Dec. 9, 1930. W. M. HASTINGS 1,784,141

CLEARER AND SLUB CATCHER FOR TEXTILE MACHINES

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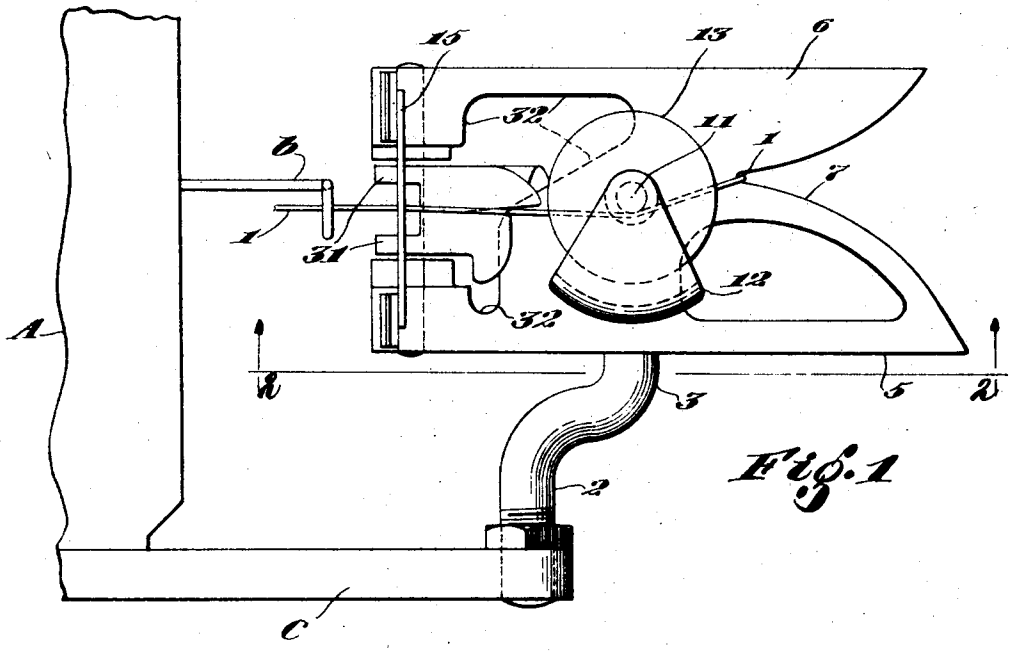


