

[54] **COMBINED THREAD-FEEDING AND LUBRICATING DEVICE FOR KNITTING MACHINES**

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[58] Field of Search**66/125 A, 132, 132 T; 242/47.01, 47.12; 28/59; 57/35; 118/8, 325**

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[57] **ABSTRACT**

A thread lubricating device for use with a knitting or other textile machine. Thread is withdrawn from a supply spool and fed tangentially onto a drum. Means are provided for moving said thread axially along said drum from one end thereof to the other. Lubricant is applied to the surface of said drum and absorbed therefrom by the thread. After leaving said drum, said thread is then conducted to appropriate utilizing means.

6 Claims, 3 Drawing Figures

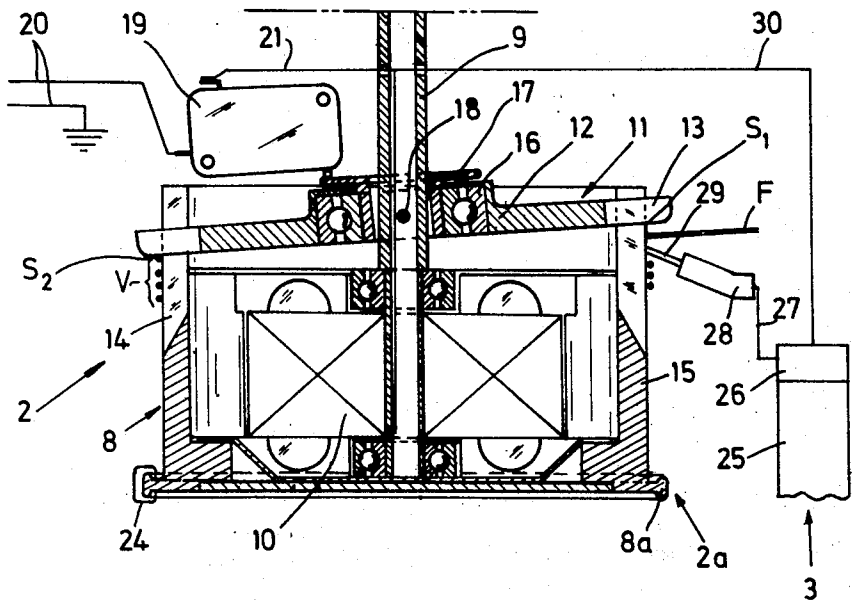
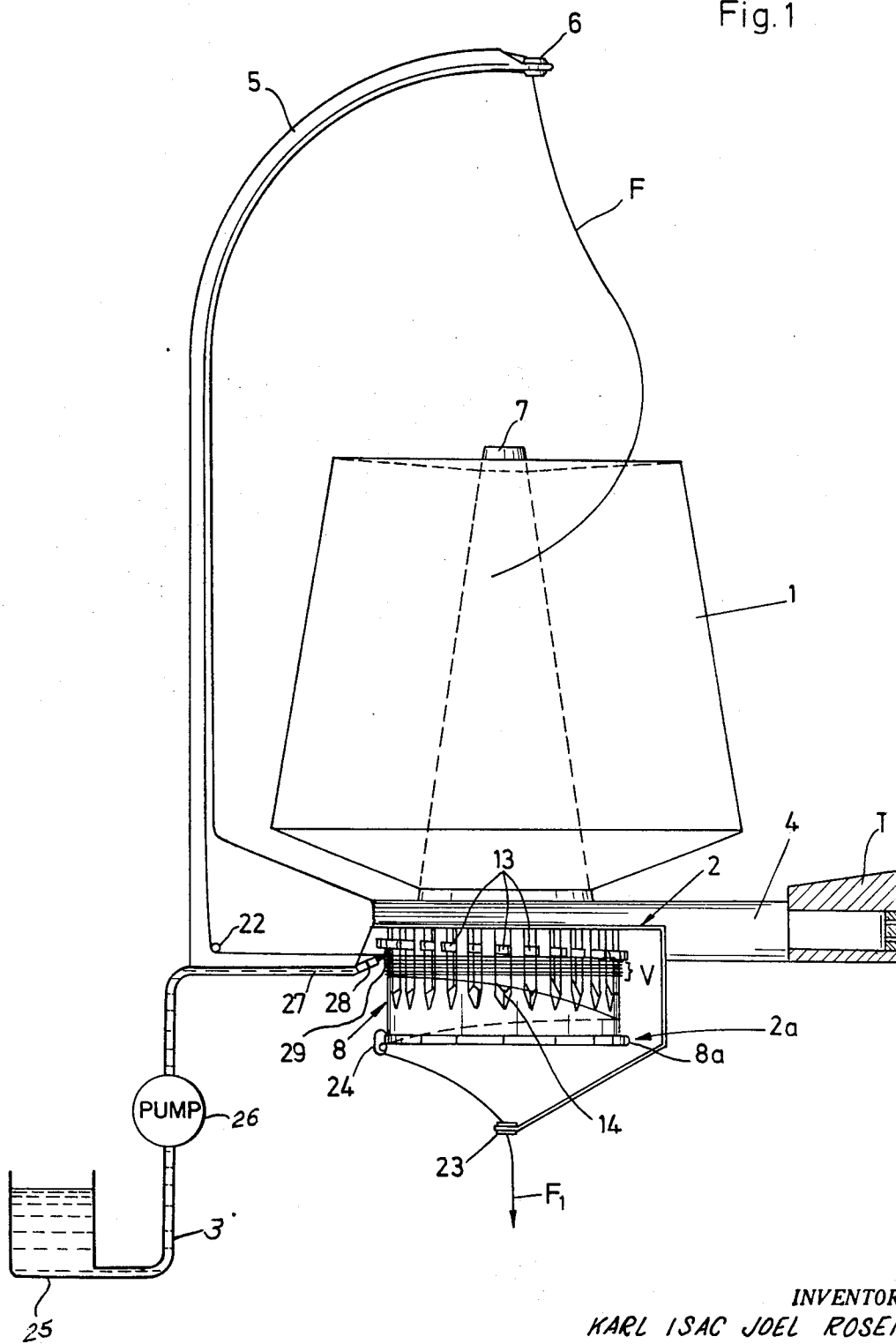
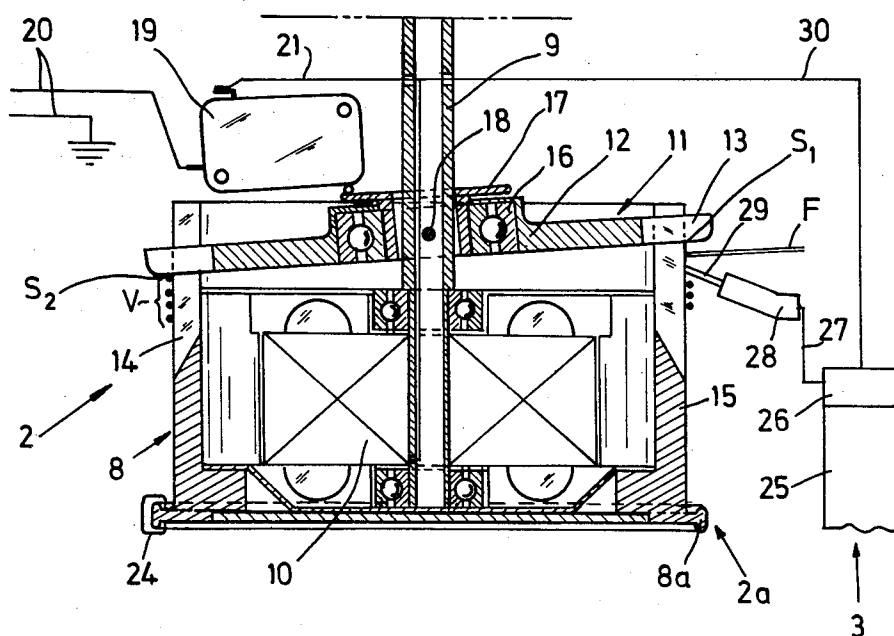


