Sept. 16, 1969 N. I. ARTAMONOVA ET AL 3,466,862

MEANS FOR CATCHING A BROKEN YARN AND PIECING IT TO THE SLIVER, PARTICULARLY FOR USE WITH SPINNING FRAMES AND SPINNING AND TWISTING FRAMES

Filed July 20, 1967 2 Sheets-Sheet 1

FIG. 1

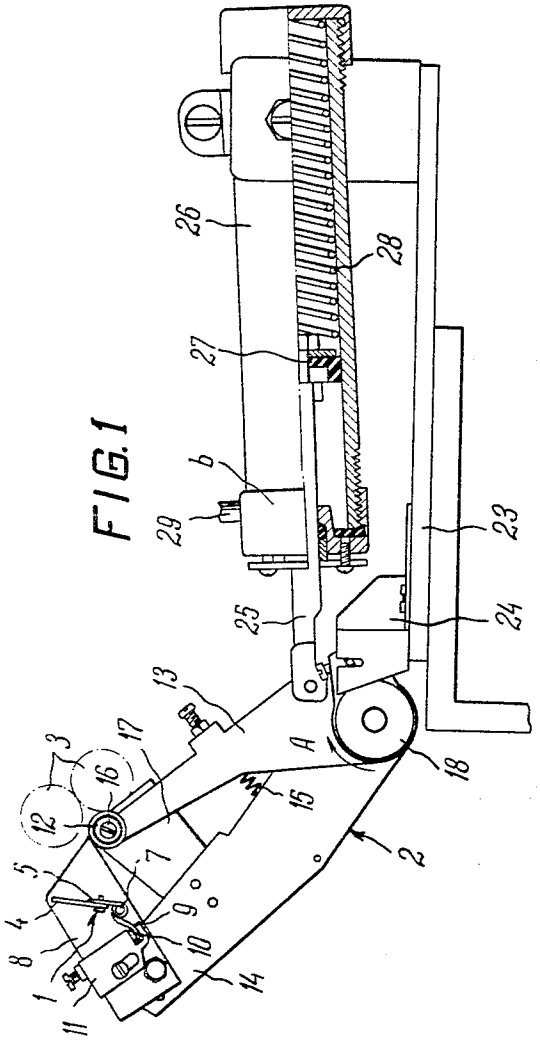
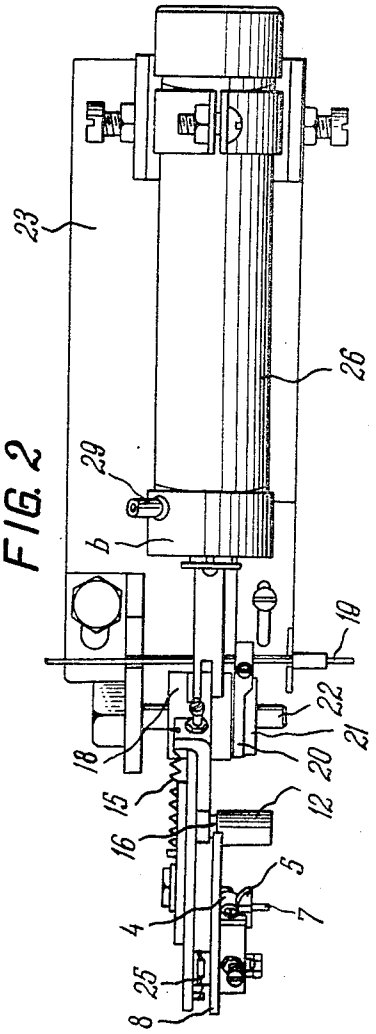
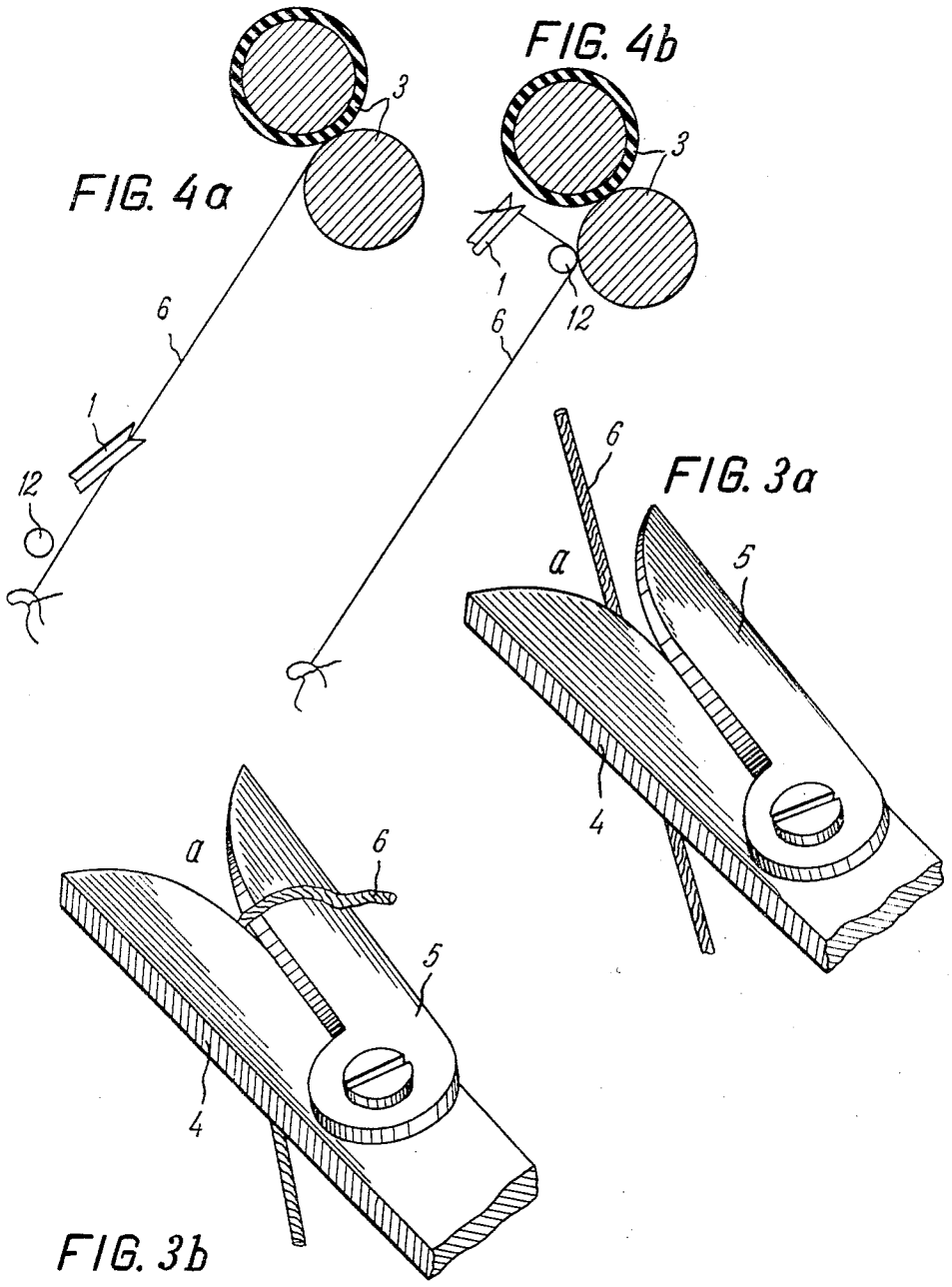


