Oct. 5, 1954 A. MOOS 2,690,607

THREAD CLEANER WITH KNOT CONTROL

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Fig. 1

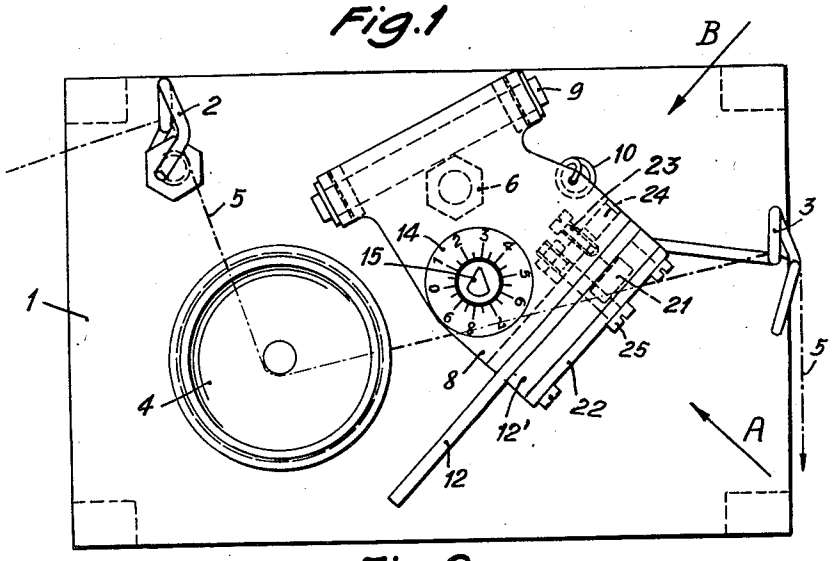


Fig. 2

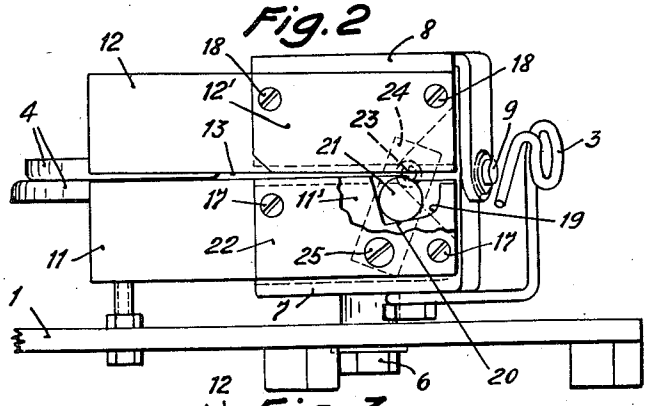
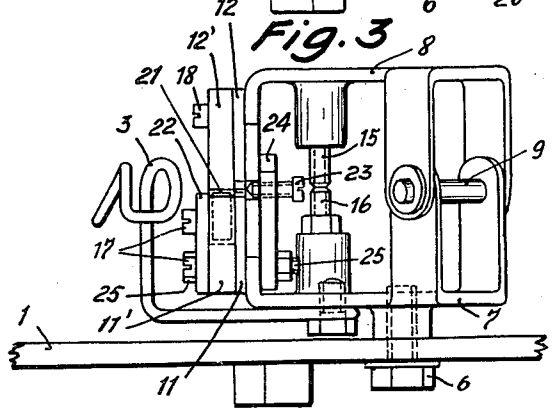


