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[54] **WAXING OR PARAFFINING APPARATUS FOR YARN WINDERS**

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[51] **Int. Cl.** **B05c 11/00**

[58] **Field of Search** ..... 118/76, 77, 78; 117/120; 184/15 R; 51/1 NQ; 33/1 NQ

[56] **References Cited**

UNITED STATES PATENTS

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[57] **ABSTRACT**

To hold a cylindrical paraffin body in centered relationship with respect to its housing, and in predetermined position with respect to a thread to be waxed, a cylindrical body of paraffin is rotated, and pressed by spring pressure against a blunt, or shallow conical counter surface, the point of the cone providing a centering point for the cylindrical wax body.

8 Claims, 2 Drawing Figures

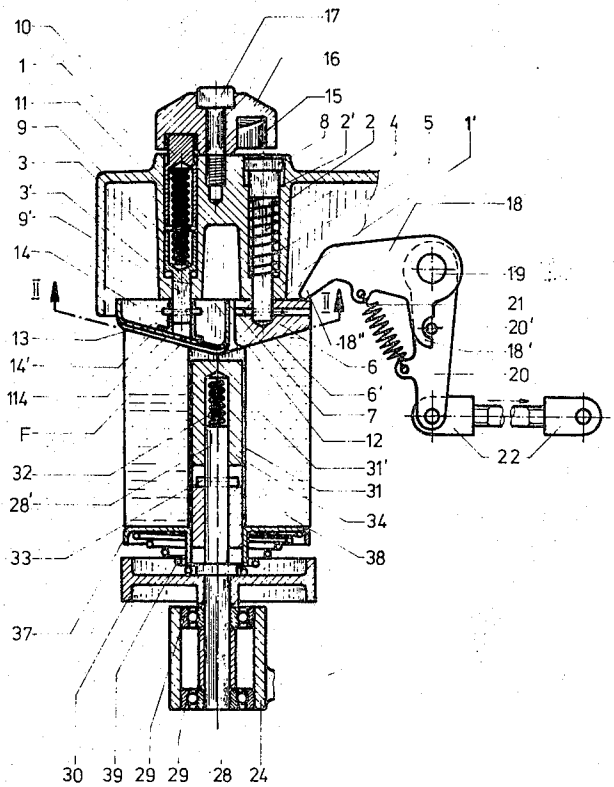

Fig. 1

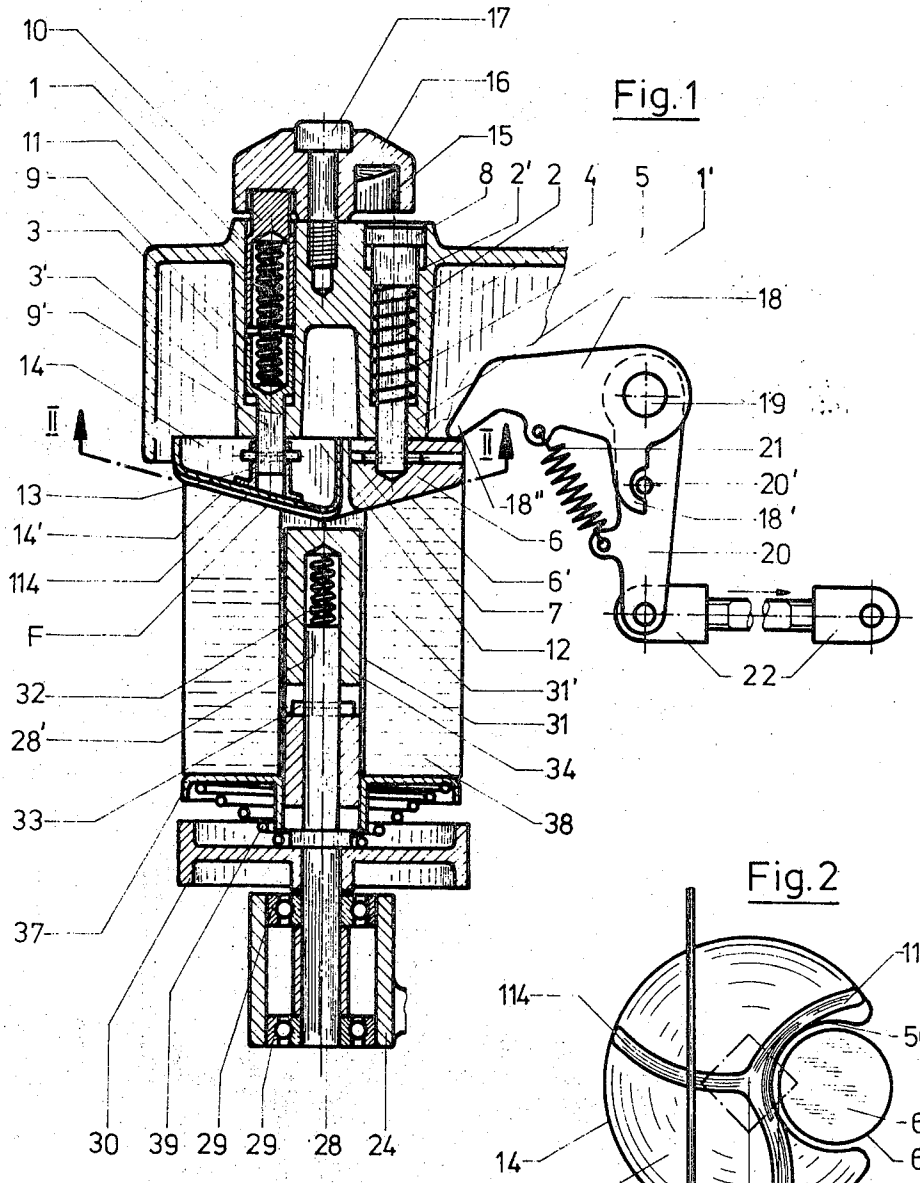
10
1
11
9
3
3'
9'
14
II
13
14'
114
F
32
28'
33
37
30
39
29
29
28
24
17
16
15
8
2'
2
4
5
1'
18
19
21
20'
18'
20
22
II
18"
6
6'
7
12
31'
31
34
38

Fig. 2

114
114
50
6'
6
14
14'
114
F
A

WAXING OR PARAFFINING APPARATUS FOR YARN WINDERS

The present invention relates to a waxing or paraffining apparatus for yarn winders, or spooling machines, and more particularly to an improvement of the type of machine disclosed in U.S. Pat. No. 3,358,641, assigned to the assignee of the present application.