Fig. 1



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Fig. 2



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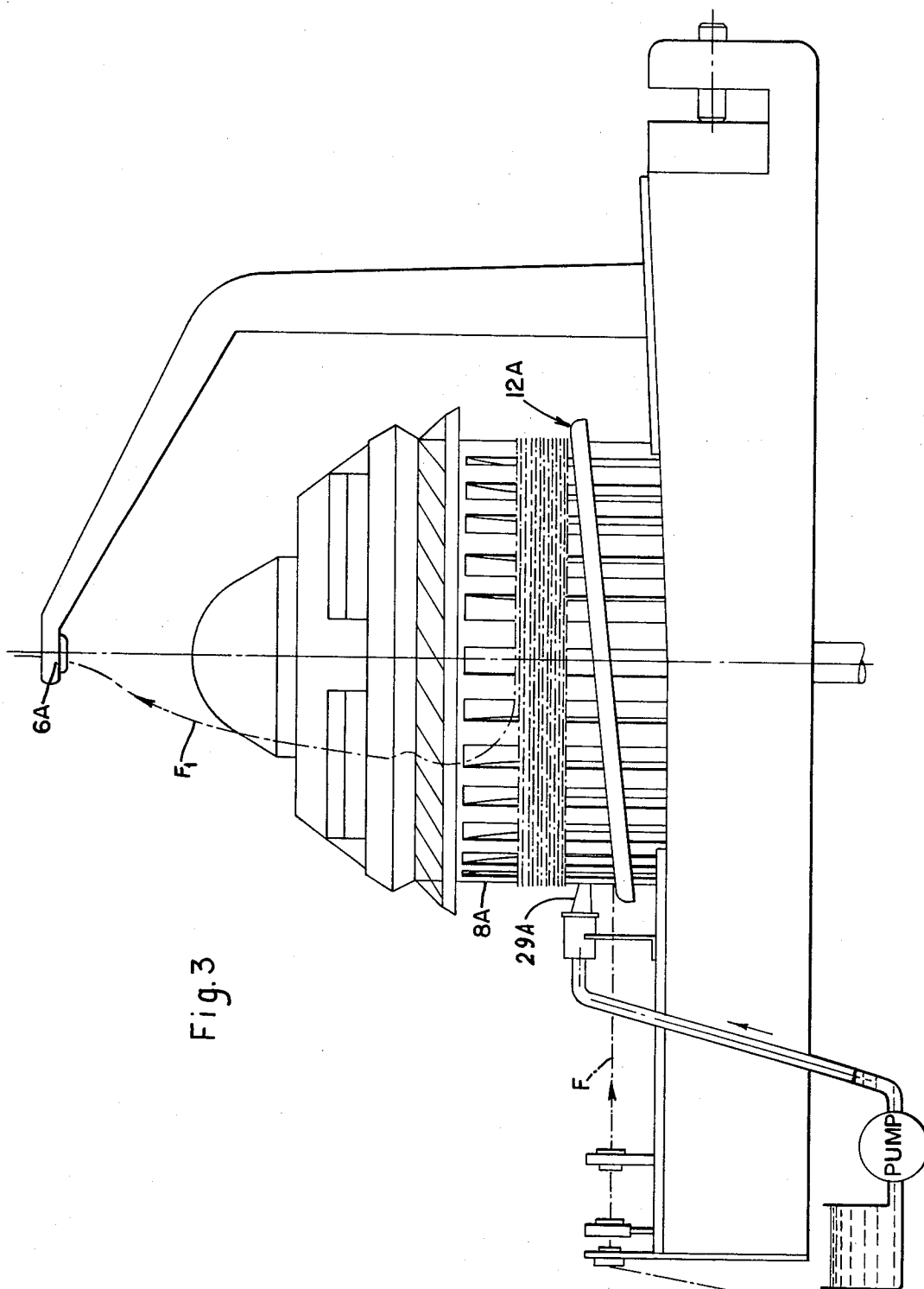


Fig. 3

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COMBINED THREAD-FEEDING AND LUBRICATING DEVICE FOR KNITTING MACHINES

The invention refers to a combined thread-feeding and lubricating device for a textile machine, particularly a knitting machine designed to work with lubricated threads, and wherein said device takes the thread off the supply spool and brings it directly to the knitting mechanism.

In order to reduce the friction between the thread and the knitting needle, as well as with other mechanical parts of knitting machines and other textile machines which must come in contact with a thread, the trade has employed the technique of treating the thread with oil or paraffin. Up to now, the oil and the paraffin were respectively applied to the thread prior to its mounting in spool form and attachment to the spool rack of the knitting machine. Since knitted goods of uniform stitch size can be manufactured only when the thread is fed to the knitting machine with uniform tension, knitting machines which do not have a separate thread supply mechanism are normally equipped with high-quality thread spools on which the thread is wound with a high degree of uniformity. Such spools are usually obtained after the thread is rewound several times over. The oil and paraffin was then applied in the final rewinding operation, i.e., at the time of achieving the high-quality spools with intended use for knitting machines.

