

[54] **THREAD STORAGE AND DELIVERY
DEVICE FOR TEXTILE MACHINES**

[72] Inventor: **Karl Isac Joel Rosen**, Villa Haga, Ulricehamn, Sweden

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Primary Examiner—Stanley N. Gilreath

Attorney—Woodhams, Blanchard and Flynn

[57] **ABSTRACT**

A thread storage and delivery device for conveying a thread from a spool to a working point on a textile machine. The thread is delivered to a storage drum in a substantially tangential direction in the region of a slide cone. The thread is draw-able from the storage drum in an axial direction while the force serving to draw the thread from the spool is imparted to the thread by means of a friction driving surface which is looped at least once by the thread. The storage drum has a storage section which is smaller in diameter than the remainder portion thereof and the thread turns are conveyed from the slide cone in an axial direction into the storage section to form at that point a double layer, or multiple layer coil from which the thread can be drawn out.

17 Claims, 5 Drawing Figures

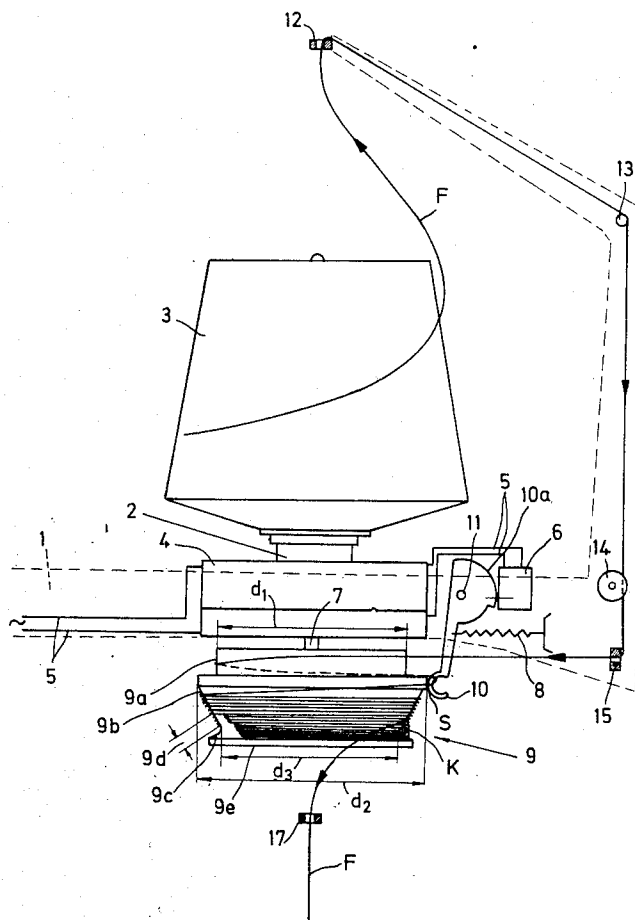
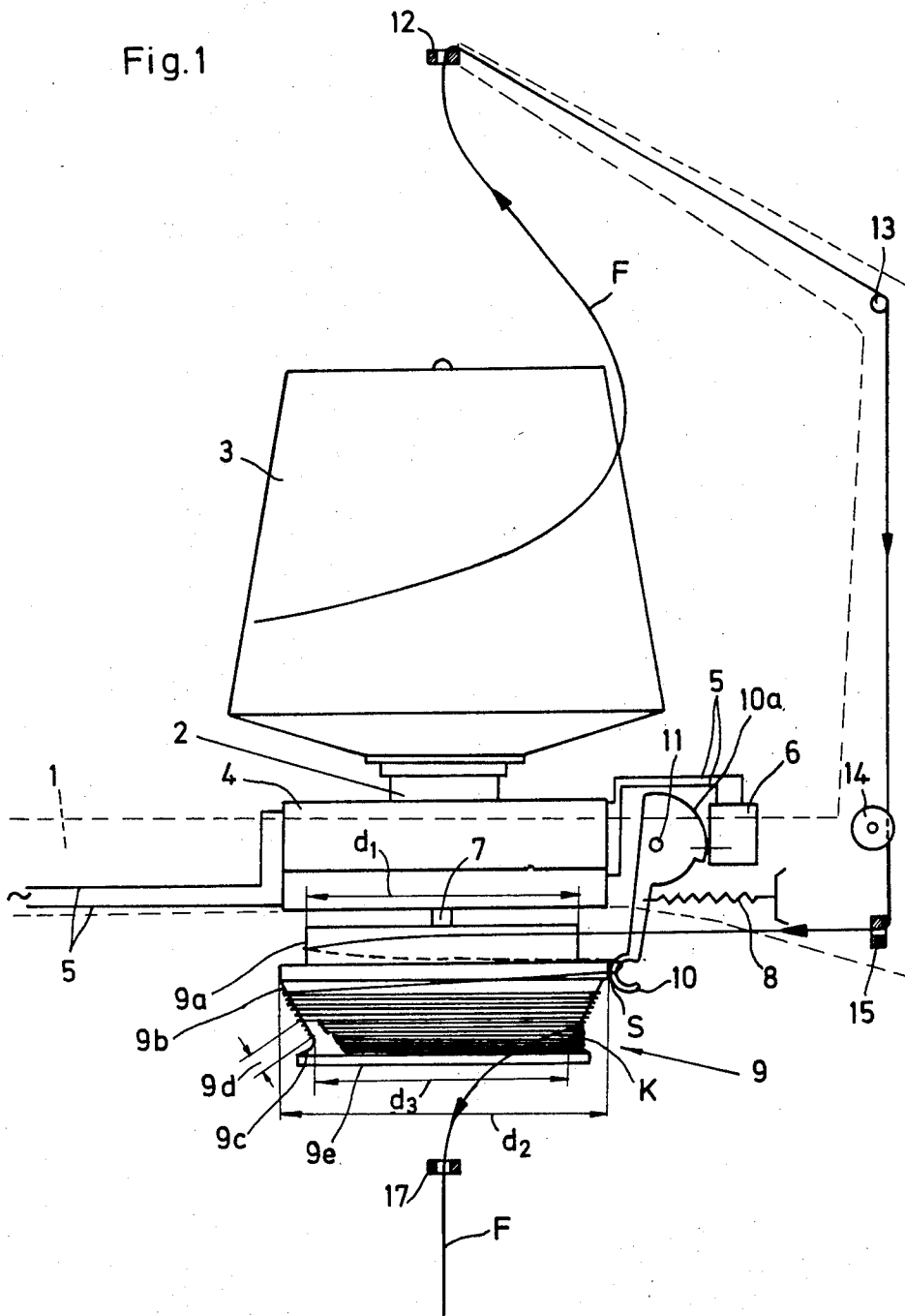