It has previously been proposed — see specifically the cross referenced patent — to provide an essentially cylindrical body of paraffin or wax and axially feed this body towards one end face, which has a counter surface bearing thereagainst, a yarn or thread being passed between the bearing surface and the end face of the cylindrical body. The cylindrical body itself is rotated, in order to apply a predetermined and measured amount of paraffin or wax to the yarn passing between the end face of the cylindrical body and the counter surface.

It has been found in use, and particularly as speeds of spooling increase to higher and higher levels, that the paraffin body may not be securely guided with respect to centricity. The diameter of the paraffin body must have a certain size in order to permit easy mounting of this body on a central core. As a result, as the paraffin body is used up, and becomes shorter and shorter, it has the tendency to wobble, resulting in wavy appearance of the end face of the paraffin cylinder which is in contact with the yarn. Waviness will result in uneven application of wax on the yarn, or otherwise loss of control of application.

It is an object of the present invention to provide a paraffining, or waxing apparatus of the type previously disclosed in the aforementioned U.S. patent, and particularly which is compatible with it, so that the entire apparatus need not be replaced, and which permits high speed operation and avoids the difficulty arising with wobble, or loss of centricity of the paraffining body.

Subject matter of the present invention: Briefly, the counter surface against which the paraffin or wax body bears is formed to be conical, preferably comparatively bluntly, so as to provide a clearly defined center point for the paraffin body.

