

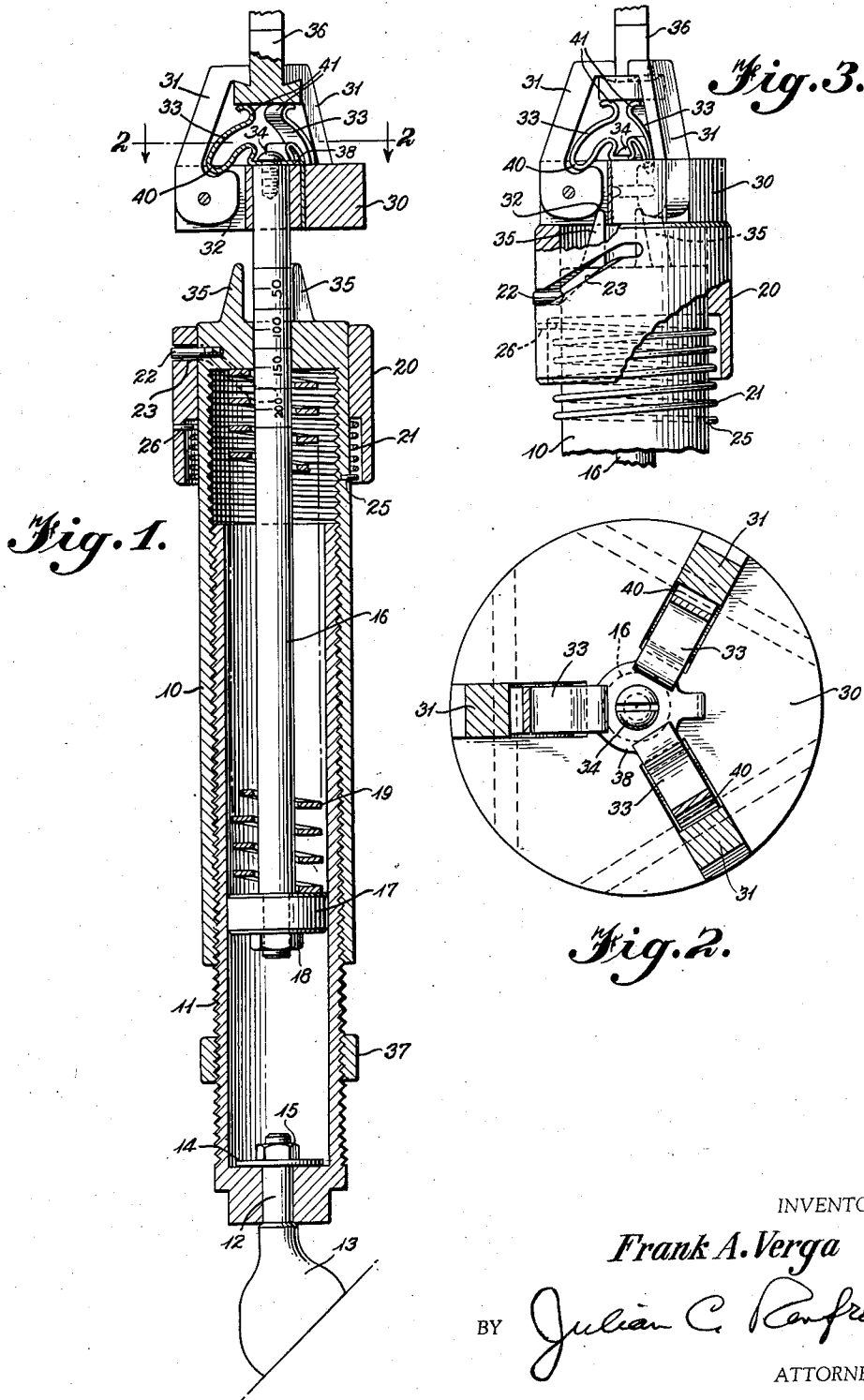
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ANTENNA WIRE TENSION AND EJECTING UNIT

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ANTENNA WIRE TENSION AND EJECTING UNIT

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The present invention relates to a device for holding an antenna wire under tension and more particularly to a device of this character which will function to eject an antenna wire in the event of loss of tension resulting principally from failure of the antenna wire.

