

July 13, 1965

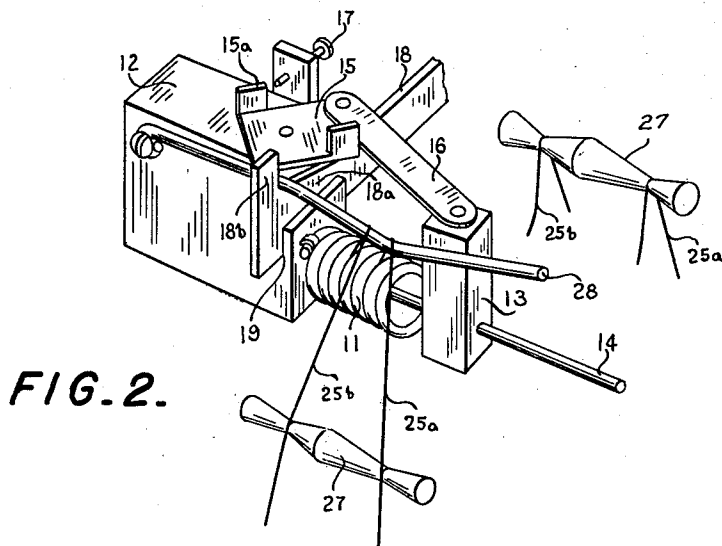
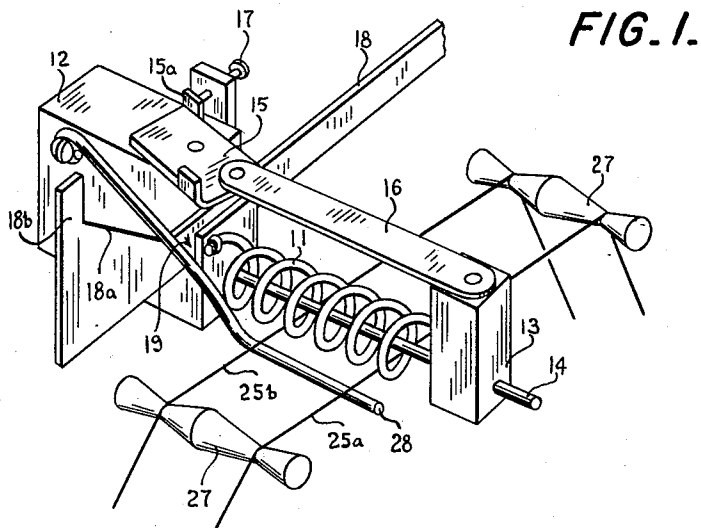
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TEXTILE YARN SEVERING DEVICES

Filed Nov. 1, 1963

2 Sheets-Sheet 1



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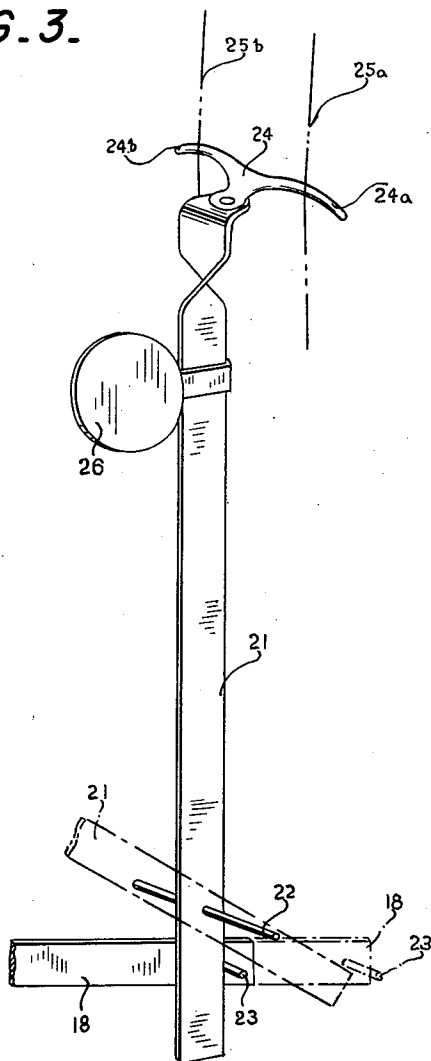
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FIG. 3.



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TEXTILE YARN SEVERING DEVICES

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7 Claims. (Cl. 57—87)

This invention relates to thread severing devices.

According to the invention, there are provided thread severing means comprising two members which can be spaced from each other permitting thread to pass between them and which can come impulsively into mutual contact over a small area whereby the thread is trapped and severed.

turns, and guide means may be provided to guide thread of a close-coiled spring. Releasable catch means may be provided to hold the spring extended to separate the turns, and guide means may be provided to guide thread between the turns.