In a preferred form, the counter surface against which the cylindrical paraffining body bears is formed of a pair of elements, one having a substantially larger counter surface than the other. In effect, one counter surface is formed with a recess, or notch, or a removed area, this removed area being filled by the second counter surface. The arrangement is so made that the larger counter surface at least partially surrounds the smaller; the smaller counter surface, preferably, is located outside of the center of the counter surface, that is, beyond the center point of the cone and to one side thereof. The apparatus permits precise centering of the paraffin body on its axis of rotation independent of its axial length, and to maintain the pressure of application against the counter surface, which is resiliently supported, at a constant and even force, to ensure uniform application of wax on the yarn.

In accordance with a feature of the invention, essentially radially extending ribs, starting from the center point of the cone, are formed on the larger one of the bearing surfaces, so that the area of contact of the thread with respect to the counter surface is restricted to a minimum, thus decreasing friction on the thread and resulting contamination of the contact surface of the thread on the paraffin body, without interfering with wobble-free, centered rotation of the body which still can bear against the conical counter surface.

The invention will be described by way of example with reference to the accompanying drawings, wherein:

FIG. 1 is a generally schematic, longitudinal cross-sectional view through the apparatus of the present invention;

and FIG. 2 is a cross section along line II—II of FIG. 1.

The paraffin body 38 bears against a counter element generally shown at 1. The counter element 1 has a pair of parallel, relatively offset bores 2, 3, extending axially therethrough, the axes extending generally horizontally and transverse to the path of the thread F (FIG. 2). A bolt 4 with a shoulder is axially slidably located in bore 2. A spring 5 presses the bolt 4 outwardly, that is upwardly in FIG. 1. The inner end of bolt 4, which extends from the bore 2 has a counter, or abutment body 6 secured thereto by means of a pin 7. This body 6 may be plug-like (see FIG. 2). The axial slidable distance of bolt 4 is limited on the one hand by the counter body 6 and on the other by a button or head 8 on the bolt 4 which engages a shoulder 2' of the bore.

Bore 3 has two sleeves 9, 10 located therein, axially slidable, which are held spaced from each other by a compression spring 11. Sleeve 9 has an end 9' of reduced diameter, to which a counter element or counter body 14 is secured by means of a sleeve extension and cross pin arrangement, located within space 12. The arrangement is so taken that there is a small amount of play between the sleeves and the counter element in order to provide for a limited movement of the counter body 14. The axial shift of the sleeve 9 is limited to such an extent that the counter surface 14', at the bottom side (FIG. 1) of the counterbody 14 can extend, or retract with respect to the counter surface 6' of the counter body 6 by a slight distance. The sleeve 10 bears with its outer end surface against a helically rising surface 15 of a rotatable adjustment knob 16, which is secured by means of a holding screw 17 to the apparatus 1, and can be locked in relatively adjusted position.

A lever 18 is rotatably mounted on a pin 19, secured in fixed relation with respect to the apparatus, for example at the holding bracket therefor. Pin 19 also secures a second lever 20 which is connected to lever 18 by means of a tension spring 21, so that the extension pin 20' on lever 20 is pressed against an abutment surface 18' of lever 18. Lever 20 is connected to the stop motion device of the winding machine by means of a control link 22 and other linkage, or transmission devices, which may be mechanical, electrical, magnetic, electromagnetic, hydraulic or the like. The stop motion, or other control apparatus is controlled by the specific spooling spindle and may include, for example, a cam disk which moves the link 22 in the direction of the arrow upon detection of operating interference, or other reasons for removing of operating defects. The cam disk, or the like moves the levers 18, 20 in counter-clockwise direction, thus shifting the body 6 counter the action of the spring 5. Spring 20 compensates for any excess motion of link 22.

