July 9, 1963 E. WILDI 3,096,945

KNOCK-OFF MOTION FOR THREAD PROCESSING MACHINES

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Fig. 1

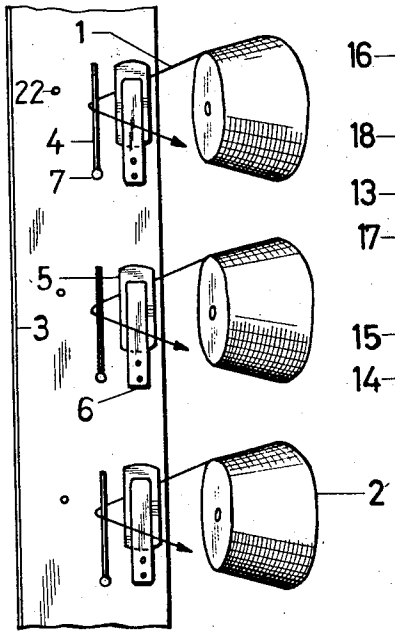


Fig. 3

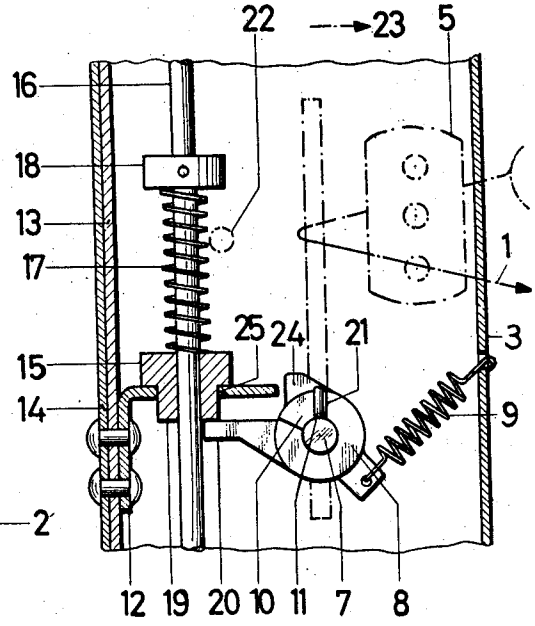


Fig. 2

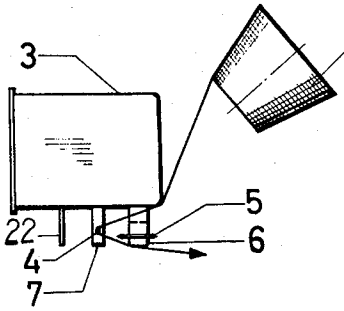
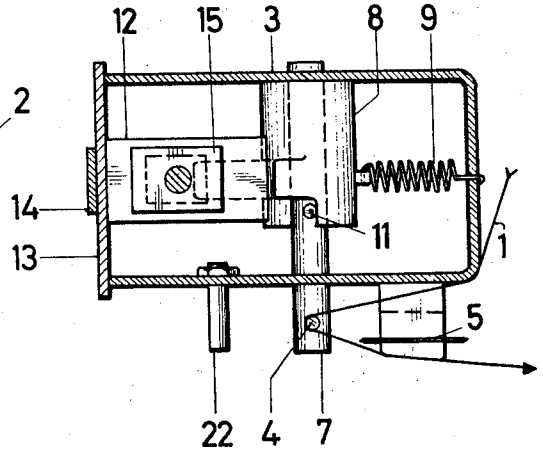


Fig. 4



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KNOCK-OFF MOTION FOR THREAD PROCESSING MACHINES

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Threads which are doffed from a beaming creel or a magazine creel and are conveyed to the winding drum of a winding frame, usually pass between the creel and the frame over a yarn brake appliance for producing a predetermined yarn tension, a knock-off motion for controlling the presence of yarn tension, a thread lease reed and a spacing or guide reed.

If a thread is caught as a result of a defective winding, for example, when whole layers are pulled off the bobbin or if the bobbin comprises sections where the thread is relief-wound the continually operating winding frame produces an increase of the yarn tension so that a breaking of the yarn is possible. Though the knock-off motion signals at this moment the breakage of the yarn and stops the winding frame, it is known that the greatest yarn tension is produced in the very sharp reed in the immediate neighbourhood of the winding drum, so that the thread breaks in most cases at this point and the broken end is wound onto the drum, before the drum stops. It is a great nuisance and it takes much time to look for the broken thread end on the drum.