It is an object of the present invention to provide a device for maintaining an antenna wire under tension and for ejecting a broken wire which functions in a simple and expedient manner with a minimum of moving parts. The device is particularly adapted for use with aircraft and includes means for automatically ejecting an antenna wire which has lost its tension due to becoming parted or broken. It will be apparent that the ejecting feature of the device will prevent the antenna wire from interfering with other parts of the means upon which it is mounted. In the case of an aircraft, it is known that the antenna wire may fail due to a variety of factors including fatigue or breakage by contact with foreign elements. In the event failure occurs in flight, there is the danger that the broken antenna wire can become wrapped around the empennage of the aircraft interfering with the control of the aircraft and thus increasing greatly the accident hazard of the airplane.

It is a further object of the present invention to provide an antenna wire tension and ejecting unit which will prevent a broken antenna wire from becoming wrapped around a control element of the aircraft upon which it is mounted and thereby greatly reduces the accident hazard of the aircraft by automatically ejecting any broken antenna wire.

Other and further objects of the invention will become more fully apparent from the following detailed description when taken in conjunction with the drawings in which:

Figure 1 is a view in section through an antenna wire tension and ejecting unit designed according to the present invention showing the unit loaded and in use;

Figure 2 is a view in section taken along line 2—2 of Figure 1; and

Figure 3 is a view in elevation showing a stable condition of the unit during loading.

Referring now to the drawings in detail, a preferred embodiment of the present invention will be described. The device consists of a barrel 10 which is internally threaded and which telescopically and threadingly engages with an externally threaded sleeve 11 apertured at its lower end. Projecting through the aperture is a bolt 12 fixed at one end to a suitable bracket 13 which facilitates mounting of the unit to an aircraft. The other end of bolt 12 is threaded and receives a washer 14 and a nut 15. The top end of the barrel 10 is apertured and a graduated rod 16 projects through the aperture. Attached to the lower end of the graduated rod is a piston 17 which is held in position on rod 16 by means of a nut 18 threaded onto the lower end of the rod 16. A compression spring 19 is fitted around the rod 16 and bears against the piston 17 at one end and against the inner surface of the top of the barrel 10 at its other end.

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A safety lock barrel 20 is received onto the upper end of the barrel 10 and a torsion spring 21 is connected between the two elements 10 and 20 with one end 25 of spring 21 anchored to element 10 and the other end 26 of spring 21 anchored to element 20. A radially projecting pin 22 is threaded into the barrel 10 and the safety lock barrel 20 defines a slot 23 which cooperates with the pin 22. Slot 23 is composed of two flat portions and an inclined portion which cooperates with pin 22 to obtain a camming effect.

A base 30 is fixed to the upper end of the rod 16 and a series of three jaws 31 are pivotally mounted to the base 30. Each jaw 31 presents a cam surface 32 against which bears a leaf 33 of a three leaf spring element having a hub 38 attached to the top of the rod 16 by means of screw 34. Each leaf 33 defines a double or S-curve with the portion 40 of the leaf forming the bottom bend bearing against a cam surface 32. The portion 41 of the leaf forming the top bend lies in the space between the jaws 31 above the hub 38 of the spring element. Integral with the top of the barrel 10 are a series of three spaced trigger elements 35 designed and located to cooperate with the jaws 31 and in particular the cam surfaces 32 of these jaws.

In its at rest position, the rod 16 is withdrawn into barrel 10 under the influence of spring 19, the base 30 lies in the plane of the triggers 35 and consequently the jaws 31 are cammed to an open position against the force of leaf 33, and the safety lock barrel is in the condition shown in Figure 1.

The loading of the unit proceeds in the following fashion. The safety lock barrel 20 is turned to shift the pin 22 from the upper flat portion of slot 23 to the lower flat portion, as seen in Figure 3. This action loads the torsion spring 21 and the cooperative efforts of the inclined portion of slot 23 and pin 22 cam the safety lock barrel 20 axially relative to barrel 10 so that safety lock barrel 20 projects over the end of barrel 10. During movement of safety lock barrel 20, it will engage the under surface of base 30 and cause this part to likewise move in the same direction, away from upstanding members 35. Upon moving of base 30, the cam surfaces 32 will disengage from triggers 35 permitting the leaves 33 to take over control of jaws 31. When the cam surfaces 32 fully disengage from triggers 35, the leaves 33 will have pivoted the jaws 31 to a closed position.