Fig. 1

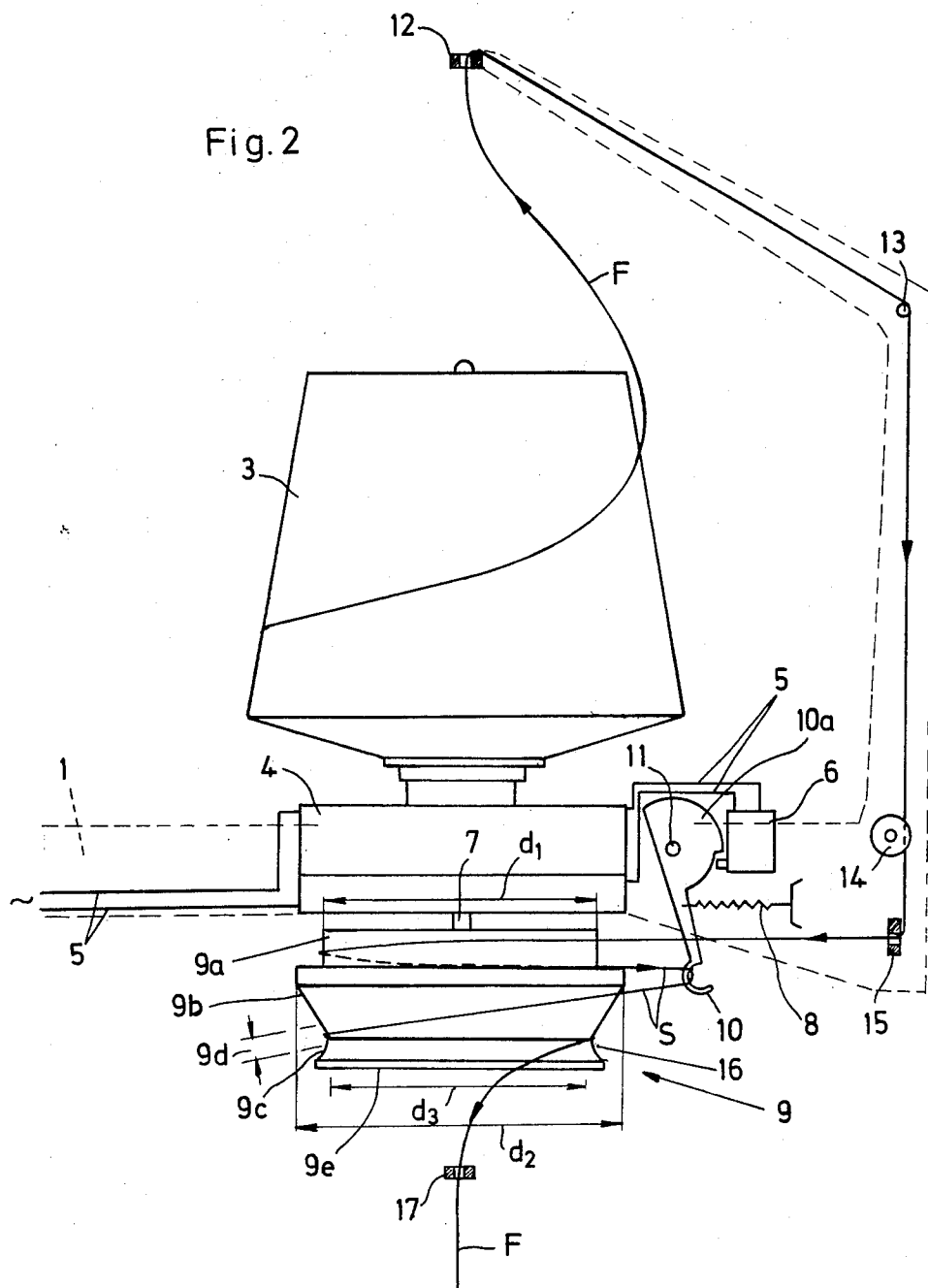


INVENTOR.