FIG. 2



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MEANS FOR CATCHING A BROKEN YARN AND PIECING IT TO THE SLIVER, PARTICULARLY FOR USE WITH SPINNING FRAMES AND SPINNING AND TWISTING FRAMES

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U.S. Cl. 57—34 2 Claims

ABSTRACT OF THE DISCLOSURE

A device for use in spinning and twisting machines for catching a broken yarn end and piecing it to the sliver in which the catcher includes two interconnected plates defining a wedge-shaped slot and the piecing unit includes a rubber covered roller.

The present invention relates to spinning frames and to spinning and twisting frames, and more particularly to means for catching a broken yarn end and piercing it to the sliver.

Known at present are thread piercing devices comprising: a sensor for checking the absence of breakages in the section between the drafting means and the thread guide; a broken end catcher defined by a solenoid provided with a movable core which is activated when a signal is sent by the sensor; a yarn piecing device and an operating mechanism actuated by the sensor and activating the yarn piecing device (see U.S. Patent No. 3,149,-451, class 57–22, 1964). Since in the above mentioned devices the broken yarn end is not brought in the middle of the sliver, it may be that the yarn will not be pieced to the sliver. This is the main drawback presented by devices of this character. Moreover, such in devices the yarn remains constantly under the action of the sensor and, as a result, the spinning process is impaired.

In these devices, the broken end is not straightened, and due to the inertness of the sensor-solenoid system, the latter is late in catching the broken end, as the time required for the yarn to pass the distance between the sensor and the solenoid is less than the duration of the action of the sensor-solenoid system.

An object of the present invention is to provide a device for the elimination of the above drawbacks thereby ensuring a better piecing of the yarn with the sliver.

Another important object of this invention is to provide a device of the character described which is capable of ensuring a greater reliability in operation.

Still another object of the invention is to provide a device of this type which is of simple design and convenient in operation.

These and other objects of the invention have been achieved by means of a device for use on spinning frames

and on spinning and twisting frames, in which a broken end catcher and a yarn piecing mechanism are provided in the space between the drafting system and the thread guide. The broken end catcher and the yarn piecing mechanism follow the sliver and bring the broken end to the middle of the sliver. The broken end catcher is defined by several interconnected elements, with two of such elements being disposed relative to each other so as to provide a wedge-shaped slot therebetween thereby ensuring the free passage of the yarn in the widest portion during normal spinning and jamming of the yarn in the narrow portion in the case of its breakage.

Movement is imparted to the broken end catcher and to the yarn piecing mechanism by means of a flexible draw bar operably connected with the machine ring and by a carrier to which the flexible draw bar is attached and which is geared with the broken end catcher and the yarn piecing mechanism. For a better understanding of the invention there is set forth below a description of one of the possible embodiments thereof with reference to the accompanying drawings, wherein:

FIG. 1 is a view partly in elevation and partly in cross section of the device according to the invention;

FIG. 2 is a top view of the device illustrated in FIG. 1;

FIG. 3*a* and 3*b* are fragmentary views in perspective of the broken end catcher at normal spinning and at the moment of yarn breakage; and

FIGS. 4*a* and 4*b* are diagrammatic views showing the broken end catcher in different positions.

The present device for use on spinning frames is constituted by a broken end catcher **1** (FIG. 1) and a yarn piecing mechanism **2** following the web emerging from a drafting means **3** and the take-up spindle of the spinning frame. There is one device for each spindle location.

The broken end catcher **1** comprises two interconnected plates **4** and **5** so disposed relative to each other that a wedge-shaped slot is provided therebetween. The slot allows the free passage of yarn **6** from the feed package to the take-up spindle in its wide portion during normal spinning and ensures the jamming of the yarn in its narrow portion in the case of breakage as illustrated in FIGS. 3*a* and 3*b* respectively.

The interconnected plates **4** and **5** (FIG. 1) are mounted on a shaft **7** attached to a bar **8**. More particularly, the plate **5** is bent to provide a sleeve **5***a* which embraces the shaft **7** and a shank **9** is fixed to the sleeve for coaction with a contact **10** of a pneumatic sensor **11**, with the sensor being fixed on the bar **8**. The broken end catcher is arranged laterally of the bar **8**.