Fig. 3



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Fig.4

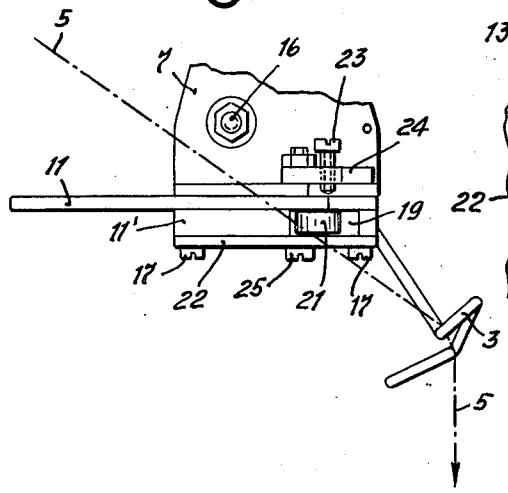


Fig.5

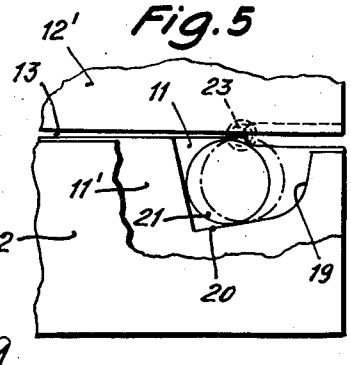


Fig.6

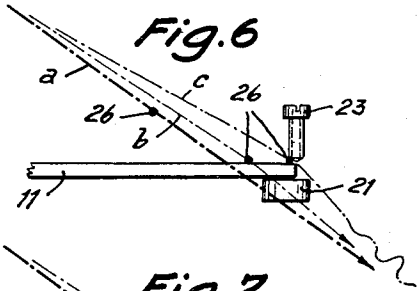


Fig.7

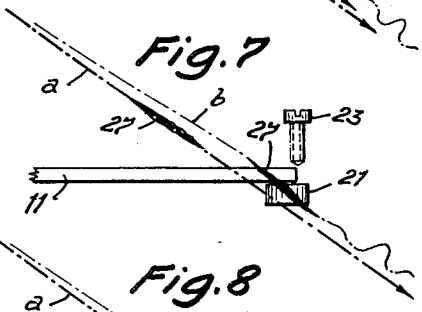
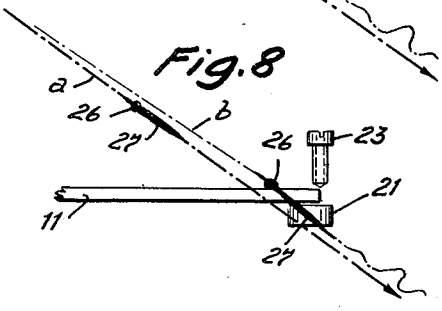


Fig.8



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THREAD CLEANER WITH KNOT CONTROL

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9 Claims. (Cl. 28—64)

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Many different constructions of thread cleaners for spooling and singeing machines are known. Most of these devices have an adjustable slot through which the thread runs. If the adjustment is set so that the slot is too narrow, the thread will break at every knot, also when there is a weaver's knot in the thread. The latter should pass through the slot, when the slot is properly adjusted.

In some cases, these slot devices work in conjunction with a comb, which is either directly attached to the slotted device and catches the thick portion of the thread as it emerges from the slot, so that the thread snaps, or it is located in front of the slot and has the function of roughening the thick portions of the thread, so that they are caught in the slot and cause the thread to snap. There are also devices where the slot is formed with a fixed and a moving knife, and where the latter has the function of being moved by a thick portion in the thread against the fixed knife, and where the latter has the function of being moved by a thick portion in the thread against the fixed knife, so that the thread is pinched between them and caused to break.

There are also thread cleaners which do not break the thread. In one case the thread is controlled by a photo-electrical device, which actuates a stop switch when there is a thick portion in the thread. In another case, the thread runs at an angle of 25–30° through a slot which is tapered so as to become narrower in the direction of motion of the thread, where the knots in the threads slide along a non-adjustable groove in the slot without breaking.

The object of the present invention is a thread cleaner with knot control, which will cause the thread to break whenever there is a large thickened portion in the thread, such as large knots or elongated thick portions, but which lets pass all minor enlargements and the weaver's knot, and similar knot-like thick portions, without causing the thread to break.

In accordance with the invention, this is obtained by arranging two knives so that they form a slot at an acute angle to the direction of motion of the thread, and by providing the lower knife with a clamping device which, if it is moved along by thick portion in the thread, is pressed against the lower edge of the upper knife and, clamping the thread, causes it to break, and by providing near the end of the slot, on the inner side of the knife, along which the knots slide, an adjustable control stop which will let

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pass a weaver's knot and similar minor enlargements of the thread, but retain all major knot-like thick portions and break the thread.

The drawing shows a possible construction of the object of the present invention.

Fig. 1 is a plan view of the thread cleaner with knot control.

Fig. 2 is a part front view to the above, in the direction of arrow A, Fig. 1.

Fig. 3 is a part side view in the direction of arrow B, Fig. 1.