In or for a textile machine in which two or more threads are treated simultaneously, actuating means may be provided to cause said members to come together on failure of either or any thread. By thread failure is meant any predetermined departure from normal thread running conditions, such as thread breakage, loss of or increase in tension or change of yarn characteristics.

In an embodiment actuated by loss of thread tension, as by breakage or failure of supply, said actuating means may include a thread-engaging member which is held against a bias by thread tension and which moves under the bias upon loss of thread tension. In another embodiment, the actuating means may include an electrical thread failure detector.

The invention also provides, in a textile machine in which two or more threads are treated simultaneously, thread severing means operative to sever one thread or some threads upon breakage of another comprising a pivotally mounted arm adapted to be retained in a first position by engaging both or all threads and biased to move to a second position when one thread breaks, and, in moving to said second position, to release catch means normally holding apart the turns of a close-coiled spring between which turns the threads can run, whereby the other thread or threads are severed.

In another arrangement in such a machine, the invention provides thread severing means comprising an electrical thread detector which upon breakage of a thread causes a solenoid to be energized to release a normally extended close-coiled spring between the turns of which the threads run, whereby the other thread or threads are severed.

In these arrangements, it is preferable to arrange that the threads normally run clear of the turns of the spring, means being provided to interpose the threads each between an adjacent pair of turns prior to release of the spring.

One embodiment of thread severing means will now be described with reference to the accompanying drawings, in which:

FIGURE 1 is a perspective view of the severing means in a first position prior to actuation,

FIGURE 2 is a similar view of the means in a second actuated position, and

FIGURE 3 is an elevation of a thread breakage detector.

The severing means comprises a close-coiled spring 11, which is shown extended in FIGURE 1 and closed in FIGURE 2. The spring 11 is fixed at one end on a block 12, adapted to be mounted in a textile machine, and at the other end on a slider 13, which is movable along

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a rod 14 projecting from the block 12. The slider 13 is connected to the block 12 by catch means consisting of a link 15 pivoted on the block 12 and a link 16 pivoted to the link 15 and to the slider 13. The spring 11 is held extended as shown in FIGURE 1 by the linkage being held in a position close to its dead centre position by a projection 15a on the link 15 abutting the end of a screw 17 fixed in the block 12. Pressure on the link 15 in an anti-clockwise sense takes the linkage through its dead centre position and releases the spring 11.

The pressure referred to is applied to the link 15 by rod 18 which slides in a groove 19 in the block 12 and has a ramp 18a for a purpose hereinafter described, and an abutment 18b which engages the link 15. The rod 18 is moved in the direction of the arrow by an arm 21 (FIGURE 3) pivoted at 22 in a textile machine, falling from its full-line position to its dashed-line position, the arm 21 acting on a pin 23 on the rod 18 to move the rod from its full-line to its dashed-line position. The arm 21 carries a yoke 24, each arm 24a, 24b of which engages a thread 25a, 25b to maintain the arm 21 in its full-line position, the yoke 24 being pivoted so that if either thread breaks, the yoke 24 turns on the arm 21 and is released from the other thread permitting the arm to fall. A disc indicator 26 is carried by the arm 21 so that an operator can detect thread breakage from a distance.

Thread guides 27 guide the threads 25a, 25b to run normally clear of the turns of the spring 11. Pivoted on the block 12 is an arm 28 which rests on the rod 18 and which is lifted by engagement with the ramp 18a on movement of the rod 18, thereby lifting the yarns 25a, 25b (if still present) to run each between an adjacent pair of turns of the spring 11. This action occurs just before the abutment 18b engages the link 15.

The snapping together of the turns of the spring 11 effectively severs the yarns.

The invention is capable of being carried out in many different ways. For example, the said two members which can come impulsively into contact may be found in a hammer and anvil arrangement, one element of which can be impulsively urged toward the other. Instead of the mechanism described with reference to FIGURE 3, an electrical thread failure detector may be employed, which, on thread failure, energizes a solenoid which attracts a piece of ferromagnetic material whereby to move the rod 18.

What I claim is:

1. Thread severing apparatus comprising, in combination, a coil spring which in its unstressed state has convolutions which press against each other; releasable stretching means operatively connected to said coil spring for stretching the latter into a tensioned condition where the convolutions of said spring are spaced from each other and for releasably holding said coil spring in said stretched condition, the said releasable stretching means when released freeing said coil spring to contract due to its inherent resiliency to its unstressed state; means for detecting a drop in the tension of a thread and for automatically releasing said stretching means whereby said coil spring will contract to its condition where its convolutions press against each other; and thread guide means positioning the thread at least when a drop in tension thereof is detected between a pair of convolutions of the spring so that when the latter said pair of convolutions thereof will snap against and grip the thread to sever the same.