The yarn piecing mechanism **2** comprises a rubber coated roller **12** and two lever arms **13** and **14** connected together by a spring **15**. The roller **12** is rotatable about a shaft **16** fixed to the lever arm **13** and a plate **17** is rigidly attached to the lever arm **14** together with the bar **8** and the arms **13** and **14** are mounted on a bushing **18**.

The lever arms are mounted on the bushing **18** so as to be capable of turning relative thereto, both simultaneously and alternately. It will be noted that the roller **12** and the shaft **16** project laterally from the arm **13** in spaced relationship to the end catcher **7** (FIG. 2).

The lever arms **13** and **14** together with the roller **12** and plates **4** and **5** are moved following the sliver by a flexible draw bar **19** (FIG. 2) connected with the machine carrier (not shown in the drawing) and a ring **20** carrying the draw bar **19**. The ring is connected by a washer **21** with the bushing **18** of the lever arms **13** and **14**.

The bushing **18** can turn about a shaft **22** stationarily secured on a bracket **24** which in turn is stationarily attached on a plate **23** serving as a base for the device and fixed to the roll beam of the spinning machine. As a re-

sult of the movement of the roller **12** and plates **4** and **5** following the sliver, the broken end is positioned precisely in the middle of the sliver, due to which action a better and more reliable piecing of the yarn is achieved.

The bar **8** is constantly pressed against the roller **12** by a spring **25** (FIG. 2).

Roller **12** not only follows the sliver in its movement, but is also turned around the shaft **22** by a rod **25** of a pneumatic cylinder **26** one end of the rod **25** is attached to the lever arm **13** as at *25a* (FIG. 1). The rod **25** is connected at its other end to a piston **27**, and a spring **28** is located between the piston and end of the cylinder for urging the piston towards the opposite end of the cylinder.

A space *b* of the pneumatic cylinder **26** is connected by a flexible hose **29** with the sensor **11** which is constantly supplied with compressed air from the air main of the spinning frame.

The entire actuating mechanism can rotate together with the rod **25** and the cylinder **26** in a horizontal plane relative to the plate **23** about a vertical axis fixedly secured in the plate **23** (not shown) disposed under a clamp C by which the cylinder is attached to the plate. Consequently, the cylinder **26** can turn in both the horizontal and vertical planes.

In the course of operation, the bushing **18** together with the lever arms **13** and **14** mounted thereon reciprocates in the horizontal plane along the shaft **22** so that the cylinder **26** executes an oscillating movement about the vertical axis on which it is secured in the plate **23** serving as a base.

The reciprocation is imparted to the bushing **18** via the drawbar **19** connected at one end with the machine carrier (not illustrated) and at the other end movably with the ring **20** capable of rotation and secured by the washer **21** on the bushing.

The continuous oscillating movement of the yarn piecing means about the vertical axis provides for the reciprocating movement of the broken end catcher and the yarn piecing roller synchronously with the sliver reciprocation along the drawing mechanism of the machine.

The device operates in the following manner:

At normal spinning the yarn **6** passes through the wide portion of the slot *a* as shown in FIG. 3*a* and at this moment the shank **9** of the plate **5** does not coact the contact **10** of the pneumatic sensor **11**. As a result, no air will be admitted into the space *b* of the pneumatic cylinder **26**, and the rod **25** will occupy its foremost front position due to the action of the spring **28**. When the rod **25** is in this particular position, the lever arms **13** and **14** are pressed together by the spring **15**, and the roller **12** is beneath the broken end catcher **1** as illustrated in FIG. 4*a*.

During normal spinning and at the moment of yarn breakage the drawbar **19** connected with the machine carrier displaces the bushing **18** along the shaft **22** by means of the ring **20** and washer **21**. Due to this, the roller **12** and plates **4** and **5** reciprocate and follow the sliver emerging from the spinning frame drafting means **3**.

