

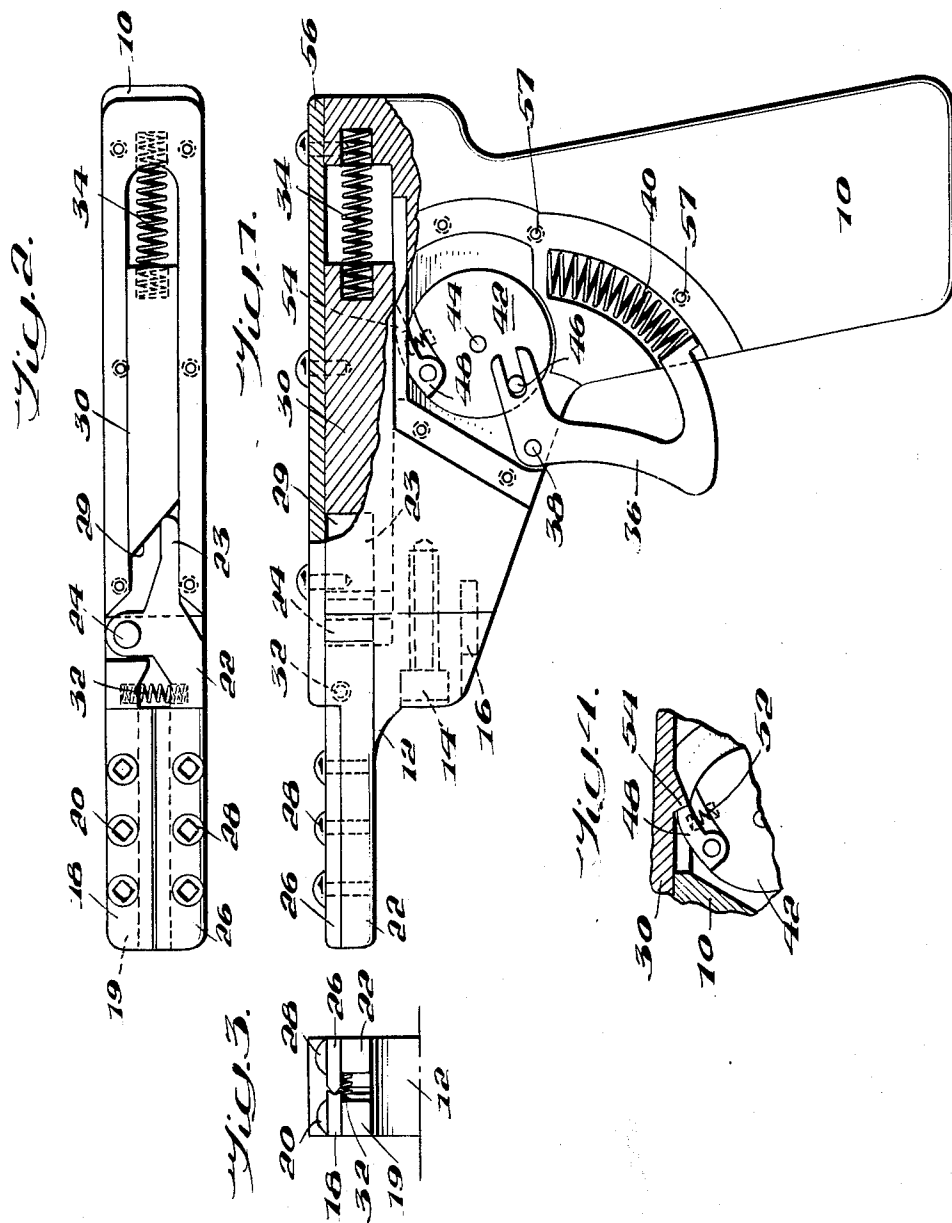
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SPRING URGED CUTTER

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SPRING URGED CUTTER

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4 Claims. (Cl. 30-189)

This invention relates to an improved apparatus for simultaneously cutting a plurality of advancing strands. As used herein, the term "strand" is intended to include either a continuous filament, a gathered plurality of such filaments, or the threads, yarns, narrow webs and the like produced either from filaments or from staple fibers.

In the past, scissors and similar shearing devices have been used to cut down strands. They have drawbacks, particularly for high speed processes involving a plurality of strands, since the scissoring action forces one strand into contact with another and oftentimes causes filaments from one strand to be picked up or transferred to another strand. With each strand going to a separate package, such pickups and transfers lead to high and low denier yarns in the respective packages which off-denier yarn lengths are not first-grade product and must be stripped or removed before shipment.

The principal object of this invention is to provide an apparatus for cutting or severing strands without disrupting or disturbing the alignment of adjacent strands. A corollary objective is to provide an effective cutting device which, in addition, is simple and easy to position, operate and maintain.

These objects are accomplished with a strand-cutting device comprised of fixed and pivotally mounted blades, a plunger engaging the pivoted blade, a first spring biasing that blade toward an open position, a second spring biasing the plunger in a direction to hold the pivoted blade in a normally closed position and trigger means associated with the plunger for sequentially cocking and releasing it. The trigger action facilitates initial opening movement of the pivoted blade responsive to the first spring and a snap action return to the normally closed position responsive to the second spring.

Further objectives and advantages of the apparatus of this invention will become apparent in the following description wherein reference is made to the accompanying drawings in which:

FIGURE 1 is a side view of the cutting device with the side cover removed, other parts having been broken away and shown in section to reveal details of construction;

FIG. 2 is a top view with the top cover plate removed;

FIG. 3 is a partial end view; and

FIG. 4 is a fragmentary view of the plunger release mechanism shown in FIG. 1, additional parts having been broken away and shown in section to reveal details of construction.