KARL ISAC JOEL ROSEN

BY

Woodham, Blanchard & Flynn
ATTORNEYS



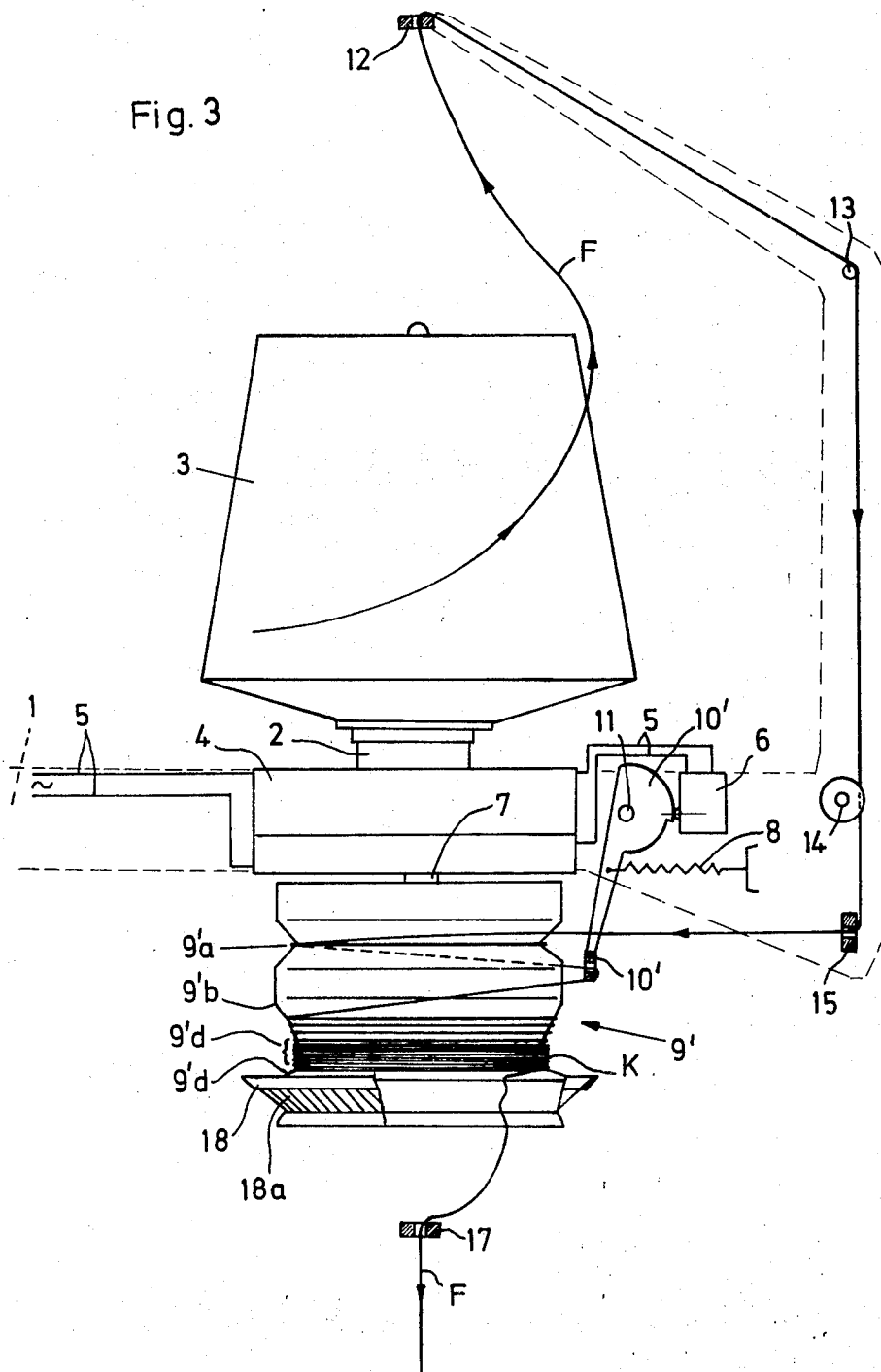
INVENTOR.

