speed-responsive braking means mounted on the holder for movement relative thereto and cooperating with the brake-drum to retard the rotation of the holder and wax-cake mounted thereon.

7. A device for waxing thread and like materials comprising a stationary support embodying a brake-drum, a holder rotatably mounted on the support and adapted to mount a wax-cake, means for drawing the thread across a surface of the wax-cake to rotate the latter to constantly present new surface to the thread, and centrifugally-operated brake members mounted on diametrically-opposite sides of the holder and cooperating with the brake-drum to govern the rotation of the holder and the wax-cake mounted thereon.

8. A device for waxing thread and like materials comprising a stationary support embodying a pivot-post and a brake-drum concentric with the axis of the pivot-post, a holder mounted to rotate on the pivot-post and adapted to mount a wax-cake, said holder having bearings cooperating with the pivot-post at points spaced longitudinally thereof to cause the holder to rotate about the axis of the pivot-post, and centrifugally-operated brakes at opposite sides of the holder for cooperating with the brake-drum to govern the rotation of the holder and wax-cake mounted thereon.

9. A device for waxing thread and like materials comprising a stationary support embodying a pivot-post and a brake-drum concentric with the axis of the pivot-post, a holder for a wax-cake mounted to rotate on the pivot-post and having a radial flange within the brake-drum, and centrifugally-operated members mounted on the flange of the holder for movement radially thereof to engage the brake-drum to govern the rotation of the holder.

10. A device for waxing thread and like materials comprising a stationary support embodying a pivot-post and a brake-drum concentric with the axis of the pivot-post, a holder for a wax-cake having a thimble telescoped on the pivot-post and a radial flange within the brake-drum, said thimble having bearings cooperating with the pivot-post at points spaced longitudinally thereof to cause the holder to rotate about a fixed axis coincident with the axis of the pivot-post, and braking members pivoted at one end on the flange of the holder, said braking members being adapted to swing about their pivots during the rotation of the holder to engage the brake-drum.

11. A device for waxing thread and like materials comprising a stationary support embodying a pivot-post and a brake-drum concentric with the axis of the pivot-post, a holder for a wax-cake rotatably mounted on the pivot-post and having a radial flange, a disk mounted on the holder in spaced relation to the flange and adapted to support a wax-cake, and centrifugally-operated members mounted on the holder between the flange and disk adapted to engage the brake-drum to govern the rotation of the holder and wax-cake mounted thereon.

12. A device for waxing thread and like materials comprising a stationary support embodying a pivot-post and a brake-drum concentric with the axis of the pivot-post, a holder having a thimble concentric with the pivot-post and a radial flange within the brake-drum, said thimble having a bearing cooperating with the pivot-post for mounting the holder for rotation about a fixed axis coincident with the axis of the pivot-post, a disk mounted in spaced relation to the flange and adapted to support a wax-cake, and centrifugally-operated members mounted on the holder between the flange and disk adapted to engage the brake-drum to govern the rotation of the holder and wax-cake mounted thereon.

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