In the drawings, a pistol type cutter having a handle 10 has been illustrated. A blade support 12 is attached to handle 10 by bolt 14 and dowel pin 16. A fixed blade 18 is attached to an extension 19 of support 12 by screws 20. A movable arm 22 is pivotally attached to support 12 by pivot pin 14. A second blade 26 is attached to movable arm 22 by screws 28. The movable arm 22 has a lever extension 23 which is in contact with the angular surface 29 of a plunger 30. Although biased away from the fixed blade 18 by a spring 32, the position of movable arm 22 is controlled by plunger 30. As illustrated, a more powerful spring 34 biases the plunger to the left, maintaining the movable blade 26 in a normal position of edge contact with the fixed blade 18. Referring to FIG. 2, 3, it is seen that fixed blade 18 has a longitudinal groove which conforms generally to the V-shaped longitudinal edge of pivoted blade 26.

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A mechanism for sequentially cocking and releasing plunger 30 has been illustrated in FIGS. 1, 4. This mechanism includes a trigger 36 which is pivoted at 38 and biased in a clockwise direction by trigger spring 40. Disc 42 rotates about pin 44. Mounted on disc 42 is control pin 46 which engages trigger 36 in a terminal slot. Also mounted on disc 42 is a pivoted dog 48 which is biased outwardly by a dog spring 52. The dog 48 engages an abutment 54 on plunger 30. To enclose the apparatus, there is a top cover 56 and a side cover (not shown) normally attached by fasteners in apertures 57.

In operation, the strand-cutting device is gripped like a pistol. When pulled, trigger 36 rotates in a counterclockwise direction about pivot 38 and acts upon control pin 46. This causes the disc 42 to rotate in a clockwise direction. Clockwise rotation of disc 42, by the action of dog 48 on projection 54, causes plunger 30 to move to the right, compressing plunger spring 34. This cocking action withdraws cam surface 29 and releases lever 23, i.e., it facilitates the initial or opening movement of blade 26 responsive to blade spring 32.

Further squeezing of trigger 36 causes further rotation of disc 42 to the point where the beveled upper edge of dog 48 disengages abutment 54 and the force of the compressed spring 34 is suddenly released. As plunger 30 snaps back, surface 29 cams lever 23 and thereby causes movable blade 26 to impact against the fixed blade 18. Upon release of trigger 36, trigger spring 40 repositions disc 42 and dog 48 for the next sequence.

In actual use, an operator grips handle 10, cocks the movable blade 26 by partially compressing trigger 36, and positions the cutting device so that a plurality of strands is advancing between the fixed blade 18 and the movable blade 26. He then further compresses trigger 36, causing the movable blade 26 to impact against the fixed blade 18. This snap action severs or grips the strands, depending upon the size and type of strand involved. For example, with multifilament strands, some filaments are severed while others may be gripped and held until broken by downstream tension on the particular strand. In neither event is there any lateral displacement or misalignment of the separate strands; consequently, pickup between adjacent strands is eliminated. The down-stream portion of each strand continues to be wound up as before. The up-stream portions of the cut strands are handled by any well-known take-off device, e.g., by a fluid actuated aspirator of the type shown by Miller in U.S. Patent No. 2,667,964.

One advantage of the pistol type embodiment described above is that it is hand held, can be readily moved about with the operator, and requires little investment. If desired, the cutter could be mounted in a fixed location and actuated automatically. Other changes and modifications may be made in the disclosed cutter without departing from the spirit of the present invention which is, accordingly, intended to be limited only by the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A strand-cutting device comprising: fixed and pivotally mounted blades; a spring biased plunger engaging said pivotally mounted blade for holding it in a normal position of edge contact with said fixed blade; and trigger means associated with said plunger for sequentially cocking and releasing the same, thereby facilitating movement of said pivotally mounted blade away from and in a snap action return to said position.

2. A strand-cutting device comprising: fixed and pivotally mounted blades; spring means biasing the latter blade toward an open position; a spring biased plunger engaging said pivotally mounted blade for holding it in a normal position of edge contact with said fixed blade; and trigger

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means associated with said plunger for sequentially cocking and releasing the same, thereby facilitating initial movement of said pivotally mounted blade responsive to said spring means and a snap action return to said normal position.

3. A strand-cutting device comprising: fixed and pivotally mounted blades; a plunger engaging said pivotally mounted blade; a first spring biasing said pivotally mounted blade toward an open position; a second spring engaging said plunger for holding said pivotally mounted blade in a normally closed position; and trigger means associated with said plunger for sequentially cocking and releasing the same, thereby facilitating initial movement of said pivotally mounted blade responsive to said first spring and a snap action return to said closed position responsive to the action of the plunger and said second spring.

4. A strand-cutting device comprising: a support; a first blade fixed to and extending outwardly from said support; a second blade pivotally mounted on said support for swinging movement toward and away from a position of edge contact with the first blade, said second blade hav-

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ing a lever extension; a first spring biasing the second blade away from said position; a plunger having a cam surface adapted for engagement with said lever extension, thereby holding said second blade in said position of edge contact with the first blade, said plunger being slidably mounted on the support for movement toward and away from the lever extension; a second spring normally biasing said plunger toward said lever extension; and trigger means for sequentially cocking the plunger against the bias of said second spring, thereby releasing said lever extension, and releasing the plunger for a snap action return toward the lever extension, thereby pivoting said second blade toward said position of edge contact.

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