KARL ISAC JOEL ROSEN

BY

Woodhams, Blanchard & Flynn
ATTORNEYS

Fig. 3

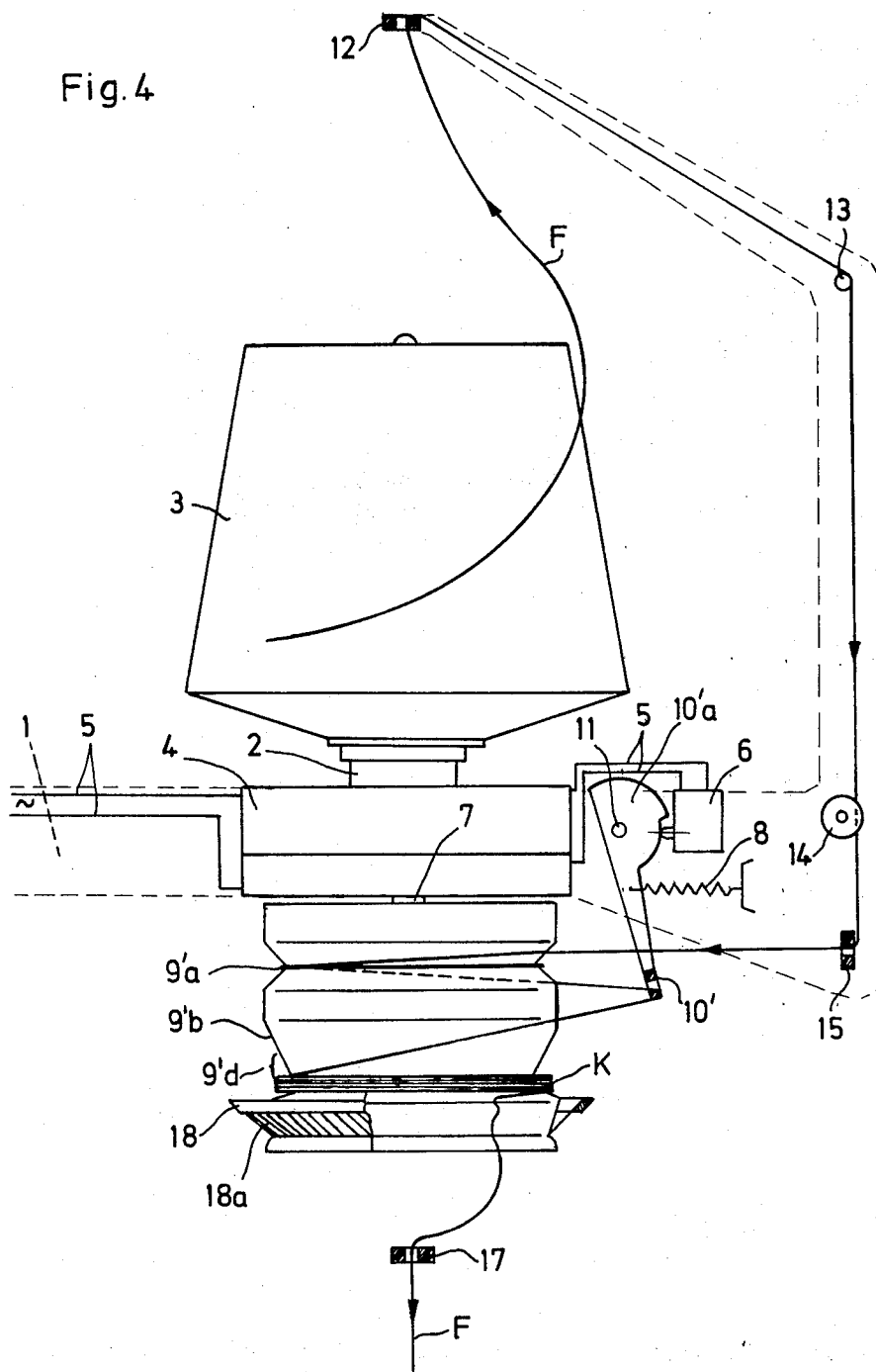


INVENTOR.

KARL ISAC JOEL ROSEN

BY
Woodhams, Blanchard & Flynn
ATTORNEYS

Fig. 4



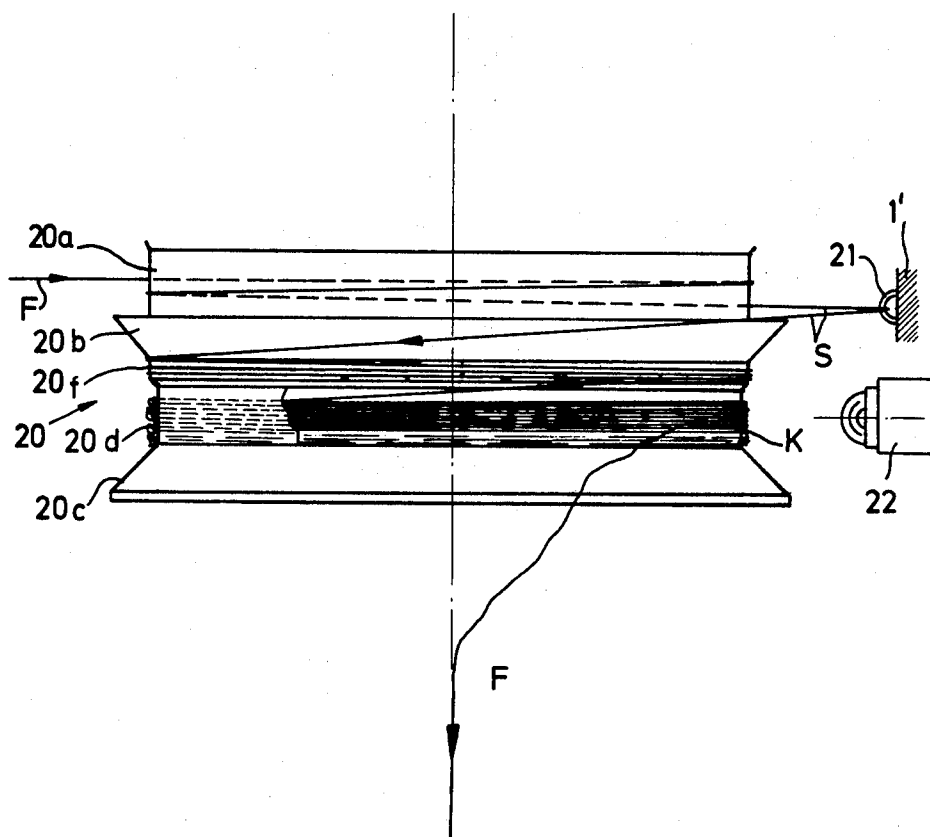
INVENTOR.

KARL ISAC JOEL ROSEN

BY

Woodham, Blanchard & Flynn
ATTORNEYS

Fig. 5



INVENTOR.

KARL ISAC JOEL ROSEN

BY
Woodhams, Blanchard & Flynn
ATTORNEYS

THREAD STORAGE AND DELIVERY DEVICE FOR TEXTILE MACHINES

The invention relates to a thread storage and delivery device for conveying a thread from a spool to a working point of a textile machine, comprising a storage drum to which the thread is delivered in a substantially tangential direction in the region of a slide cone, and from which the thread is drawable in an axial direction, while the force serving to draw the thread from the spool is imparted to the thread by means of a friction driving surface which is looped at least once by the thread.

In a known device of this type (U.S. Pat. Spec. No. 3,225,446) there are provided upon a substantially cylindrical body, in succession from one end of the cylinder to the other, a V-shaped groove, a cylindrical section forming the friction driving surface, a conical section forming the slide cone, and a cylindrical section representing the storage drum. The diameter of the friction driving surface and the storage drum is the same and corresponds to the smallest diameter of the slide cone. The cone angle (half of the apex angle) amounts to more than 45°. First of all the thread is conveyed through the V-shaped groove to a cylindrical deflecting body provided with V-shaped grooves and spaced away from the cylindrical body, wherefrom the thread arrives upon the cylindrical friction driving surface, round which it is looped once, then passes back to the deflecting body, and runs from there to the steeply angled slide cone operating as a feed cone. The latter moves the turns of the thread in the axial direction and pushes them successively onto the cylindrical storage drum. From there the thread is drawn off axially and delivered to the working point of the textile machine. The size of the thread supply upon the storage drum is supervised by photoelectric scanning of the storage drum, and is held within definite limits by suitable control of the driving means for the drum.

