Aug. 8, 1967 P. B. WEST ET AL 3,334,385

COILERS

Filed Oct. 1, 1964

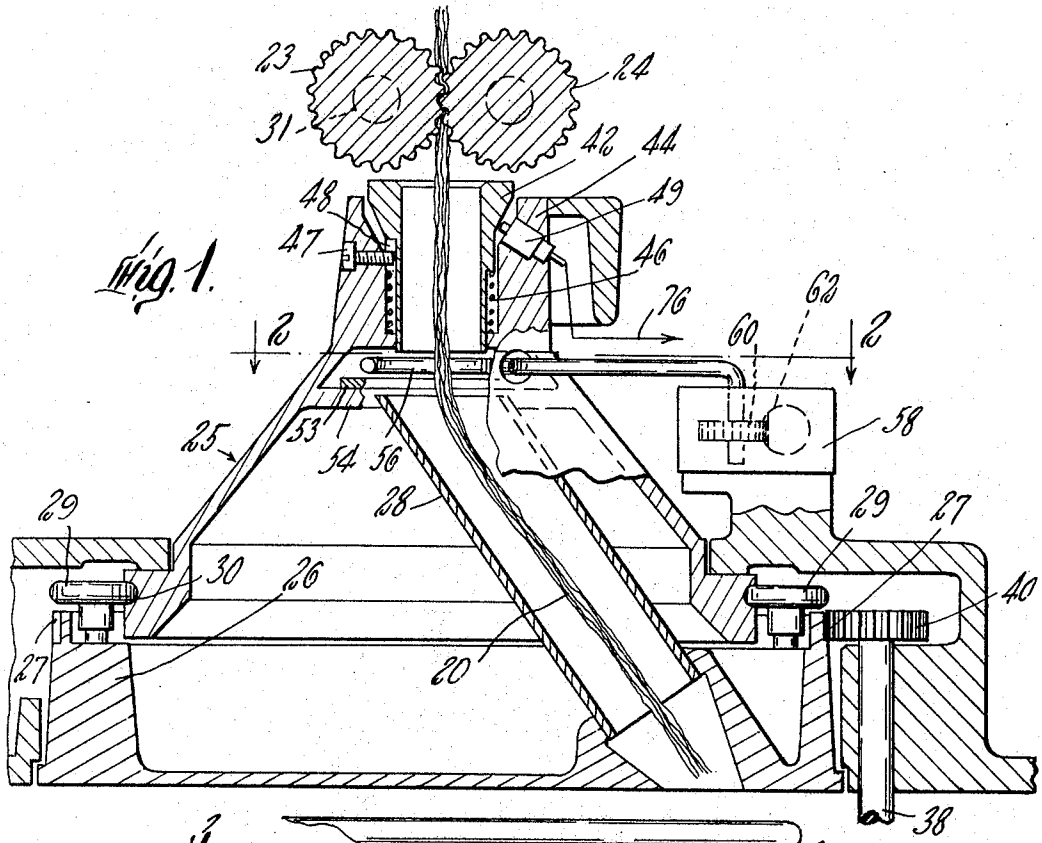

Fig. 1.

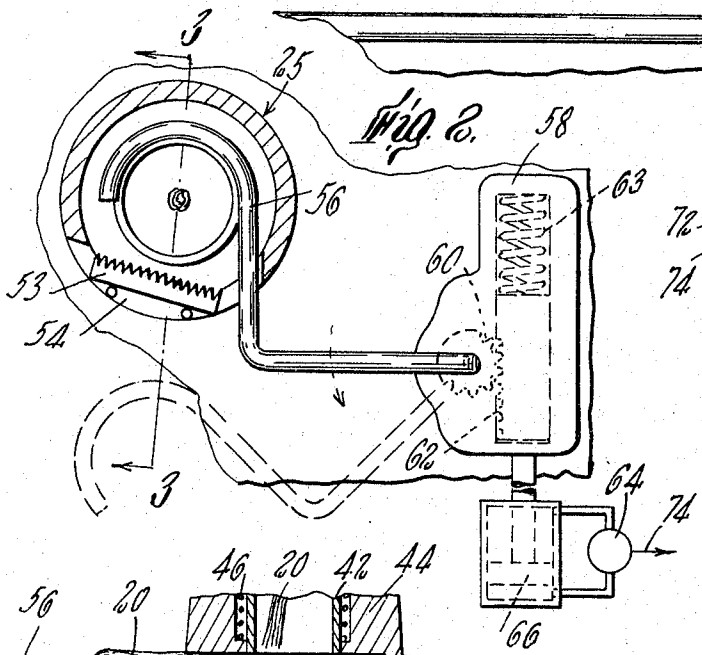

Fig. 2.