However, whenever spools with synthetic threads are stored for a period of time, the oil in the spool penetrates to the interior, so that the outer thread layers are oiled to a much lesser degree than those on the inside. This resulted in the problem that at the beginning of a spool the knitting machine had to utilize a poorly oiled thread and at the end of a spool, an excessively oiled thread. For example, 6 percent of oil is frequently used relative to the thread weight, but it has often occurred that the thread of a stored spool in its outer layers showed only 1 percent by weight of oil.

At the same time, thread feeding devices are frequently used with knitting machines and other textile machines. These mechanisms take the thread off the supply spool and feed it with uniform tension to the respective knitting or other manufacturing system. It has been found that with the use of such a thread feeding device, no high-quality spools are essential because any lack of uniformity in the windings of the supply spool is equalized by the thread feeding device, without any adverse effects on the overall stitching output of the knitting machine. Therefore, with machines equipped in such fashion, one could use so-called dye packages; these are cylindrical cross wound packages which are produced subsequently to the dyeing of the thread. However, in order to obtain the desired high-quality precision spools, they must be respooled. As was previously mentioned, oil or paraffin is ordinarily applied during this final respooling process, which is not the case with color spools. For that reason, the advantage of a machine equipped with a thread-feeding device is unavailable with color spools. They cannot be directly introduced to the knitting machine or similar machines, because an oil or paraffin treatment of the thread is yet required.

It is the object of this invention to equip textile machines, particularly knitting machines of the type mentioned above, in such a way as to allow the use of supply windings of unoled thread.

In machines equipped according to the invention, the thread is treated by the machine itself with the necessary lubricant. The point of lubrication is chosen in such a manner so as not to inhibit in any way the uniform tension of a yarn or strand consumed by a textile machine, particularly a knitting station, ordinarily obtained by the threading device. With machines equipped according to the invention, it is therefore possible to use color spools or other relatively unevenly coiled spools of unoled thread. This results in a significant economic advantage because thread spools of this type are much less expensive.

According to an added improvement of the invention, it is intended for machines equipped with a threading mechanism and possibly a storage device shaped like a drum to which the thread coming from the supply spool is led tangentially, to arrange the lubricating device in relation to the drum in such a way that the lubricant, such as oil, is applied to the outer surface section across which the thread runs. In as much as the thread in this case takes oil directly from the surface of the drum of the threading device, a uniform and intensive lubrication is assured.

For knitting machines or similar apparatuses which have a threading and thread storage device that is shaped like a drum with a guiding element and axial transport system for the thread supply, inclined in the direction of the drum's axis and with arms attached to its outside which guide the thread to the take-off point of the drum, whereby the thread from the supply spool is tangent to the drum and is led across it in a surface area located between points which are closest to the take-off point and farthest from an imaginary cross section between the arms and the drum circumference, it is appropriate to have the lubricating device of the threading and storage mechanism arranged in such a manner that the oil is applied to the thread-free drum surface area located between such points which area is subsequently overridden by the thread windings in the axial direction. In this case, the oil is applied to a drum surface section across which the thread is moving in axial direction while coiling around the drum. In this process it absorbs the oil particularly well from the drum surface and is uniformly lubricated all around.

It is of advantage to equip the lubricating device with an oil supply tank, a pump, a pipe and a lubrication element.

For textile machines, particularly knitting machines, the threading and thread storage device of which has a guidance element which controls the rotary drive of the drum of the mechanism, it is, according to a preferred embodiment of the invention, intended to have the guidance element simultaneously control the driving mechanism of the lubricating pump in such a manner that it supplies oil only when the drum is rotating. In this way an excessive amount of oil will not be applied to the drum of the threading device while the drum is standing still. An application of oil takes place only then when thread which can absorb the applied oil is being led to the drum.

In case a knitting machine has several knitting components, it may be sufficient to provide only a portion of the system with an oil application device for the respective threads being fed.

A variety of embodiments of the invention are illustrated in the drawings, as follows:

FIG. 1 shows a schematic side view of a threading and thread supply mechanism for a textile machine with an attached oil lubrication device.

FIG. 2 shows an enlarged cross-sectional representation of the storage drum of the device according to FIG. 1 with a schematically indicated lubricating device.

FIG. 3 shows a further modification of the invention essentially similar to FIG. 1 but with the thread running in the opposite direction.

FIGS. 1 and 2 show the threading system of a conventional knitting machine (not shown). A thread F comes from the supply spool 1, goes over a thread storage device, labeled generally as 2 and moves from there, as indicated by F_1 to the knitting system of the knitting machine. A lubricating device, labeled generally as 3 is placed in the thread path between the take-off point of the supply spool 1 and the take-off end 2a of the threading mechanism, and is used for the lubrication of the thread F.