In this known device great importance is laid on the fact that at any time there is formed upon the storage drum only a single layer of thread turns. This is ensured by the equality of size of the diameter of the friction driving surface and the storage drum. It has not been considered possible to maintain, in the known device, a uniform and low magnitude thread tension in the thread draw-off region if a number of layers of turns became superimposed upon each other. The precaution which is taken of forming only a single layer of thread turns upon the storage drum compels the operation to be performed in such a manner that the thread is wound upon the storage drum at a tension, which, although it can be small, must nevertheless attain a value so as to prevent the condition in which the turns of thread slide over each other during the axial transport thereof as a result of pressure exerted upon the particular thread which has last been formed. The turns of the thread must therefore loop the storage drum so snugly that no one of the turns can push itself underneath or on top of the adjacent turn. The total quantity of thread which may be stored in this manner is only small. The axial feed of the thread turns depends exclusively upon the wedge action of the feed cone. However, with increasing winding tension there is also an increase in the frictional resistance of the layer of turns upon the storage drum. Thus, an increase in the feeding force emanating from the feed cone has the result of causing a corresponding increase in resistance against the feed action. This leads to the situation that in the known devices a maximum of about 12 to 16 thread turns can be stored. In textile machines using a large amount of thread, the fact that there is only a small amount of thread in store causes the winding operation, controlled by the thread supply control device, to be set into operation and again interrupted very frequently. From this there arise consequential problems of construction, control and wear. Furthermore, the tightness of winding of the thread, attributable to the equality of diameter of the friction driving surface and the storage drum, has the result that, in working with threads which consist of individual fibers, the individual fibers which unavoidably project laterally from the surface of the thread become clamped to the drum surface by the adjacent turn of thread. If now the thread is drawn off the

storage drum, the thread offers a somewhat increased resistance to the traction at those places where projecting fibers are clamped by the subsequent turn of thread. This leads to the so-called "tugging" in the withdrawing operation, that is to say irregular fluctuations of tension take place, which prevent the realization of the desired uniform and low value of the tension in drawing off the thread.

The invention takes as its basic purpose the design of a device of the above described type wherein a comparatively large store of thread can be formed, and a very small and uniform tension can be maintained in drawing off the thread. According to the invention this problem is solved in that the storage drum exhibits, in the thread drawing direction towards the slide cone, a storage section which, as compared with the diameter of the frictional driving surface, has a smaller diameter so that the thread turns conveyed from the slide cone in the axial direction of the storage drum into the storage section form at that point a double layer, or multiple layer, coil from which the thread can be drawn out.

In the thread storage and delivery device according to the invention at least a part of the thread supply upon the storage drum is accumulated in a region of the drum, whose diameter is smaller than the diameter of the friction driving surface. In this region the turns of thread naturally have a very low tension because their diameter corresponds to the diameter of the friction driving surface. Therefore, as a result of the axial displacement movement originating from the slide cone, the thread turns are partly and somewhat irregularly piled up on each other and thereby form a coil. From this coil the thread can be drawn off with a very uniform thread tension, because the individual turns have no mutual clamping action. The coil of thread can contain a very large thread supply, so that the frequency of the starting and stopping of the winding operation is reduced.

In the preferred practical form of the invention it is provided that, following the storage section of the drum in the direction of drawing the thread, there is formed a collecting surface of increased diameter for retaining the coil. The provision of such a collecting surface avoids the condition in which the coil moves in an uncontrolled manner in the draw-off direction of the thread. The surface holds back the turns of thread and prevents the turns of thread from assuming a position which is too sharply inclined with respect to the axis of the storage drum. The collecting surface thus contributes to the formation of a compact, but comparatively slack, coil. The action of the collecting surface can be still further enhanced by a retarding ring, under which the thread is drawn while making resilient slipping contact therewith.

Appropriately the collecting surface is formed by a conical build-up surface which widens out in the direction of drawing the thread. The thread can be drawn without obstruction over this collecting cone. It is already known per se, to provide in the draw-off region of the storage drum a conical member which widens in the drawing direction of the thread. However, in the known devices this cone does not make any contribution to the collecting of the turns of thread and the formation of a coil.

In a practical form of the invention it is provided that the side walls of the slide cone and the collecting cone form a V-shaped groove, whose base diameter is smaller than the diameter of the friction driving surface and which forms the storage section. In this practical form the turns of thread slide simply along the sliding cone into the base of the V-shaped groove, which is thereby filled up by the coil of thread. In this manner it is possible to build up a large supply of thread in a comparatively small space upon a short storage drum.

It is however also possible to provide between the slide cone and the collecting cone a cylindrical section of the storage drum constituting a storage section. This section of the storage drum, which must have a smaller diameter than the friction driving surface, accommodates the thread coil. It can be made of any width desired so as to solve the problem of suiting the device to the quantity of thread which is to be stored.

Moreover in this case the coil of thread can be made somewhat thin, whereby the drawing off operation is simplified in many qualities of thread.

In an advantageous practical form of the invention it is provided that the friction driving surface comes before the slide cone when considered in respect to the direction of drawing off the thread, and that following this there is situated a cylindrical drum section having a diameter substantially equal to the diameter of the friction driving surface and having a width suitable for accommodating about 12 to 16 turns of thread, said section of the drum merging into the storage section. In this case there is situated before the storage section a cylindrical drum section of diameter equal to that of the friction driving surface, upon which cylindrical drum section there is formed a thread winding in a single layer. In this case the slide cone pushes the layer comprising the thread winding over the cylindrical drum section into the storage section. The cone does not therefore act directly upon the thread coil, which arrangement can contribute to the formation of a particularly loose coil, from which the thread can be drawn at a very low tension.

Appropriately the friction drive surface, the slide cone, the storage section and the collecting cone can be designed upon a common rotatably driven body. In this way a particularly simple construction of the device is realized.