Fig. 1

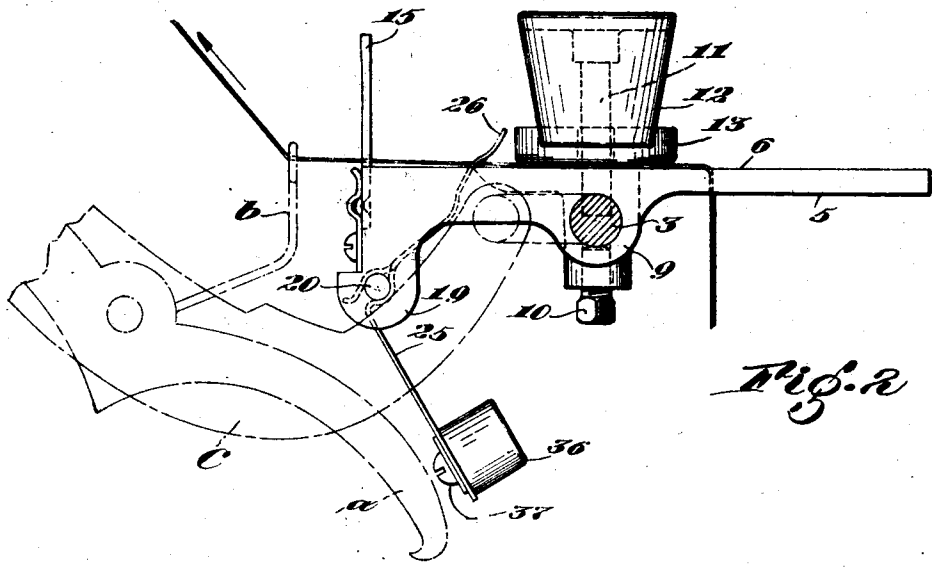


Fig. 2

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Fig. 3

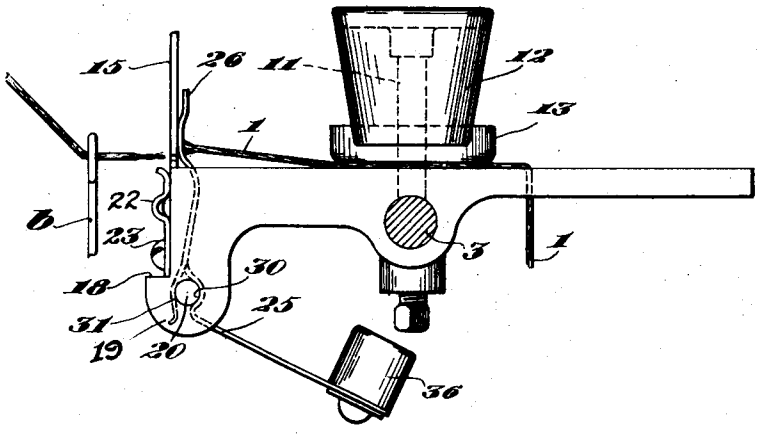


Fig. 4

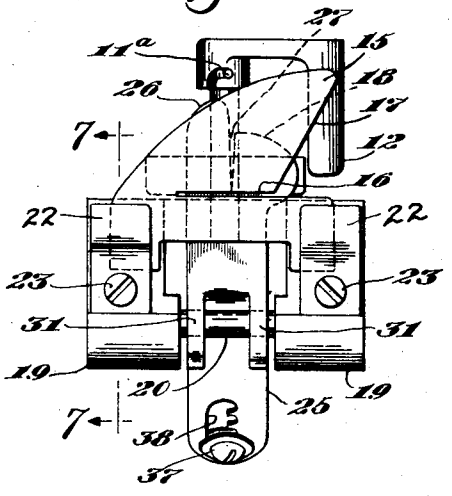


Fig. 5

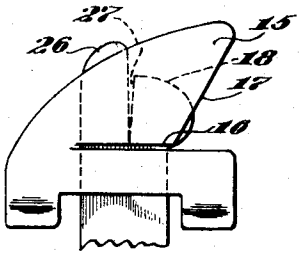


Fig. 6

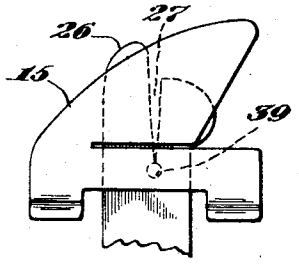


Fig. 7

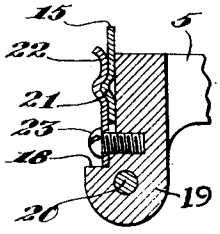
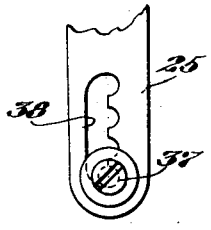


Fig. 8



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UNITED STATES PATENT OFFICE

WALTER M. HASTINGS, OF METHUEN, MASSACHUSETTS

CLEARER AND SLUB CATCHER FOR TEXTILE MACHINES

Application filed November 10, 1927. Serial No. 232,315.

This invention relates to yarn clearers, knot or slub detectors, and to mechanism employing such devices for use in winding or other machines handling or employing textile or other yarns, cordage or other filaments, and adapted to detain a knot, slub or other obstruction on the running filament.