A further disadvantage of this widely known arrangement is the fact that threads which are drawn-off from the bobbins at increased tension as mentioned above but without attaining the breakage tension, do not cause a signal, as the knock-off motion only reports breakage of threads. However, such stretched threads impair the quality of the product to a considerable degree. They appear in the finished tissue as "glossy threads" and lead to rejects.

In order to avoid the last mentioned disadvantage a device was created which prevents the formation of such glossy threads by the provision of a knock-off motion which is so arranged that it causes a signal when there occur threads having such an increased tension. However, this known device cannot avoid the situation in which there is an increase of the tension above the resistance of breaking of the thread, the breakage still occurs at the point of the greatest tension, namely in the spring reed in the immediate neighbourhood of the winding drum, so that the broken end is again lost on the drum.

The present invention has for its object the provision of means for avoiding both said disadvantages, namely the winding of broken thread ends and of undesired stretched threads on the winding frame in order to prevent a further processing of threads which are subject to an increased tension during winding-off from a creel bobbin as a result of pulling or being caught. To this end the present invention contemplates a device comprising cutting means and means for guiding the thread in such a way that the thread approaches these cutting means when a definite tension is exceeded and is cut thereby.

Thus, the thread is severed by the cutting means placed remote from the winding frame, provoking the stopping of the winding frame in the same way as when the thread breaks, before the increased tension produces glossy threads or a natural breakage of the thread.

Other features and advantages of the invention shall become apparent from the following description of a preferred embodiment thereof given by way of example only and in which reference will be made to the accompanying diagrammatical drawings, in which

FIGURE 1 shows a front view of a creel with three bobbins and three cutting means for cutting the thread having an increased tension,

FIGURE 2 is a plan view of FIGURE 1,

FIGURE 3 is a sectional view of the device avoiding the further processing of threads having an increased tension, and

FIGURE 4 is a plan view of FIGURE 3.

As shown in FIGURE 1 of the accompanying drawings a plurality of bobbins **2** are provided on a creel (not shown) the threads **1** of which are passed through the lease reed and the spacing reed (not shown) in the form of a sliver and are wound at uniform tension onto the winding drum of a winding frame (not shown). Every single thread **1** drawn-off from the bobbin **2** is caused to run through an obtuse angle by the blunt edge of a U shaped iron channel **3** (see FIGS. 2 and 4) placed near the bobbin, and through an acute angle in V-shape about a feeler pin **4**, whereupon it arrives at the reeds and at the winding drums. Each feeler pin **4** cooperates with a cutting means, such as a blade **5** and guide **6** rigidly mounted on the U-shaped iron channel. Each feeler pin **4** is radially forced into the end portion of a rotatable shaft **7** which traverses the inner space of the U-shaped iron channel **3** and is rotatably mounted with respect thereto. As shown more specifically in FIGS. 3 and 4 a sleeve **8** is rotatably mounted on the shaft **7** in the interior of the channel **3** where it is protected from dust. This sleeve **8** is urged by a tension spring **9** along a sector-shaped opening **10** against an abutment pin **11** radially protruding from the shaft **7**. An angle iron contact portion **12** is associated with each sleeve **8**, said angle iron contact portion **12** being fixed to an insulated cover plate **13** closing the open side of the channel **3** and being connected with a contact strip **14** to form a contact. The leg of the portion **12** projecting from the cover plate **13** is provided with a quadrangular hole **25** receiving an insulating block **15** which is axially movable on a rod **16** and is pressed against the portion **12** by a compression spring **17** bearing against a collar **18** fixed to the rod **16**.

The lower end face **19** of the insulating block **15** serves as stop for the sleeve **8**, a leg **20** of which engages this surface **19**.

In the rest position of the represented device the sleeve **8** is rotated by the tension spring **9** until a switch member **24** on the sleeve **8** engages the free end of the angle iron contact portion **12**. Upon cutting of the thread by the blade **5**, the shaft **7** is angularly moved a small amount by the edge **21** of the sector shaped opening **20** in sleeve **8** acting on the pin **11** and is pivoted together with the feeler pin **4** towards the left in FIGURE 3. In the position of rest of the device the feeler pin **4** is freely pivotable through an angle between a stop **22** fixed to the U-shaped channel **3** and the edge **21**. As soon as the thread **1** passes about the feeler pin **4** thus forming a V the feeler pin **4** is pivoted into its operating position by the tension of the running thread in which position the leg **20** is pressed with a force corresponding to the thread tension against the lower surface **19** of the insulating block **15**.