The apparatus is held in position on a support 24 which is connected to a machine element. The support 24 itself is movable from the position shown in FIG. 1, and can be swung out from its position into the plane

of the paper in order to permit exchange of the paraffin body **38** for a new one, when it is worn. Support **24** retains a drive shaft **28** by means of a pair of ball bearings **29.** It is retained in axial position by elements well known in the art, such as C-rings, distance sleeve spacers, a nut, or the like (not shown). A drive pulley **30** is connected to shaft **28** to rotate therewith. The free end **28'** of shaft **28** has a sleeve-like extension pin **31** extending therefrom to form a core or central holding element for the paraffin body **38.** The core **31** is longitudinally slidable, a spring **32** within the bore of core **31** bearing against the end face of drive shaft **28.** Core **31** is connected by means of a pin **33** with the shaft **28** so as to rotate therewith. The pin **33** is retained in the sleeve of the core **31** by an elongated opening so that the sleeve is axially slidable on the shaft **28.** Spring **32** retains the sleeve **31** in its outer end position. Sleeve **31** has an outer cross section which is square (see FIG. **2,** chain-dotted lines) and, at its bottom, is secured to a guide disk **37** which has a hub shaped to accept the core **31** and is longitudinally slidable thereover. Core **21** retains the paraffin body **38** to be longitudinally slidable thereon, engaged by the square outer aspect of the core **31,** which matches a square hole in the paraffin body **38.** A compression spring **39** is located between the guide disk **37** and the drive pulley **30,** and tends to bias the guide disk **37** in upward direction (FIG. **1**) towards the counter elements **6** and **14.**

The paraffin body **38** is positively centered. It is guided by a guide disk **37** and, since the two counter elements **6, 14,** form counter surfaces **6', 14',** of conical shape, a centering point is formed for the paraffin body **38,** as clearly appears in FIG. **1.** The paraffin body itself is formed with a suitable matching depression into which the cone formed by the counter elements **6, 14,** fits.

The cone is comparatively shallow, or blunt, and a tip angle in the order of 150° is suitable, although this angle is not critical and may be more or less.

The guide surface **14',** as clearly appears from FIG. **2,** has circular cross section and is substantially larger than the guide surface **6'** of the counter element **6.** The cross section of the counter element **6** is preferably also circular. The counter surface **14'** is formed with a recess, or cut-out, or hollow **50,** which is so shaped that the remainder of the surface **14'** surrounds, at least in part, the surface **6'.** The circumference of the counter element **6** is so selected that some distance A will remain between the circumference of the surface **6'** and the center, or point of the cone formed by the entire, composite counter surface **6'** and **14'.**

The counter surface **14'** is formed with three ribs **114** which extend generally radially from the center, or point of the cone outwardly and which are provided to press the thread F, under the affect of spring **11,** against the paraffin body **38.** These ribs are preferably shallow and may be slightly S-shaped, as clearly appears from FIG. **2,** the ribs at least partly surrounding the body **6,** at its surface **6',** and lying adjacent the edge of the surface **14'.**

Operation: FIG. **1** illustrates the normal operating position, that is the working position of the various parts. Spring **39** which has a very flat characteristic presses the disk **37,** and hence the cylindrical paraffin body **38** against the counter elements **6, 14,** so that the cylindrical element **38** will bear against the surfaces **6', 14',** that is, against the surface region **1'** of the counter body **1.** Wear and use of the wax or paraffin body **38** is compensated by spring **39,** which feeds the body **38** axially. The counter element **6** is additionally pressed by spring **5** against the zone **1',** so that the position of the surface **6'** is retained without change. Thus, the position of the end surface of paraffin body **38,** from which the paraffin or wax is delivered, remains relatively unchanged, and the position of the end surface **14',** or the ribs **114,** respectively, between which the thread F to be waxed runs, remains relatively unchanged. The force with which the counter element **14** is pressed against the paraffin body **38** is determined by the compression spring **11,** which is adjustable, by rotating the adjustment knob **16** with its helically rising surface **15,** thus changing the axial position of sleeve **10** and with it the bias of the compression spring **11.** The plane at which the waxing occurs remains unchanged, so that the compression spring **11** always will be at the same spring position, thus providing for compressive force of the counter body **14** against the body **38** which is steady, and independent of the length of the paraffin body **38.** As a result, the degree of wear of the paraffin body, that is, use of the paraffin during waxing remains at a constant rate and permits working with smallest compressive forces. This ensures uniform economical application of wax. The characteristics, and the force of spring **39** should be so selected that for any operating position its force of application is greater than that of the spring **11.**