The size of a comparatively irregularly wound coil cannot be easily controlled by means of a photoelectric device, as in the above described known arrangement. In a further development, the invention provides means for simple control of the quantity of stored thread in a device comprising a slide cone upon a storage drum, whose maximum diameter is greater than the diameter of the friction driving surface, and whose smallest diameter is smaller than or equal to the diameter of the friction driving surface, and comprising a deflector element, over which the thread issuing from the driving surface is conveyed in the form of an open loop, and comprising also a control device, which upon a definite quantity of thread upon the storage drum being exceeded terminates the winding operation or retards said operation and which, when the quantity of thread falls below a determined limit, initiates or accelerates the winding operation, wherein the deflector element is mounted for movement against a force storage device transverse to the path of the thread guided over the deflector element, and the control device is controllable by the movement of said deflector element.

When a store of thread representing a definite quantity has accumulated upon the storage drum, then the incoming thread contacts the slide cone at places of increasingly large diameter. When the diameter, at which the thread meets the slide cone is larger than the diameter of the friction drive surface, the thread is positively removed from the open loop so that the latter is shortened. By the shortening of the loop the deflector element is moved against the force storage device. By this movement it is possible to control a switching operation which brings to rest or retards the drive of the friction drive surface. When the store of thread becomes smaller than the thread turns slide upon the slide cone in a range of diameter which is equal to or smaller than the diameter of the friction drive surface. Thereby the loop can retain its original length so that it allows the deflector element to return to the initial position. This movement is utilized for a switching operation of opposite sense.

Therefore, by simple utilization of the diameter difference between the slide cone and the friction drive surface the store of thread can be maintained within definite limits. In this way the necessity for providing costly and complicated photoelectric supervisory devices is avoided.

This control principle is in fact particularly advantageous in the formation of a coil of thread as a consequence of winding the thread in a region of diameter smaller than that of the friction drive surface, because the supervision of a coil by a photoelectric method is particularly difficult. The control principle according to the invention may however also be ap-

plied in the case where the thread is wound only in one layer in a drum region serving as the storage section, and this is so independently of the fact whether the storage section is of cylindrical shape with a diameter which is precisely as large as the diameter of the friction drive surface, or whether the storage section is designed as a portion of the slide cone. Independent protection is claimed to that extent for the described control and regulating principle. For the exercise of this principle it is essential only to provide a friction drive surface, a slide cone whose maximum diameter is greater than the friction drive surface diameter and whose minimum diameter is smaller than or equal to the last mentioned diameter, and a movable deflector element, whose movement is utilized for control purposes.

It has proved to be satisfactory if the cone angle (one-half the apex angle) of the slide cone amounts to 15°-25°, preferably 17°.

Practical examples of the invention are represented in the accompanying drawing, in which:

FIG. 1 is a schematic side view of a thread storage and delivery device according to the invention shown in the disconnected position;

FIG. 2 is a view corresponding to that in FIG. 1 with the drive operational;

FIG. 3 is a further practical form of the device according to the invention in the disconnected condition;

FIG. 4 is a view corresponding to that in FIG. 3 showing the device in the operating position;

FIG. 5 is a partial view of a further practical form with another type of control device.

The thread storage and delivery device according to FIGS. 1 and 2 includes a carrier shown in dashed lines and indicated by the reference 1, which carries a spool carrier 2 with a thread spool 3. Furthermore upon the carrier 1 there is mounted a housing 4, which contains an electric motor, which is supplied with current through a supply circuit 5. The supply circuit contains a switch 6. At that side of the casing 4 remote from the coil 3 there projects a shaft 7 of the electric motor, upon which is rigidly mounted a rotation body or drum indicated by the general reference 9. This body has at one end a cylindrical part which forms a friction drive surface 9a. Connected to the latter by a cylindrical flange is a cone which tapers in a direction away from the friction drive surface 9a, said cone having the function of a slide cone 9b. To the latter is connected an opposing cone which forms a collecting or retaining cone 9c. The diameter of the friction drive surface 9a is indicated by d_1 , the largest diameter of the slide cone is indicated by d_2 and the smallest diameter of the cone 9b is indicated by d_3 . As is clear from the drawing, d_1 has a value between d_2 and d_3 . The region of the slide cone 9b situated between its diameter corresponding to diameter d_1 and its smallest diameter d_3 , is indicated by the reference 9d and forms a storage section. The angle of the cone 9b amounts to 17°. The rotation body is terminated by a cylindrical flange 9e at the side remote from the friction drive surface 9a.

Laterally adjacent the housing 4, a hood shaped deflector element 10 is pivotally mounted about an axis 11 upon the carrier 1, and is stressed by a spring 8, which tends to remove it away from the periphery of the rotation body 9. That part of the deflector element 10 which surrounds the axis 11 is designed as a switch cam 10a, which cooperates with the switch 6.

A thread F issuing from the spool 3 is delivered tangentially to the friction drive surface 9a through a thread guide 12, a deflector stud 13, a disc brake 14 and a further thread guide 15—the parts 12 to 15 are all mounted upon the carrier 1. The thread passes around the friction drive surface 9a at least once and is then laid in the form of an open loop S about the hook shaped deflector element 10. From that point the thread F runs again in a substantially tangential direction onto the slide cone 9b, upon which thread turns are formed when the body 9 rotates. The thread turns slide along the slide cone 9b in the direction of its conicity. As soon as these turns come into the storage section 9d, the thread turns become comparatively

loose, because at that point the diameter of the rotation body 9 is smaller than the diameter d_1 of the friction drive surface 9a. The friction drive surface 9a imparts by friction the force necessary to withdraw the thread F from the spool 3, so that the diameter d_1 of the friction drive surface determines the length of thread wound per unit time upon the slide cone 9b. Thereby the thread upon the slide cone is under tension until it reaches the storage section 9d. In the storage section 9d the diameter of the rotation body 9 is less than the diameter d_1 and so the turns of thread lose the greater part of their tension and accordingly are pushed together and over each other in a more or less irregular manner by the slide cone 9b. They form a comparatively loose irregular coil K (shown broken away at the left hand part of FIG. 1), which fills the V-shaped groove 16 (FIG. 2) formed between the storage section 9d and the collecting cone 9c. From the coil K the thread F is drawn off through a thread eye 17 in the axial direction of the rotation body 9. In the draw-off section of the thread F there is a low and very uniform tension because the thread is being drawn out of the coil K in which the thread is not held fast on account of the loose formation of the coil.