2. Thread severing apparatus comprising, in combination, a coil spring having in its unstressed state convolutions which press against each other; toggle linkage means operatively connected to said coil spring for stretching the latter to a condition where its convolutions are spaced from each other when said toggle linkage

means is in an operating position slightly beyond a dead-center position thereof; means responding automatically to a drop in the tension of a thread for engaging said toggle linkage means and displacing the latter from said operative position back through said dead-center position thereof to release said coil spring which due to its inherent resiliency immediately contracts to its unstressed state; and thread guide means guiding the thread at least when the drop in tension thereof is detected between a pair of the convolutions of the spring so that when the thread tension drops said pair of spring convolutions will snap against the thread to grip and sever the latter.

3. Thread severing apparatus comprising, in combination, a coil spring which in its unstressed state has convolutions which press against each other; toggle linkage means operatively connected to said coil spring for stretching the latter to a condition where said convolutions thereof are spaced from each other and for maintaining said coil spring in said stretched condition when said toggle linkage means is in an operative position situated slightly beyond its dead-center position; release means responding automatically to a drop in the tension of a thread for engaging and displacing said toggle linkage means from said operative position back through said dead-center position to release said spring for return to its unstressed state; thread guide means normally guiding a thread when the latter is under tension along a path adjacent but clear of said spring; and an arm extending beneath the thread and automatically raised by said release means, when the thread tension drops, to an elevation situating the thread between a pair of convolutions of said spring so that when the latter returns to its unstressed state said pair of convolutions thereof will snap against and grip the thread to sever the latter.

4. Thread severing apparatus comprising, in combination, a coil spring having convolutions which in an unstressed state of said coil spring press against each other; a rod extending through the convolutions of said coil spring; a stationary guide block fixedly connected to said rod to support the latter in a position extending from said block and said block also being fixedly connected to one end of said spring which also extends from said block, said block being formed with a guide groove extending transversely of said rod; a slide member formed with a bore through which said rod extends and fixed to an end of said spring distant from said guide block; said slide member being freely slidable along said rod; a pair of toggle levers pivotally connected to each other and respectively pivotally connected to said guide block and said slide member, said levers having an operative position located slightly beyond their dead-center position and maintaining said slide member on said rod at a distance from said block substantially greater than the length of said spring in its unstressed state so that said spring is thereby maintained in a stretched condition with its convolutions spaced from each other; an elongated release member guided for movement in said groove of said block and having a projection extending through a plane occupied by one of said levers and in which said one lever

turns; detecting means for detecting a drop in the tension of a thread, said detecting means being operatively connected to said release member for automatically shifting the latter in said groove of said block when the thread tension drops through a distance sufficient to displace said one lever by engagement with said projection through an angle displacing the toggle levers back through their dead-center position whereupon said spring contracts to its unstressed state while drawing said slide member toward said block; and guide means guiding the thread between a pair of convolutions of the spring at least when said detecting means detects a drop in said tension so that said pair of said convolutions will snap against the thread to grip and sever the latter.

5. Apparatus as recited in claim 4 and wherein said thread guide means includes guide members which guide the thread along a path clear of the coil spring, and an arm pivotally connected to said block and having a normal rest position freeing the thread for movement clear of said spring, said release member having a ramp which, upon movement of said projection toward said one lever, engages said arm and swings the latter in a direction displacing the thread into the space between said pair of convolutions.

6. Apparatus as recited in claim 5 and wherein a plurality of threads are guided by said guide members clear of said spring when they are under normal tension, said arm when swung by said ramp displacing said plurality of threads respectively into spaces between convolutions of the spring to be gripped thereby.

7. Apparatus as recited in claim 5 and wherein a pair of threads are guided by said guide means clear of said spring when said threads are under normal tension, said arm when swung by said ramp displacing said pair of threads into spaces between convolutions of said spring to be gripped and severed thereby, said detecting means including a lever normally having a substantially upright position, means pivotally supporting said lever for free turning movement, a yoke pivotally carried by an upper portion of said lever and engaging said threads to hold said lever in said substantially upright position, whereupon when either of said threads undergoes a drop in tension said yoke will turn to release said lever which automatically falls, said release member carrying a second projection in the path of falling movement of said lever of said detecting means to be engaged and moved by the falling lever for displacing said release member in a direction which places said first projection thereof in engagement with said one of said toggle levers.

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