The paraffin body **38** is driven by driving the pulley **30;** the paraffin body is simultaneously precisely centered by the conical surfaces **6'** and **14'.**

In case the thread should break, link **22** is pulled to the right by a stop motion device, not shown, thus rotating the lever arm **20** and, over spring **21,** lever arm **18** in counter-clockwise direction. Lever **18** will then press with its nose **18''** against the counter body **6** to press counter body **6** in opposite direction to the spring **5,** together with the paraffin body **38** and against spring **39** downwardly, until the head **8** of the bolt **4** engages the shoulder **2'** in the counter unit **1.** Moving the paraffin body axially downwardly (FIG. **1**) causes eventually engagement of the body **6** against the pin **31** to also move the pin or core **31** counter the spring **32.** The counter body **14** will follow, due to the spring **11,** until the sleeve **9,** with its shoulder, engages shoulder **3'** in the counter unit **1.** The body of wax or paraffin **38** is pressed downwardly farther, by engagement of element **6** against the center core **28** than the motion of element **14** to form a gap, between which the thread F, now spliced to the preceding or broken thread, can be inserted, or, to permit insertion of the thread between the ribs **114** and the paraffin body **38,** respectively. After repair of the thread break, link **22** is released, and the spinning or spooling machine can be started again; all the elements are returned to their original position, as shown in the drawings, by means of the springs **5, 32** and **39** for continued operation.

To insert a new paraffin cylinder **38,** the core **31** together with support **24** are swung sideways, or laterally, a new paraffin body is inserted on the core **31** and the core **31** with the new body is again swung into the working position, as shown. To positively seat the paraffin body, and get around the slant of the cone, the paraffin body can be depressed by hand against the force of the spring **39** to snap the paraffin body into

positively centered position and in engagement with the composite conical surfaces 14', 6'.

Various changes and modifications may be made within the scope of the inventive concept.

I claim:

1. In a waxing apparatus for yarn winders, a cylindrical body of wax or paraffin,

means rotatably holding said cylindrical body;

spring means urging said cylindrical body in axial direction;

a counter support means having a counter surface against which the cylindrical body is urged,

the improvement wherein

the counter surface formed by said counter support means is generally of conical shape and forms a centering point for the body of wax or paraffin and said apparatus adapted for passage of yarn between the counter surface and said body.

2. In the apparatus of claim 1, the conical surface being blunt and having a cone point angle in the order of 150°.

3. In the apparatus of claim 1, the counter support means comprising two counter support plugs, one having substantially more counter support surface than the other, the larger counter support plug being of generally conical form with an essentially cylindrical recess or cut-out and reaching around the recess, the smaller counter support plug fitting into said recess or cut-out and having a support surface matching the generally conical surface of the larger plug to form with the larger plug an essentially uniform conical surface,

and wherein the smaller support surface is generally located beyond the center of the conical support surface.

4. In the apparatus of claim 1, the counter support means comprising two counter support elements, one element having substantially more counter support surface than the other, the larger counter support element being of generally conical form with an essentially cylindrical cut-out reaching around the cut-out, the smaller counter support element fitting into said cut-out and having a support surface matching the generally conical surface of the larger element to form with the larger element an essentially uniform conical surface, and axially extending ribs formed on the larger support element and extending from the center of the conical surface approximately radially.

5. In the apparatus of claim 4, at least some of the ribs being located at least in part adjacent the edge next to said cut-out.

6. In the apparatus of claim 4, at least one of the ribs extending in slightly "S" curve in their longitudinal extent from the center of the cone to the outer edge thereof.

7. In the apparatus of claim 4, wherein one of the ribs is located substantially adjacent the edges defining said cut-out, and extending from the center of the cone:

and another rib extends in part from the center of the cone a further edge portion of said cut-out, said other rib having a slightly "S" shaped curvature following said edge over part of its length.

8. In the apparatus of claim 4, wherein said ribs are shallow and project only slightly from the larger counter surface.

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