In particular, a fastener 4 is attached to a support T with an arm 5 extending upward and slightly bent. The free end of the arm 5 is provided with an ear or guide 6. On the top side of the fastener 4 is a spool support 7 for the thread spool 1.

To the underside of fastener 4, the thread feeding and thread storage device 2 is attached. This device includes a storage drum 8 which is rotatable and is supported by a shaft 9 which is attached to the fastener 4. The storage drum 8 can be rotated with the aid of an internally mounted motor 10. On the inside of the drum 8 is a guidance and supply element, generally labeled as 11 which controls the thread supply V on the drum 8. This element is in the form of a disk 12, which has spoke-like arms 13 extending through lengthwise cuts 14 formed in the drum wall 15. The ends of the arms 13 extend to the outside beyond the surface of the drum 8. The disk rests on a ball bearing 16 on a support 17 which can be swung out and which is mounted on a pin 18 and in turn is supported by the shaft 9. With the aid of a switch 19, as illustrated in FIG. 2, the disk is moved into a slanted position. It can, however, swing about the pin 18 in clockwise direction, as in FIG. 2, according to the switch pattern necessary for the operation of the switch 19. The switch 19 is included in electric feed circuit 20 and is connected by the lead 21 with the driving motor 10.

During operation, the thread F is wound around the rotating storage drum 8. The thread comes from the supply spool 1, goes through the ear 6, is led along the arm 5 and is guided around element 22 on fastener 4 prior to being wound around the drum 8. In the reversed representation of FIG. 2 opposite to FIG. 1, one can see how the thread is wound onto the drum from the right hand side, particularly in a surface area of the drum 8 which is located between the imaginary intersection S_1 , farthest from the take-off point 2a of the device, and an imaginary intersection S_2 , nearest the take-off point 2a, between the underside of the

guidance or control element 11 and the surface of the drum 8. Because of the slanted position of the disk 12, a maximum of one wrap-around of thread is wound on the drum in the surface area defined between the points S_1 and S_2 . The thread in this area is then axially pushed by said disk 12 in the direction of the take-off point 2a, resulting in a thread supply V being formed on the drum surface below point S_2 . Out of this supply, the thread is withdrawn past a lower flange edge 8_a of the drum 8 and approaches the knitting system of the knitting machine through a thread guidance ear 23. The flange 8_a is profiled. On it runs a guide ring 24 through which the thread is guided and thus is somewhat slowed.

The winding process lasts until a certain maximum quantity of thread is wound up. The disk 12 is then tilted clockwise by the thread supply so that the closed switch 19 is opened. Thereby the supply of electric current to the driving motor 10 for the drum 8 is interrupted. When the thread supply V is reduced by the withdrawal of the thread at F_1 to a point which allows the spring action of the switch to reverse the motion of the disk 12, the thread supply is pushed by the arms 13 along the drum surface toward the bottom, and the supply of electric current is now again possible through switch 19. The drum 8 is again rotated to wind thread thereon.

The lubricating device 3 is also attached to the holder 4. It shows an oil supply tank 25 and an oil pump 26. The pump 26 is connected to a felt clamp 28 through a pressure pipe 27. In the felt clamp 28 is a felt applicator 29 which rests with its free edge on the surface of the drum 8; particularly in the area where the thread is wound onto the drum 8 but in the direction of rotation in front of the first point of contact between the thread F and the drum surface. The motor drive of the pump is connected through an electric wire 30 to the switch 19 so that the pump motor is turned off and on simultaneously with the motor 10.

When the drum 8 rotates, the pump 26 supplies oil through the pipe 27 to the felt 29, being a flexible and absorbent material, then the felt applies the oil to the drum in the above mentioned surface area section. The thread F moves through this section while being wound onto the drum 8 and takes up the required quantity of oil. Whenever the drum 8 stands still, the pump 26 ceases to supply oil, so that no excessive oil is applied to the drum 8.

In FIG. 3 there is shown an arrangement essentially similar to that shown in FIGS. 1 and 2 but with the thread running in the opposite direction. The parts corresponding to the parts shown and described in connection with FIG. 1 are here shown by the same numerals with an A written thereafter. It will be understood that said parts correspond to the parts described in connection with FIGS. 1 and 2 and no further description thereof will be needed.