Fig. 4 is a part plan view, with the top knife holder removed.

Fig. 5 is an enlarged part front view, with a part broken away,

Figs. 6–8 diagrammatic plan views to explain the function of the device.

The thread cleaner with knot control is mounted on a base plate 1, which is easy to fix to a spooling or singeing machine. The base plate of the thread cleaner is provided with two thread guides 2 and 3 and with a thread brake 4, through which thread 5 passes. Between thread brake 4 and thread guide 3 the thread cleaner with knot control is firmly fixed to the base plate 1 by means of a screw 6. The thread cleaner has a lower knife holder 7 and an upper knife holder 8, which are hinged together by means of a pin 9 so that the upper knife holder can be raised. The upper knife holder 8 is pulled down against the lower knife holder 7 by a spring 10. The slot for the passage of the thread is formed by two knives 11 and 12, the lower knife 11 being fixed to the lower holder 7 and the upper knife 12 to the upper holder 8. The lower knife is horizontal, and the upper knife is slightly inclined, so that the width of the slot decreases in the direction of motion of the thread. The slot width is adjustable in accordance with the thickness of the thread, it is adjusted by turning a screw 15 in the upper knife holder 8, the adjustment screw 15 can be set with reference to a scale 14, and it is supported by a screw 16 fixed in the lower knife holder. The lower and upper knives have each at their front parts an enlargement 11' and 12' which are flush with those parts of the knives 11 and 12, which form slot 13. These enlargements 11' and 12' are fixed by means of screws 17 and 18 to the knives 11 and 12. The enlargements could be solid with the knives. The lower knife enlargement has a notch 19, whose bottom 20 forms an inclined plane, sloping at an angle of 11° to the horizontal. In notch 19 a loose clamping roller 21 is located, whose top surface is

tangential to that face of the lower knife enlargement which forms one of the sides of slot 13. The thread cleaner is located, with reference to the direction of motion of the thread, so that the knives 11, 12 make with this direction an angle of about 35° and that the thread passes close to the clamping roller 21. The front of the notch is covered by a cover plate 22, which is fixed by screws to the knife enlargement 11'. The knot control device is a control screw 23 on the inside of the knives. The knot-like enlargements of the thread slide along the knife slot. The control screw is located on the support 24, which is fixed by means of a screw 25 to the inner face of the lower knife holder 7. The point of the control screw is formed like a cone frustum and points exactly towards the end of slot 13, so that it is at a small adjustable distance from the slot. This distance is adjusted for each thread or yarn number so that the weaver's knot and similar small enlargements in the thread pass this point, while all major enlargements are caught and cause the thread to break.

Roller 21 could project by 0.5 to 1 mm. above that face of the lower knife, which is one of the walls of the knife slot. This would guarantee accurate functioning even with fine threads.

The method of operation of the thread cleaner with knot control is shown in Figs. 5 to 8. If there are no thick positions in the thread, the motion of the thread is not changed in the position *a* of Fig. 6, the clamping roller 21 is not touched by the thread and remains in its lowest position in the notch 19. If there is in the thread a large knot 26, the direction of motion of the thread is changed slightly, because the knot slides along the slot when the knot hits the knives. This is indicated by path *b* of the thread motion. The knot slides along until it comes to the narrow gate formed by the control screw 23, where it is stopped, and the thread, reaching path *c*, is broken. Weaver's knots and knot-like enlargements of similar size pass the construction without breaking the thread.

If there are long thickened portions 27 in the thread, they will pass between the knives, but the thread path is moved to *b*, Fig. 7, so that the thick portion touches the clamping roller and moves it into the clamping position (chain-dotted line, Fig. 5), so that the thread is clamped and caused to break.

If a long enlarged portion 27 precedes the knot 26 (Fig. 8), and if portion 27 can pass through the slot, the long enlarged portion 27 will move the clamping roller along, when the thread moves into path *b*, and the thread will be broken by clamping before the knot has reached the constriction of the control screw.

When the thread or yarn number is changed, screw 15 is set accordingly, with reference to the indicator scale 14, and the constriction is set to the new size by adjusting the control screw.