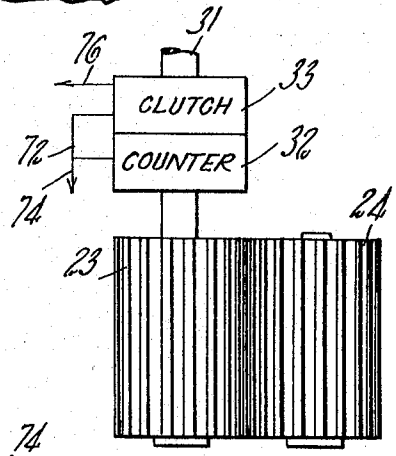

Fig. 4.

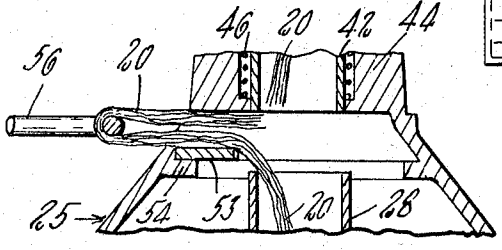

Fig. 3.

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3,334,385

COILERS

Paul B. West, Clemson, and Richard J. Savageau, Seneca, S.C., assignors to Maremont Corporation, Chicago, Ill., a corporation of Illinois

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6 Claims. (Cl. 19—.2)

The present invention relates to improvements in coilers, and more particularly to a mechanism for rupturing the sliver or similar short fiber strand material in process of being coiled, and simultaneously for positioning the leading end of the ruptured sliver in position for continued feed.

It is a principal object of the invention to provide a novel sliver rupturing device for use in a coiler, which acts automatically when rendered operative to effect a clean break of the feeding sliver so that the trailing end severed with the coil is drawn into the can, and the severed end of the sliver leading from supply is accurately positioned to be advanced certainly and accurately into a substituted can whenever feed of the sliver is resumed.

It is a further object of the invention to provide a novel and improved detector device associated with the rupturing device herein set forth which will operate in a simple and effective manner to detect any obstruction to the sliver feed which may occur in that portion of the apparatus located between the tube gear of the coiler and the delivery rolls through which the sliver is fed to said tube gear.

With these and other objects in view as may hereinafter appear, the several features of the invention will be readily appreciated by one skilled in the art from the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a fragmentary large scale vertical section taken through a coiler for delivering sliver to a can, illustrating particularly the tube gear carrying the inclined tube for delivering sliver in coiled form to a can, portions of the mechanism for feeding sliver thereto, the sliver disrupting device, and including the sliver feed obstruction detector device associated therewith;

FIG. 2 is a sectional plan view taken on a line 2—2 of FIG. 1 illustrating particularly elements of the sliver disrupting device;

FIG. 3 is a detail sectional view taken on a line 3—3 of FIG. 2 illustrating the operation of the sliver disrupting device; and

FIG. 4 is a detail plan view of the delivery rolls of FIG. 1, and including a clutching device through which said rolls are driven and a predetermined yardage counter for measuring the sliver delivered.

The invention is herein disclosed as embodied in a coiler for coiling sliver and like material in cans, only so much of the apparatus being shown as believed necessary to illustrate the connection of the invention therewith. The coiling apparatus is in general similar to that shown, for example, in the patent to P. B. West et al., No. 2,983,967, in which sliver **20** is delivered by delivery rolls **23**, **24** supported on a fixed coiler head **25** directly over a conventional tube gear **26** having external gear teeth **27** and carrying an inclined tube **28** rotatable on a vertical axis on bearings provided by wheels **29** supported on the tube gear **26** for engagement in an annular groove **30** formed in the coiler head **25**.

The delivery rolls **23**, **24**, best shown in FIG. 4, are preferably fluted intermeshing rolls, one of which is conventionally driven from a drive shaft **31** forming part of the coiler device, not here shown. For purposes of the present disclosure, an electrically operated clutch diagrammatically shown at **33** and a predetermined yardage counter **32** have been interposed between the drive shaft **31** and the delivery roll **23**. The inclined tube **28** is formed with the mouth portion thereof centered directly beneath the delivery rolls **23**, **24** and with the orifice through which the sliver is discharged to a can **36**, offset radially from the axis of rotation of the tube gear.