In this embodiment the thread F is guided onto the lower end of the drum 8A is urged by the disk 12A upwardly, with the thread F_1 being withdrawn upwardly through the guide 6A. As before, the lubricating applicator 29A is located to discharge lubricant onto the drum surface at a point between the uppermost point of the disk 12A and the point of winding the threads on the drum 8A. Thus, a thread passing through the zone

to which lubricant is applied will readily and effectively soak up lubricant and thereby become well lubricated as further above described.

The scope of the invention is not restricted to the illustrated models. In addition to oil, other lubricants may be used to lubricate the thread. The concept, therefore, is to indicate merely the application of means which are employed for the direct application of lubricants (such as oil, paraffin, etc.) to the thread. The invention may also be applied to other types of textile machines, inasmuch as an lubricant treatment of the thread is found to be appropriate in the use with such machines.

I claim:

1. In a textile machine, in particular a knitting machine, designed for use with lubricant treated threads, and equipped with a thread storage device which takes the thread off a supply spool and conducts it to the knitting system, the improvement comprising a lubricating device disposed between the take-off point of the thread storage device and the thread supply spool for the direct lubrication of the thread, the storage device including a drum toward which the thread is fed tangentially from the supply spool, the drum having a plurality of circumferentially spaced and longitudinally extending slots formed therein, the storage device also including a guidance and axial transport element for the thread supply which is slanted in relationship to the drum's axis, said transport element being equipped with arms extending through said slots and positioned on the outside of the drum circumference for axially transporting the thread to the take-off point of the drum, whereby the thread coming from the supply spool is led to the drum tangentially at a take-on point of the drum surface area which is located between a first imaginary point of intersection of the arms and the drum circumference farthest from the take-off point of the drum and a second imaginary point of intersection of the arms and the drum circumference closest to the take-off point, this drum surface area having a maximum of one wrap-around of thread thereon located between said first and second points of intersection, and the lubricating device being arranged in relation to the drum in such a manner that the lubricant is applied directly on a section of said drum surface area between said first and second imaginary points of intersection, this drum section being first thread-free and subsequently overridden by the one wrap-around of thread as it is pushed in the axial direction of the drum by the transport element.

2. A textile machine according to claim 1, wherein the lubricating device includes an oil supply tank, an oil applicator for applying the oil on the surface of the drum, and pump means disposed between the tank and the oil applicator for pumping oil from the tank to the applicator.

3. A textile machine according to claim 2, further in-

cluding motor means connected to said drum for rotatably driving same, and control means coacting with said guidance element for controlling energization of said motor means, said control means including means for simultaneously controlling said pump means for causing oil to be supplied to the drum surface only when the drum is rotating.

4. An apparatus for supplying thread to a textile machine, particularly a knitting machine, said apparatus including a storage mechanism adapted to have thread wound thereon, said storage mechanism including a drum adapted to have the thread wound on the periphery thereof, and means associated with said storage mechanism for drawing thread from a thread storage spool and for feeding same tangentially onto said drum, said storage mechanism including a guidance and axial transport element which is slanted in relationship to the drum axis and is provided with arms positioned on the outside of the drum circumference for pushing the thread stored on the drum axially toward the pulling off end of the drum, whereby the thread coming from the storage spool is fed tangentially to the drum at a take-on point of the drum surface area which is located between a first imaginary point of intersection of the arms and the drum circumference furthest from the thread pull-off point and a second imaginary point of intersection of the arms and the drum circumference closest to the pull point, this drum surface area having a maximum of one wrap-around of thread thereon located between said first and second points of intersection, the improvement comprising a lubricating device associated with the drum for applying lubricant directly onto the surface of the drum in a region thereof on which the thread is wound, the lubricating device being arranged in relation to the drum such that lubricant is applied directly on a section of said drum surface area between the first and second imaginary points of intersection, this drum section being first thread-free and subsequently overridden by the one wrap-around of thread as it is pushed axially toward the pulling-off end of the drum by the transport element.

5. A thread feeding apparatus according to claim 4, wherein the lubricating device includes oil storage means, an oil applicator for applying the oil onto the surface of the drum, and pump means for supplying oil from said storage means to said applicator.

6. A thread feeding apparatus according to claim 4, wherein said lubricating device includes an oil applicator mounted adjacent the periphery of said drum, said oil applicator member being of a flexible and absorbent material and being disposed in engagement with said drum surface area, and means for supplying oil to said applicator member, whereby said applicator member causes oil to be applied to said drum surface area as said drum is rotated.

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