

June 28, 1960

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2,942,818

REEFING OR STATIC LINE CUTTER

Filed Oct. 7, 1957

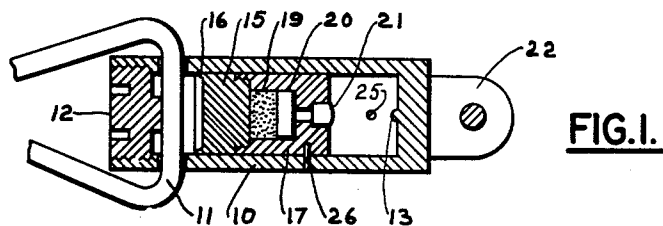


FIG.1.

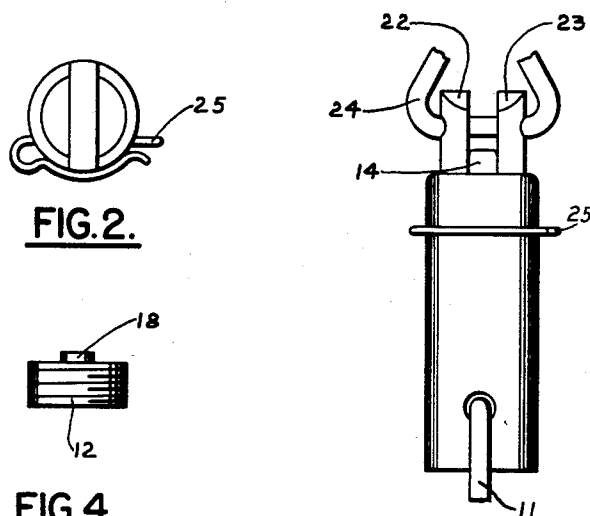


FIG.3.

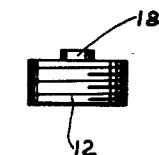


FIG.4.

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2,942,818

REEFING OR STATIC LINE CUTTER

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Filed Oct. 7, 1957, Ser. No. 688,791

4 Claims. (Cl. 244—150)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates to an improved means for severing a line such as the reefing line of a parachute, and has for its principal object the provision of an improved line cutter which requires fewer parts and operates more simply than the devices heretofore provided for this purpose.

Various types of line cutters have been proposed in the past. Many of these prior art devices have utilized the energy generated by the firing of a cartridge to actuate the cutter. Insofar as applicant is aware, however, all such devices have involved the use of a spring, or some other mechanical element, to fire the cartridge which actuates the cutter.

The line cutter of the present invention has the important advantage that it is actuated in response to a predetermined tension in a shroud line of the parachute to which it is attached without the need of a compressed spring or any other such mechanical element for firing the cartridge which actuates the cutter. Alternatively, the cutter of the present invention may be actuated in response to a tension in the line which is to be cut.

The invention will be better understood from the following description when considered in connection with the accompanying drawings and its scope is indicated by the appended claims.

Referring to the drawings:

Fig. 1 is a sectional view of the improved line cutting device.

Fig. 2 is an end view of the device.

Fig. 3 is a side view of the device.

Fig. 4 illustrates a detail of the device.

The device of Fig. 1 includes an enclosure 10 which is apertured at its left-hand end to receive a reefing line 11 of nylon or the like and is provided at its right-hand end with a transverse bridge 14 (see Fig. 3) on which is mounted a firing pin 13.

Movable within the enclosure 10 is a member 15 which has at its left-hand end a cutter 16 and at its right-hand end a cartridge firing chamber 17. A plug 12, threaded into the left-hand end of the enclosure 10, is provided with a raised central part 18 to stop movement of the member 10 so that the edges of the circular cutter 16 do not contact the plug.

The firing chamber 17 is shown as containing a cartridge which includes a charge 19, a delay element 20 and a primer 21.

At its right-hand end, the movable member 15 is bifurcated to provide legs 22 and 23 (see Fig. 3) which straddle the bridge 14 of the enclosure 10. The legs 22 and 23 are apertured near their ends to receive a line 24 which may be a connection to shroud line of the

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parachute. Since the reefing line is attached to the parachute and the shroud line is connected to the load, the sudden pull produced by opening of the parachute is applied to the member 15 and operates to shear the pin 26 which releasably couples the firing chamber 17 to the enclosure 10.

In the inactivated state of the line cutter, a safety pin 25 is positioned as indicated in Fig. 2 and a shear pin 26 (see Fig. 1) is utilized to couple the enclosure 10 and the member 15 together. When the device is to be used, the safety pin 25 is withdrawn.

The cutter is preferably fixed to the parachute with its longitudinal dimension more or less aligned with the shroud line when tensioned by the load. Exact positioning of the cutter, however, is not essential for the reason that the flexibility of the parachute fabric permits the cutter to align itself with the applied force so that this force is applied to the member 15.

In the operation of the device as heretofore disclosed, the connection 24 to the shroud line becomes taut as the load exerts a pull upon the parachute. The tensile force stored momentarily in the resilient nylon cord upon opening of said parachute is sufficient to shear the pin 26 and snap the primer 21 against the pin 13. The resulting impact, regulated by the size and composition of the shear pin 26, causes the primer 21 to fire. If the delay element 20 is used, it will burn for one second (or as long as desired) and then the main charge will ignite. This charge propels the cutter 16 which forcibly cuts the reefing line 11. Thereafter movement of the cutter is stopped by the raised portion of the plug 12 so that its sharp edge does not come into contact with the plug 12.

If the device of the present invention is to be operated in response to tension in the reefing line, one end of this line is attached to the legs 22 and 23 and its other end may be passed through the aperture in the left-hand end of the member 10 and provided with a knot to prevent it from slipping out of the aperture. Under these conditions, sufficient tension in the reefing line will activate the cutter to sever this line in the manner heretofore set forth.

I claim:

1. In a device for cutting a line in response to a predetermined tension, the combination of an enclosure having at one end a bridge bearing a firing pin and at the other end an aperture for receiving a first line to be cut, a member forming a firing chamber facing said firing pin, said member having at one end a cutter movable transversely of said aperture and at the other end a pair of legs which straddle said bridge and are formed to receive a second line for applying tension between said member and said enclosure, and means coupling said member to said enclosure, said coupling means being severable upon the application of a predetermined tension to said second line.

2. A device according to claim 1 wherein said first line is a reefing line and said second line is a shroud line.

3. A device according to claim 1 wherein said firing chamber encloses an explosive cartridge.

4. A device according to claim 3 wherein said cartridge contains a time delay element.

References Cited in the file of this patent

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