While the invention has been described in detail with respect to a now preferred example and embodiment of the invention it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended, therefore, to cover all such changes and modifications in the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A thread cleaner, with knot control, comprising, in combination, two knives arranged one above the other forming a slot at an acute angle between their working edges to receive a thread or yarn, a clamping member behind the lower of said knives, said clamping member being engageable by an enlarged portion in the thread passing over it and moving it into pressing engagement against the lower face of said upper knife, an adjustable control stop at the end of said slot, adjacent the inner side of said knives along which the enlarged thread portion slides, the arrangement of such control stop being such that weaver's knots and similar small thick portions pass through the slot while larger thick portions in the thread are stopped by said adjustable control stop and the thread broken.

2. A thread cleaner, with knot control, as claimed in claim 1, in which said lower and said upper knives have enlarged portions, and in which the lower knife has a notch in which said clamping member is located.

3. A thread cleaner, with knot control, as claimed in claim 1, in which said lower and said upper knives have enlarged portions, and in which the lower knife has a notch in which said clamping member is located, said clamping member being a clamping roller located at the lowest point of an inclined plane formed by the bottom of said notch.

4. A thread cleaner, with knot control, as claimed in claim 1, in which said lower and said upper knives have enlarged portions, and in which the lower knife has a notch in which said clamping member is located, said clamping member being located at the lower point of an inclined plane formed by the bottom of said notch, the upper periphery of said clamping roller being tangential to the plane of that surface of said lower knife which forms one of the walls of the slot.

5. A thread cleaner, with knot control, as claimed in claim 1, in which said lower and said upper knives have enlarged portions, and in which said lower knife has a notch in which said clamping member is located, said clamping member being a clamping roller located at the lowest point of an inclined plane formed by the bottom of said notch, the upper periphery of said clamping roller being tangential to the plane of that surface of said lower knife which forms one of the walls of said slot, said control stop being a screw, pointing towards the end of said knife slot and forming an adjustable constriction passage.

6. A thread cleaner, with knot control, as claimed in claim 1, in which said lower and said upper knives have enlarged portions, and in which said lower knife has a notch in which said clamping member is located, said clamping member being a clamping roller located at the lowest point of an inclined plane formed by the bottom of said notch, the upper periphery of said clamping roller being tangential to the plane of that surface of said lower knife which forms one of the walls of said slot, said clamping roller projecting above the plane of that surface of said lower knife which is the lower wall of said knife slot.

7. In apparatus for detecting and eliminating enlargements and like blemishes in threads and yarns, upper and lower knives arranged in superposed relation to form an elongated V-shaped slot between their adjacent edges, means for

guiding a thread or yarn through said slot, the adjacent edge of the lower knife having a notch with an inclined bottom wall, and a roller member loosely mounted in said notch, the upper peripheral surface of said roller member being tangential to the upper edge of said lower knife and disposed in the path of movement of said thread or yarn whereby enlargements on the thread or yarn of a certain size passing through the slot are adapted to bodily move said roller member thereby clamping said enlargements and cutting the thread or yarn, said roller member being so arranged that enlargements of lesser sizes pass through said slot.

8. In apparatus for detecting and eliminating enlargements and the like blemishes in threads and yarns, upper and lower knives arranged in superposed relation to form an elongated V-shaped slot between their adjacent edges, means for guiding a thread or yarn through said slot, the adjacent edge of the lower knife having a notch with an inclined bottom wall, a roller member loosely mounted in said notch and adapted to roll along said inclined bottom wall, the upper peripheral surface of said roller member being tangential to the upper edge of the lower knife and disposed in the path of movement of the thread or yarn whereby enlargements of the thread or yarn of certain sizes passing through the slot are adapted to bodily move said roller member thereby clamping said enlargements and cutting the thread or yarn, said roller member being so arranged that enlargements of lesser sizes pass through said slot.

9. In apparatus for detecting and eliminating enlargements and like blemishes in threads and yarns, upper and lower knives arranged to form a V-shaped slot therebetween, means for guiding a thread through said slot, and a bodily movable roller member adjacent said slot, said roller member being mounted on a surface inclined with respect to said slot, the roller being movable into said slot, and being disposed in the path of movement of said thread, the upper peripheral surface of said roller being tangential to the edge of said lower knife, said roller being adapted to intercept enlargements in the thread of certain sizes as they pass through said slot, and being constructed and arranged so as to pass enlargements of lesser sizes of thread through said slot.

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