It is customary to use some form of yarn clearer (for example in connection with winding machines adapted to wind from the primary package such as spinning bobbins, to secondary packages, such as spools, cops or cheeses) for the purpose either of scraping off and removing removable slubs, or of detaining more serious obstructions such as snarls and knots, in order to cause breakage of the yarn prior to embodiment of the defect in the winding package; or also for removing and for detaining such a slub, snarl or knot. Hereinafter such defects, slubs, snarls or knots are referred to in general by the word "slub". As more fully explained in my Letters Patent No. 1,570,248, dated January 19, 1926, it is usual to associate a slub catcher or clearer with devices employed for automatically stopping winding upon breakage or exhaustion of the yarn, and I have in my said patent described and claimed an improved form of slub detainer and detector, the arrangement being such as to provide for a clearer and slub catcher having thin, flat blades penetrated by slots for the yarn or filament to be cleared or detained at the blades, one of the blades being supported for freedom of motion in the direction of travel of the yarn or filament to cause motion of the blade to define a more restricted passage for the yarn when there has been motion of that blade in response to the passage of a slub. The device of my said patent is adapted to operate upon any or all slubs, knots or obstructions capable of reacting with walls of the slot in the movable blade to displace the movable blade, and in this respect depends on the adjustment of the impedance against which the movable blade operates to prevent operation of the movable blade upon immaterially small or easily removed slubs, in respect to the occurrence of which it is not desirable to detain and break the yarn and stop winding. One object of my present invention is to provide a yarn clearing and slub detaining combination including a movable plate which will not begin to act toward the detention of a slub unless there passes through the device a slub of such substantial proportions as to make it desirable to break the yarn rather than to allow the slub to be wound into the winding package, or to run into the yarn-using machine if the device is applied to a textile machine other than a winding machine. Another object of the invention is to provide a slub catching and detector device having a detector element with a slub detaining or slub clearing mechanism adapted to present to the yarn clearing-jaws more closely spaced after detection of a substantial slub than before detection of this slub; and also adapted finally to present to the running yarn, before the slub detected shall have gone forward to the winding or using machine, a restricted opening made up of the superposed slots of the movable detector element and a relatively fixed element.

A further object of the invention is to provide in a slub detecting and detaining device means for detecting and detaining the slub normally in a condition facilitating rapid threading, the organization being such as to cause the device after operation automatically to be positioned for re-threading; and a further object of the invention is to provide for the immediate and close association of a running tension device with the detector element of this slub detector and detaining device.

For these and other objects, and in order to explain the invention, I have elected to show a form of the device particularly adapted to use with a winding machine of a well-known type having a yarn breakage actuated stop motion, of which part only is shown in the drawings, and adapted to wind cops, cones or other wound packages. In the accompanying drawings,

Fig. 1 is a plan illustrating the invention as applied to a winding machine;

Fig. 2 is a side elevation in section on line 2—2 of Fig. 1;

Fig. 3 is a view similar to Fig. 2 showing the device in operation to detain a slub and and break the yarn;

Fig. 4 is a front elevation of the devices shown in Figs. 1, 2 and 3;

Fig. 5 is a detail elevation corresponding to Fig. 4 showing the relation of a detector element to a pair of horizontal scraping edges;

Fig. 6 is a detail similar to Fig. 5 showing a modified form;

Fig. 7 is a detail section on the line 7—7 of Fig. 4; and

Fig. 8 is a detail elevation of one end of the detector member showing an adjustment for the impedance member.

Referring now to Fig. 1, let 1 illustrate a running yarn, wire or other filament passing into a filament-using or winding machine shown generally at A on the left of the figure. As illustrated the machine A may be a well-known type of winder having, Fig. 2, a usual knock-off hook *a* normally supported by a breakage or exhaustion detector guide *b*. In the type of winding machine illustrated a frame element *c* provides a convenient support to which it is preferred to attach a cranked bolt 2, on the adjustable arm 3 of which the tension and slub detecting and detaining devices may be adjustably supported in proper relation to the remainder of the mechanism.