It is possible to tension all compression springs **17** by means of the rod **16** and the set collars **18** in such a manner that all insulating blocks **18** are pressed with the same force upon their seat of the angle iron contact portion **12**. As soon as the predetermined tension of a thread is increased, for example by pulling or by being caught, above the set value, the particular thread pivots its pin **4** in the direction of the arrow **23** (see FIGURE 3) out of its normal operating position, whereby the insulating block **15** is raised against the action of the spring **17** by the intermediary of the shaft **7**, pin **11**, edge **21**

then arrives into proximity of the cutting edge of the blade 5 situated within the V at the running-off side of the thread, and upon a further pivoting of the pin 4 the thread cuts itself on the cutting edge. The cutting blade may be parallel to or, as shown, form an acute angle to the running-off side of the thread.

The thread tension suddenly disappearing by the severing of the thread, the sleeve 8 returns immediately under the action of the spring 9 until the switch member 24 again abuts against the free end of the angle iron 12. The feeler pin 4 simultaneously is turned back into its starting position by the edge 21, the pin 11 and the shaft 7.

In order to permit the stopping of the winding frame simultaneously with the cutting of the thread, an electric circuit is established between the U-shaped iron channel 3 and the contact strip 14, when the spring 9 returns the sleeve 8 into its position of rest, by engagement of the switch member 24 with the end of the angle iron contact portion 12.

It is obvious, that according to the present arrangement, upon formation of an increased thread tension eventually resulting in breakage of the thread or in "glossy threads," the thread in question is cut immediately and near the bobbin and correspondingly far from the winding frame, and simultaneously as the winding frame is stopped, not only is the formation of "glossy threads" which become visible in the finished tissue only avoided, but particularly also the cumbersome winding of the ends of threads broken in the spacing reed on the winding drum which only can be stopped slowly on account of its great inertia.

In order to provide a shockfree contact between the switch 24 of the sleeve 8 and the angle iron contact portion 12, the sleeve 8 is so arranged that the pin 11 may continue its angular motion in the milled-off sector-shaped opening 10 of the sleeve in the same direction until the feeler pin 4 meets the stop 22.

It will be apparent in the described arrangement that a displacement of the rod 16 permits a common adjustment of the critical tension at which the cutting of all threads associated with the rod 16 shall be effected.

While I believe the above described embodiments of the present invention to be preferred I wish it to be understood that I do not desire to be limited to the exact details of the design shown, for obvious modifications will be apparent to a person skilled in the art.

I claim:

1. In a tension actuated device for responding to tension in the thread being unwound from a bobbin, said device having a feeler pin around which thread is adapted to be passed, a rotatable shaft on which said feeler pin is mounted, a cutting means cooperating with said feeler pin against which the thread is drawn and cut when the tension gets too great, and a contact adapted to be contacted to close a circuit when the tension in said thread is released suddenly, that improvement comprising an abutment pin on said shaft, a sleeve rotatably mounted around said shaft and having a sector-shaped opening therein in which said abutment pin is free to move, a switch member projecting from said sleeve and adapted to contact the contact when said sleeve is rotated, and spring means connected to said sleeve urging said sleeve to rotate said switch member against the contact in the opposite direction from that in which said shaft will be rotated by increasing thread tension acting on the feeler pin, whereby when the tensioned thread is cut, said spring means will rotate said sleeve and the edge of the sector-shaped opening will engage said abutment pin and carry said shaft and feeler pin along in the rotation of said sleeve until said switch member abuts the contact, after which said feeler pin is free to continue its rotational movement as said abutment pin rotates in the sector-shaped opening of said sleeve.

2. The improvement as claimed in claim 1 further comprising a leg on said sleeve, and tension adjusting means engaged with said leg and comprising a rod movable axially of itself, a collar fixed on said rod, a block slidable on said rod, said block engaged with said leg on said sleeve, a spring between said collar and said block, and a fixed member against which said block is abuttable, said block being moved away from said fixed member against said spring when said shaft and said sleeve with said leg thereon are rotated by the tension in the thread moving the feeler pin, whereby movement of said rod will adjust the tension in said spring and the total tension on said sleeve against which said shaft is rotated by the tension in the thread acting on the feeler pin.

References Cited in the file of this patent

UNITED STATES PATENTS

455,786	Bellis	July 14, 1891
2,595,998	Vossen	May 6, 1952

FOREIGN PATENTS

629,511	France	July 26, 1927
764,511	France	Mar. 5, 1934
585,418	Canada	Oct. 20, 1959