The tube gear **26** is driven through driving connections which may be conventional and include, for driving the conventional can turntable, a vertically disposed drive shaft **38** and a pinion **40** secured to the upper end thereof, which meshes with the peripheral teeth **27** of the tube gear.

In the preferred construction as shown, a vertically disposed tube **42** is mounted directly beneath the delivery rolls **23**, **24** through which the sliver **20** is fed directly into the mouth of the inclined tube **28**. The vertically disposed tube **42** forms an essential element of our sliver disrupting device, and also forms part of a detector device which will detect and will be suitably activated by the occurrence of any obstruction in the feed of sliver to the inclined tube gear **26**. As best shown in FIG. 1, the tube **42** is loosely supported within a sleeve **44** in the fixed coiler head **25** and is normally held in a raised position relative thereto by means of a compression spring **46** seated at its lower end against a shoulder portion of the sleeve **44** and at its upper end against a shoulder formed in the external periphery of the tube **42**. Movement of the tube is limited by the stop screw **47** mounted in the sleeve **44** for engagement in a slot **48** in the peripheral surface of the tube **42**. Downward movement of the tube **42** causes an outwardly shouldered upper end portion thereof to engage and to actuate a microswitch **49**. In the event that sliver should become jammed or back up in the tube **42**, the tube will be automatically moved downwardly by additional sliver delivered by the calender rolls causing the microswitch **49** to operate. The detector device thus provided is advantageously employed to arrest the operation of the machine, as, for example, by disconnecting clutch **33** to stop the delivery roll **23**, **24**.

Elements of my improved sliver disrupting device include additionally a sliver flow impeding element in the form of a comb **53**, which is secured to an inwardly projecting flange **54** of the coiler head **25** to extend transversely adjacent one edge and immediately above the inlet opening of the inclined tube **28**, and a hook **56** which is arranged to swing laterally in a horizontal plane immediately beneath the lower end of the tube **42** and above the comb **53**. The hook **56** comprises a wire member having at one end a downward extension which is fitted into a bearing formed in a block **58** mounted on the coiler head **25** and provides a pivot support about which the hook swings. A segmental gear **60** secured to the pivoting portion of the hook **56** is arranged for engagement with a rack **62** slidably supported in a bore in the block **58**. A coiled compression spring **63** seated within the bore referred to and engaging one end of the rack **62** normally holds the rack, segmental gears **60** and swinging hook **56** in the retracted inoperative position shown in FIG. 2. The hook is adapted to be swung across the inlet opening of the upper end of the inclined tube **28** and over the comb **53** to engage and to disrupt the sliver **20** by means of operating connections which include an electrically operated air valve **64** connected with a piston **66** which is formed integrally with the rack **62**. The swinging movement of the hook **56** induced by the operation of the air valve **64** and rack **62** causes a bight of sliver **20** to be taken and moved laterally as shown in FIG. 3, the lower edge thereof engaging against the teeth of the comb **53**, the comb acting as a heavy friction snub to prevent movement of this portion of the sliver. The movement of the hook **56** thus has the effect of stretching that portion of the sliver extending between the nip of the

calender rolls **23**, **24** and the friction snub on the sliver produced by the engagement of the teeth of the comb **53** thereagainst. Inasmuch as this distance is substantially greater than the length of any individual fiber in the sliver, the stretch thus imposed upon this portion of the sliver causes the sliver to be disrupted.

Conventionally arranged electrical connections between the counter **32**, clutch **33** and air valve **64**, and between the microswitch **49** and the clutch **33** are diagrammatically indicated in FIGS. 1, 2 and 4 of the drawings. As shown in FIG. 4 the counter **32** when actuated closes a circuit through a wire **72** to the electrically operated clutch causing the clutch to open, and closes a second circuit through lead **74** indicated in FIG. 4 and in FIG. 2 to the electrically controlled air valve **64** causing the hook **56** to operate. The micro-switch **49** when actuated closes a circuit to the clutch **33** through a wire **76** shown in FIGS. 4 and 1 causing the clutch to open.

The operation of our improved sliver disrupting device will be described more particularly as follows:

It is assumed that the completion of a coiling operation has been signaled as, for example, by the operation of the conventionally shown electric counter **32**. The rotation of the calender rolls **23**, **24** is now arrested or greatly reduced as, for example, by the operation of the electrically operated clutch **33** energized through the electric circuit **72**.