At breakage, the yarn **6** passes through the narrow portion of the slot *a* as shown in FIG. 3*b* and is jammed therein. The yarn caught in the slot tends to turn the plates **4** and **5** around the shaft **7**. As a result, the shank **9** engages the contact **10** of the pneumatic sensor **11**. The sensor is activated and compressed air flows through the hose **29** into the space *b* of the pneumatic cylinder **26** thereby displacing the piston **27** to the right (FIG. 1) and compressing the spring **28** so that the rod **25** is retracted into the pneumatic cylinder **26**. The rod **25** rotates lever arms **13** and **14** pressed thereto by the spring **15** in the direction of arrow A. The plates **4** and **5** between which the yarn is clamped rotate and raise together with the lever arms. At this moment, the yarn is unwound from the package and as soon as the plate **17** engages the fluted roller of the drafting means **3**, the lever arm **14** stops and only the lever arm **13** continues its rotatable movement. This rotatable movement will cause the roller **12** to move from beneath the broken end catcher **1** and press against the fluted roller of the drafting means **3**, as shown in FIG. 4*b*. Thereupon, the roller **12** starts to rotate and pulls the yarn **6** from the slot *a* thus straightening the broken end and bringing such end over the sliver.

After the yarn end has been drawn out of the narrow portion of the slot *a*, the plates **4** and **5** return into their initial position, the sensor is deactivated and the air supply to the space *b* in the pneumatic cylinder **26** is arrested.

The spring is released and the rod **25** assumes its initial position. The lever arms **14** and **13** are brought together by the spring **15**, and the roller **12** returns to the position shown in FIG. 4*a*. After this, the above cycle is repeated.

Thus, the device described hereinabove ensures the positioning of the broken end of the yarn in the middle of the sliver, as well as straightening of the broken end, and makes the attendance more convenient.

We claim:

1. In spinning and spinning and twisting frames of the type having drafting means, a take-up spindle and means for catching a broken yarn and piecing the same to a sliver arranged between the drafting means and take-up spindle, said catching and piecing means including a base, a pair of lever arms, spring means interconnecting said lever arms, means mounting one end of said lever arms to said base whereby said lever arms are capable of relative rotation, a roller mounted for rotation adjacent the opposite end of one of said lever arms, said lever arms and roller constituting a yarn piecing mechanism, a bar mounted on the other of said lever arms and having a free end engaging the periphery of said roller, a pair of interconnected plates so arranged as to provide therebetween a wedge-shaped slot, said slot allowing the free passage of the yarn in its wide portion at normal spinning and the yarn jamming in the narrow portion after yarn breakage, means mounting said plates on said bar for movement toward and away from the roller, said interconnected plates defining a broken yarn end catching mechanism, means operably connected to said lever arms mounting means for moving said mounting means and arms transversely to follow the sliver whereby the broken end is positioned precisely in the middle of the sliver, movement imparting means operably coupled to one of said lever arms to rotate said lever arms upon activation thereof, sensor means on said bar operably connected to said movement imparting means to activate said movement imparting means, and actuating means on said mounting means for said plates to activate said sensor means, the arrangement being such that during normal spinning, the yarn passes through the wide portion of the wedge-shaped slot and said lever arms mounting means reciprocate tarnsversely so that the roller and interconnected plates follow the sliver emerging from the drafting means but upon yarn breakage, the yarn passes through the narrow portion of the wedge-shaped slot and is jammed therein thus turning the interconnected plates so that the actuating means actuates the sensor means to activate the movement imparting means thereby turning said lever arms in the direction of the drafting means until said other lever arm engages the drafting means whereby its movement is stopped while said one lever arm continues its rotation causing the roller to move from beneath the end catching mechanism and press against the drafting means thereby rotating the roller which pulls the yarn from the wedge-shaped slot thereby straightening the broken end and positioning such end over the sliver.

2. The apparatus as claimed in claim **1**, in which said movement imparting means includes a cylinder, a piston slidable therein, a piston rod operably connected to said one lever arm, a spring within said cylinder normally

biasing said piston rod outwardly of the cylinder, means for supplying compressed air to said sensor means, and a flexible hose between said sensor means and said cylinder for supplying air to said cylinder to retract the piston rod against the action of the spring means.

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