When the winding speed is greater than the draw-off speed of the thread, the coil K grows so rapidly that the slide cone 9b is no longer able to push the turns of thread into the coil. The thread then accumulates in that section of the slide cone 9b which is situated before the storage section 9d as seen in the thread drawing direction. In the section 9b of the slide cone the cone diameter is larger than the diameter d_1 of the friction drive surface 9a. For each rotation of the rotary body 9, more thread tends to be wound in this region upon the slide cone 9b than is delivered from the friction drive surface 9a. The length of thread necessary for this is drawn out of the loop S, so that this loop becomes narrower in a manner which is clear from FIG. 1. The loop draws the deflector element 10 against the force of the spring 8. When the position shown in FIG. 1 is reached the switch cam 10a operates the switch 6, whereby the drive motor of a rotary body 9 is disconnected. In this way the switch 6 and cam 10a function as a control device for controlling the rotation of the body 9, whereby it is ensured that the thread supply upon the rotary body does not exceed a definite limit.

If then thread is again drawn off the device, the size of coil K is reduced and the turns situated upon the slide cone 9b can slide forwardly into the coil K. This thus permits the hook shaped deflector element 10 to be drawn back by the spring 8, whereby the loop S becomes wider and the position of FIG. 2 is attained. The switch cam 10a again releases the switch 6, whereby the drive motor of the rotary body 9 is again connected and the cycle begins afresh. In this way the supply of thread upon the rotary body 9 is prevented from falling below a definite minimum quantity.

The practical form shown according to FIGS. 3 and 4 corresponds essentially with that according to FIGS. 1 and 2. Corresponding parts are indicated by the same reference characters and do not therefore require to be described again. The device according to FIGS. 3 and 4 includes a rotary body 9', whose friction drive surface 9'a has a V-shaped groove, which is looped at least once by the thread F. Again in this case the slide cone 9'b follows a cylindrical shoulder portion and then merges into a collecting cone 9'c. The storage section is indicated by 9'd.

In this practical form of the invention the thread F is drawn out of the coil K formed in the storage section 9'd while passing through and underneath a braking ring 18, which is provided with resilient fingers 18a projecting radially inwards along a conical surface. These fingers are pressed sideways by the thread F so that a small retarding force is exerted upon the thread. The lower ends of the resilient fingers 18a engage the lower flange 9'e for maintaining the ring 18 in proper position.

As the deflector element 10' a rock lever is provided, which at its free end carries a thread eye and which again is formed as a switch cam 10'a in the region of the pivot 11.

The function of the device is the same as in the practical form according to FIGS. 1 and 2. FIG. 3 shows the position in which the drive has just been disconnected because the upper limit of the thread supply on the body 9' has been reached. In FIG. 4 the deflector element 10' has again operated the switch 6 by the action of the switch cam 10'a, because the thread supply on the body 9' has reached the lower limit. This limit is so chosen that even in the region of the lower limit there is still a certain amount of thread stored in the storage section 9'd.

FIG. 5 shows a rotation body 20 in a further practical form of the device according to the invention. This body is again provided at one end with a cylindrical friction drive surface 20a, which is looped at least once by the thread F. Adjacent this surface there is a slide cone 20b, whose smallest diameter is equal to the diameter of the friction drive surface 20a. After the slide cone 20b there follows a cylindrical section 20f whose diameter corresponds to the diameter of the friction drive surface 20a. The latter merges, through the intermediary of a small conical surface, into a storage section 20d, which in this case is of cylindrical form and has a somewhat smaller diameter than the friction drive surface 20a. Connected to the storage section 20d there is again a collecting cone 20c.

The thread F is conveyed by the friction drive surface 20a in the same manner as in the practical forms according to FIGS. 1 to 4. The turns are pushed by the slide cone 20b onto the cylindrical section 20f. From there they proceed into the storage section 20d, where they lose their tension and again form a coil K, from which the thread F may be drawn off over the collecting cone 20c in a substantially axial direction free of tension.

In the practical form according to FIG. 5 there is provided a stationary deflector element 21 in the form of a thread eye, which is fixed to the carrier 1'. The control is effected in this case by means of a photoelectric scanning device 22, which optically scans the size of the thread coil K and when the quantity of thread falls below a particular value initiates or accelerates the drive of the rotary body 20 and disconnects or retards said drive when the quantity of thread exceeds a definite value.

The invention is not restricted to the practical examples represented. It is possible to provide the frictional drive surfaces 9a and 9'a upon an individual rotor in each case, which is arranged separately from the other rotary body 9 or 9' and is driven in synchronism therewith. It is also possible to drive only this individual rotor and to keep the other rotary bodies stationary. In this case however the deflector element 10 or 10' must rotate with the rotor which carries the friction drive surface. In the practical form according to FIG. 5 the friction drive surface 20a may in some circumstances be completely omitted. In that case the function of the friction drive surface is assumed by the cylindrical section 20f. In place of using a hook-shaped or eye-shaped deflector element it is possible to employ a roller with V-grooves, over which the thread is guided. Finally in place of the slide cone it is possible to use a different feed element, which exerts upon the turns of thread an advancing force in the axial direction of the rotary body. The collecting cone can be replaced by a radial flange.