The electrically operated valve **64** is now energized through electric circuit **74** to swing the hook **56** to the sliver disrupting position shown in dotted lines in FIG. 2 and in full lines in FIG. 3 causing a length of sliver extending between the arrested calender rolls **23**, **24** and the high friction snub produced by the teeth of the comb **53** to be substantially stretched. The held length of sliver **20** is thus stretched to the disrupting point at which the relatively short lengths of fiber are pulled away from one another producing the break in the sliver shown in FIG. 3. The hook immediately returns to its normal position. The lower of the two sliver ends produced by the sliver severing operation is drawn downwardly into the filled can upon removal of the can, while the upper end of the severed sliver leading from supply is left suspended in the vertically arranged tube **44**.

The apparatus described has the advantage that it produces a clean break in the sliver and leaves a hanging end thereof which is positioned within the vertical tube **44**, so located that when the feeding of the sliver is resumed the free end will automatically be fed downwardly through the vertical tube **44**, the connecting sloping tube **28**, and finally into a can selected to receive said fibers.

The tube **42** is of such length with relation to the length of the individual short fibers of the sliver and the relative positions and proportions of the various elements are such that the severing of the sliver must occur without fail in the upper tube **42**. The orderly rupture of the strand and its vertical orientation in the tube insures that the sliver strand will be self-threading through a lower inclined tube when the calender rolls **23**, **24** resume their rotation. Satisfactory operation of the sliver severing device is made possible principally by the use of the vertical tube section preceding the swinging hook, and by the use of the high friction snubbing surface provided by the comb **53** directly below the hook, to prevent withdrawal of sliver from the inclined tube and so to cause the rupture to occur where desired.

It will be readily appreciated that circumstances may occur in which the severed end or more following portion of the sliver may become bunched up or otherwise entangled in the vertical tube **42** with the result that the normal feed of the sliver is obstructed with the risk of damage to the apparatus. In such case the tube **42** will be forced downwardly against the spring **46** causing the micro-switch to operate closing the circuit through wire **76** to the clutch **33**, which is immediately disconnected to stop the feed of delivery rolls **23**, **24**.

The invention having been described what is claimed is:

1. In a coiler having a pair of delivery rolls having a sliver feeding nip providing a sliver delivery path therebeneath, control means for controlling the rotation of said delivery rolls to arrest the feed of sliver therebetween; sliver severing means comprising sliver deflecting means including an arm mounted below said delivery rolls for swinging movement in a horizontal plane from an inoperative position at one side of the path of sliver delivery to an operative position adjacent the opposite side of said path to deflect said sliver toward said opposite side, sliver snubbing means including a sliver flow impeding element mounted below said sliver deflecting means on said opposite side of said path, and operating means moving said sliver deflecting means from its inoperative to its operative position to deflect said sliver from said path into snubbing contact with said sliver flow impeding element, said operating means operating upon the reduction of feed of sliver by said control means to disrupt said sliver between said delivery rolls and said sliver flow impeding element.

2. In a coiler, a sliver severing means according to claim **1** in which there is provided a vertically disposed sliver feed tube extending from beneath said rolls downwardly to a point above said sliver deflecting means, said tube having a length so related to the length of individual fibers of said sliver that the severed end of the feeding sliver will be located within said vertical tube.

3. In a coiler, sliver severing means according to claim **1** in which the sliver snubbing means comprises a high friction toothed comb for frictionally engaging the deflected sliver.

4. In a coiler, a sliver severing means according to claim **1** having a vertically arranged feed tube extending from beneath said delivery rolls to a point immediately above said sliver deflecting means, and a sliver snubbing means comprising a transversely disposed toothed comb mounted below said sliver deflecting means and above said delivery tube for snubbing and frictionally impeding the snubbed sliver.

5. In a coiler having sliver severing means according to claim **1** in which there is provided a vertically disposed sliver feed tube extending from beneath said rolls downwardly to a point above said sliver deflecting means, a support on which said feed tube is movable longitudinally, means biasing said feed tube longitudinally upwardly toward said rolls, and an operating device arranged to be actuated by a downward movement of said feed tube against said bias upon the occurrence of an obstruction of said feeding sliver within the feed tube.

6. In a coiler as claimed in claim **1**, further including a stop motion comprising a vertically movable tube mounted between said delivery rolls and said sliver deflecting means surrounding said path, yieldable means normally maintaining said vertically movable tube in a predetermined position, and switch means responsive to movement of said tube occurring upon plugging of said tube, said control means being responsive to said switch means to stop said delivery rolls.

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MERVIN STEIN, *Primary Examiner.*

I. C. WADDEY, *Assistant Examiner.*