In the preferred form shown in the drawings the device comprises a bed plate 5 which may be made as a casting having an upper plane surface 6, usually polished, and integrally provided with an open V guide at 7 for a run of the filament 1 from the unwinding package or bobbin, not shown. Preferably the plate 5 is provided with a depending bored lug 9 having a boss for set screw 10 to clamp on the arm 3, upon which the plate 5 may be rotatively adjusted, and by which by rotation of the bolt 2, the vertical position of the plate 5 may be appropriately adjusted. Centrally of the plate 5 a pin 11 having an overhanging guard member 12 removably fastened to the top of the pin 11 by a bayonet joint connection at 11^a may serve as a guide for a polished tension weight 13 resting upon the filament guided by the pin 10 and supported by the upper polished surface of the plate 5. The filament running over the plate 5 and under the tension weight 13 is positioned by these elements and by a relatively fixed jaw element 15 of a guide and clearer device mounted on the inward end of the plate 5. The jaw plate 15, as best shown in Figs. 4 to 6 inclusive, is provided with a substantially horizontal slot 16 and a flared opening 17 to facilitate threading the filament into the slot 16 from the right of Fig. 4. As best shown in Figs. 3, 4 and 7, plate 15 may be mounted against one end of the plate 5 in a recess having a shoulder at 18, Figs. 3 and 7, in each of depending lugs 19 serving as bearings for a cross stud 20. Preferably the plate 15 is corrugated at 21, received under a similar corrugation in a hold-down piece 22 fastened to the plate 5 by one of the screws 23. The hold-down piece 22 may be resilient, and whether resilient or rigid, the jaw plate 15 having the slot 16 can be taken out and replaced by another with a slot 16 of a different width, with ease. The stud 20 serves as a pivot for the detector and detainer element 25 for slubs in the filament running on the upper surface 6 of the plate 5 and through the slot 16 and guide *b*. In the preferred form, the detector and detainer element may comprise as shown at 25 a light sheet metal stamping constituting a bell crank lever of which the upper arm 26 is provided at 27 with a V-shaped slot, the angular apex of which is removed from a bearing on the detector and detainer device 25 adapted to seat on the stud 20 by such a radial distance as, when the parts are in the position of Fig. 3, to bring the apical end of the slot 27 closely into relation with the upper wall or jaw of the slot 16 in the plate 15. Preferably the detector element 25 is slit and deformed by stamping as best illustrated in Figs. 3 and 4 so as to provide a depression 30 to bear on one side of the stud 20 and separate bent spring arms 31, 31, Fig. 4, to bear on the other side of the stud 20. The detector element 25, being of thin spring metal, the bearing parts 30, 31 may be sprung on and off of the stud 20 to exchange the detector and detainer element 25 for another.

The plate 5 is cut away between the lugs 19, 19 as shown at 32, Fig. 1, to provide an ample free space for motions of the detector and detainer element 25, and a stop for its normal position as shown in Fig. 2.

Normally the upper arm 26 of the element 25 rests against one edge of the opening 32 in the position shown in Figs. 1 and 2. This position may be induced by overweighting the arm 26 of the device 25, but preferably the device 25 is provided with an adjustable weight 36 held by a screw 37 in the serrated slot 38, Fig. 8, at the end of its lower arm. In the preferred form of the upper arm 26 of the detector and detainer device 25, one arm of the bifurcated upper arm 26 is cut away at 18 so as to permit the other longer arm to stop a yarn or filament entered in the slot 16 and under the tension weight 13 in position to enter the upper end of the V slot 27 in said upper arm 26 when running.

Referring to Fig. 6, the slot 27 may be formed as a cut entering a bore hole 39, to avoid accumulations of lint at the narrower part of said slot 27.

The operation of the device will now be manifest. By reason of the position of the

stud 20 on the radius arm comprised of the upper part 26 of the detector and detainer lever 25, the normal position of the device shown in Figs. 1 and 2 permits the filament or yarn to run as guided by the slot 16 and the pin 11 under the tension weight 13 through the wider part of the V slot 27 in the member 26. But upon the travel past the slot 27 of a slub of sufficient resistance to lift the weight 36 by reaction with the arm 26 of the device 25, the arm 26 will be carried with the running filament toward the plate 15, and during this progress will rise, whereupon the filament will enter more deeply into the slot 27, with the effect of closing upon the filament the jaws constituted of its edges.