It is important that the described control effect shall also function if no storage section 9d, 9'd or 20d is available, for example also in that case where the thread is stored in a cylindrical or conical drum section in only one layer. For example, in the practical form according to FIG. 5 the cylindrical section 20f can be extended in the axial direction and may serve as the storage section. When the storage section then becomes full to such an extent that the thread turns begin to build up in the region of the slide cone 20b, or if they reach a section of the slide cone whose diameter is greater than that of the friction drive surface, then the tension will rise in the thread loop S. If then the deflector element 21 is designed as a movable switching element, the diminution or enlargement of the loop S may be utilized for controlling the drive of the rotary body.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A thread storage and delivery device for conveying a thread from a spool to a working point on a textile machine, said thread storage and delivery device comprising storage drum means mounted for rotation and drive means drivingly connected to said drum means for rotatably driving same, said drum means being adapted to be disposed intermediate said spool and said working point and including a slide cone portion to which the thread is delivered in a substantially tangential direction and from which the thread is drawable in an axial direction, said drum means also including an annular friction driving surface positioned adjacent the larger diameter end of said slide cone portion and having one thread looped at least once therearound for drawing the thread from the spool, said drum means further including an annular storage section disposed adjacent the small diameter end of said slide cone, said storage section having a diameter less than the diameter of the annular friction driving surface, whereby the thread windings are conveyed along the slide cone portion in an axial direction toward the storage section and form in the storage section a multiple layer coil from which the thread can then be withdrawn, and retaining means coaxing with said drum means for retaining the multiple layer coil within said storage section.

2. A device according to claim 1, wherein said retaining means includes an annular collecting surface formed on said drum means and disposed axially on the opposite side of said storage section from said slide cone portion, said collecting surface having a diameter larger than the minimum diameter of said storage section for retaining said multiple layer coil within said storage section.

3. A device according to claim 2, wherein said annular collecting surface is formed by a collecting cone which diverges in the axial direction extending away from said storage section.

4. A device according to claim 3, wherein said slide cone portion and said collecting cone form the sidewalls of a V-shaped groove whose base diameter is smaller than the diameter of the annular friction drive surface, the base portion of said V-shaped groove forming said storage section.

5. A device according to claim 3, wherein said storage section comprises a substantially cylindrical portion disposed and extending between the smaller diameter ends of the slide cone portion and the collecting cone.

6. A device according to claim 5, wherein said drum means includes a cylindrical section disposed axially between said storage section and the smaller diameter end of said slide cone portion, said cylindrical section having a diameter substantially equal to the diameter of the annular friction drive surface and a width suitable for accommodating approximately 12 to 16 thread turns, said cylindrical section merging into said storage section.

7. A device according to claim 3, wherein said friction drive surface, said slide cone portion, said storage section and said collecting cone are constructed upon a common drum-like body which is rotatably driven.

8. A device according to claim 1, wherein the friction drive surface comprises a V-shaped groove formed in said storage drum means.

9. A device according to claim 1, wherein said slide cone portion is defined by a conical angle as defined relative to the axis of said storage drum means of between approximately 15° to 25°.

10. A device according to claim 1, further including deflector means positioned adjacent said storage drum means for guiding the thread in the form of an open loop as it is delivered from said friction driving surface to said slide cone portion, means mounting said deflector means for movement in a direction substantially radially relative to said storage drum means, biasing means coaxing with said deflector means for normally urging same radially outwardly relative to said drum means, and control means coaxing with said deflector means and responsive to the position thereof for controlling the rota-

tion and of thread on said storage drum means whereby the quantity of thread on said storage drum means is maintained between predetermined maximum and minimum limits.

11. A device according to claim 1, wherein the large diameter end of said slide cone portion has a diameter greater than the diameter of said annular friction drive surface.

12. A thread storage and delivery device for conveying a thread from a spool to a working point of a textile machine, comprising rotatable storage drum means for temporarily storing the thread as it is delivered from the spool to the textile machine and drive means drivingly connected to said drum means for rotatably driving same, said storage drum means including first and second axially spaced portions, said first portion of said storage drum means having an annular friction driving surface adapted to have said thread looped at least once therearound for drawing the thread from the spool, said second portion of said storage drum means being tapered in the drawing direction of the thread and forming a slide cone having maximum and minimum diameters adjacent the opposite axial ends thereof, the maximum diameter end of said slide cone being disposed more closely adjacent the friction driving surface and having a diameter greater than the diameter of the friction driving surface, the small diameter end of the slide cone being disposed remote from the friction driving surface and having a diameter no greater than the diameter of the friction driving surface, deflector means positioned adjacent said storage drum means for guiding the thread in the form of an open loop as it is transferred from the friction driving surface onto the slide cone, means mounting the deflector means for movement in a direction substantially transverse to the path of movement of thread as it passes over the deflector means, biasing means coaxing with said deflector means and urging same in a direction opposite to the force imposed on said deflector means by the loop of thread passing thereover, and control means controlling the rotation of said drum means by said drive means for restricting the winding of thread on the storage drum means when the quantity of thread on the drum means reaches a predetermined maximum and for initiating winding of thread on the storage drum means when the quantity of thread on the drum means falls below a predetermined minimum, said control means being interconnected to and actuated by movement of said deflector means.

13. A device according to claim 12, wherein said deflector means includes a deflector element mounted for movement in a direction substantially radially relative to said drum means, and said biasing means including spring means coaxing with said deflector element for normally resiliently urging same in a radially outward direction.

14. A device according to claim 13, wherein said drive means includes motor means drivingly connected to said drum means for rotatably driving same, and said control means including switch means electrically interconnected to said motor means and coaxing with said deflector element for causing energization of said motor means and rotation of said drum means in response to actuation of said switch means by radial movement of said deflector element.

15. A device according to claim 12, wherein the small diameter end of said slide cone has a diameter smaller than the diameter of said friction driving surface whereby the small diameter end of said slide cone forms an annular storage section wherein the thread windings form a multiple layer coil, and retaining means coaxing with said drum means for retaining the multiple layer coil within said storage section.

16. A device according to claim 12, wherein the conical surface of the slide cone defines an angle relative to the axis of said drum means of between about 15° to 25°.

17. A device according to claim 15, wherein said retaining means comprises a substantially conical retaining surface coaxially aligned with and fixedly connected to the small diameter end of said slide cone, said conical retaining surface extending radially outwardly and having a diameter greater than the small diameter end of the slide cone.

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