It will be clear to those familiar with devices of the type in question that the slot 27 may be in such position as virtually to be closed by the upper jaw of plate 15 and any opening between the elements closed when the arm 26 is in contact with the face of the plate 15, and in that case the filament will be sheared off whatever its diameter. But, as illustrated more particularly in Fig. 6, the slot 27 may be tapered to a degree at which it is merely of the diameter of the yarn, wire or other filament being passed through the device, and in that case, when the arm 26 has been disposed against the face of the plate 15, an effective scraping hole for the removal of a removable slub will have been brought into effective relation to the yarn or filament. Of course this closed scraping hole will detain the yarn or filament and break it if the slub is not capable of being scraped off by continued running of the yarn or filament.

When the filament has parted and the breakage or exhaustion detector *b* has operated, it will be observed that the parts automatically resume the position of Fig. 2, and that the operator upon piecing up can rethread the device by a motion upward in relation to Fig. 1 with a single sweep of the yarn or other filament.

As pointed out in my said patent the impedance to the motion of the movable plate of a two-part yarn clearer and slub catcher toward the other plate is an important factor of the sensitiveness of the device to detection of a slub. The movable weight 36 provides an accurate adjustment in this respect.

I claim:

1. A filament clearer and slub catcher having plates with slots therein, means for supporting the plates normally out of contact with each other, one of said plates being mounted for motion about a center toward the other plate, and having a slot narrower toward the center than toward the periphery of its arc of motion, and means for guiding the filament normally to run in the wider part of the slot in the movable plate.

2. In a slub detector and detainer device, the combination of a slotted plate and a support determining a plane of passage of a running filament with a movable detector pivoted to swing through said plane of passage toward said slotted plate, said detector having an angular slot of which the walls converge toward its center of pivotal motion.

3. In a slub detector and detainer device, the combination of a slotted plate and a support determining a plane of passage of a running filament with a movable detector pivoted to swing against an impedance through said plane of passage toward and into contact with said slotted plate, said detector having an angular slot of which the walls converge toward its center of pivotal motion.

4. In a slub detector and detainer device, in combination, a relatively fixed slotted plate and a relatively movable detector comprising a slotted plate, means to guide a filament through the slots in said plates respectively, the slot in the movable plate having walls converging toward the position of the slot in the fixed plate when the slotted plates are juxtaposed, and means for causing motion of the slotted part of the detector toward such juxtaposition and in relation to the plane of the running filament when said detector is moved by a slub on the running filament.

5. In a slub detector and detainer device, in combination, a relatively fixed slotted plate and a relatively movable detector comprising a slotted plate, means to guide a filament through the slots in said plates respectively, the slot in the movable plate having walls converging toward the position of the slot in the fixed plate when the slotted plates are juxtaposed, and means for causing motion of the slotted part of the detector toward such juxtaposition and in relation to the plane of the running filament when said detector is moved by a slub on the running filament, and means to restore the detector to normal position on breakage of the filament.

6. In a slub detector and detainer device, the combination of a plate having a surface to establish a plane of position for a running filament, a fixed plate having an open-ended slot in said plane, a movable detector plate pivoted at one side of said plane, and adapted in one position to lie against said slotted plate, said movable plate having an open-ended angular slot whose apex lies in the direction of its center of pivotal motion, and means acting normally to hold said movable plate away from said fixed slotted plate with a wider part of said angular slot intersecting the plane of position of said filament.

7. In combination in a slub detector and detainer device, a support for a filament and

a plate having an open-ended slot fixed to said support, a movable detector between said support and said slotted plate having an open-ended slot, said detector being extended on one side of said slot and normally positioned to permit a filament to be entered into said slots and upon said support upon motion of the filament into the slot in said slotted plate and against the extended side of said detector.

Signed by me at Lawrence, Massachusetts, this seventh day of November, 1927.

WALTER M. HASTINGS.