Since the base 30 is fixed to rod 16, movement of the former will involve a partial withdrawal of rod 16 from the barrel 10 thereby partly loading spring 19. The force of spring 19 holding base 30 against safety lock barrel 20 coupled with the shape of slot 23 and in particular the position of pin 22 at the lower flat portion of slot 23 creates a stable condition for the unit and it will remain in this condition until disturbed notwithstanding the fact that torsion spring 21 is loaded. This condition for the unit is illustrated in Figure 3.

While the unit is in the stable condition as described an antenna wire is anchored by jaws 31. For this purpose an antenna wire adapter 36 to receive the antenna wire is placed between the jaws 31. Both the adapter 36 and the jaws 31 are tapered in order to enhance the gripping action. The antenna wire is now placed in the adapter 36 or secured to it and the wire is brought to the desired specific loading tension by rotating sleeve or turnbuckle 11.

With the adapter 36 located between the jaws 31, a further advantage is obtained. The bottom surface of the adapter 36 contacts the portions 41 of the leaves 33 displacing them downwardly thereby increasing the force applied to cam surfaces 32 by the portions 40 of the leaves 33. This feature of the invention is illustrated in Figure 1.

Upon turning sleeve or turnbuckle 11 in the proper direction, the barrel 10 will be telescoped down over the

sleeve or turnbuckle 11. As the barrel 10 moves down, the upper edge of safety lock barrel 20 will disengage from the base 30. When this occurs, the torsion spring 21 will snap the safety lock barrel 20 to its at rest position with pin 22 resting at the upper flat portion of slot 23. This condition of the safety lock barrel 20 is illustrated in Figure 1.

During downward movement of barrel 10 responsive to turning sleeve 11, the compression spring 19 will be compressed between the top of barrel 10 and piston 17 with more of the rod 16 showing above the top of barrel 10. This occurs by reason of the assembly at the top of rod 16 (base 30—jaws 31) remaining in a relatively fixed position after the antenna wire slack has been taken up. Rod 16 is suitably calibrated by axially spaced graduated markings to indicate readings of antenna wire tension in pounds. When the desired tension is obtained as will be indicated by the markings on rod 16, a nut 37 threaded onto the sleeve 11 and serving as a lock nut is run up against the lower end of the barrel 10. The unit is now loaded ready for use.

In the event of failure of the antenna wire, the compression spring 19 will snap the jaws 31 back against the trigger elements 35 to force the jaws 31 to open and release the antenna wire and adapter 36. This happens by virtue of the trigger elements 35 riding on the cam surfaces 32, and by this means camming the jaws 31 open against the force of leaves 33.

Since the unit of the present invention functions to securely anchor an antenna wire and to quickly and efficiently release the antenna wire upon failure of the wire, damage to and interference with the controls of the aircraft will be prevented, greatly reducing the accident hazard.

Although the present invention has been shown and described with reference to a specific embodiment, nevertheless various modifications obvious to one skilled in the art are within the spirit, scope and contemplation of the invention.

What is claimed is:

1. A wire anchoring and releasing unit comprising a pair of sleeves arranged in threaded telescoping relation, a rod having one end received within said sleeves and one end partly projecting from said sleeves, resilient means biasing said rod into said sleeves, wire anchoring means attached to the projecting end of said rod, and trigger means mounted on one of said sleeves in registry with said wire anchoring means adapted to open said wire anchoring means to release a wire held thereby when said wire anchoring means is forced against said trigger means under the influence of said resilient means, said unit including a barrel mounted on said pair of sleeves adapted to lift said wire anchoring means out of engagement with said trigger means.

2. A wire anchoring and releasing unit as defined in claim 1 including means to maintain said sleeves in a relatively fixed position.

3. A wire anchoring and releasing unit as defined in claim 1 including bracket means attached to one of said sleeves to facilitate mounting of said unit.

4. A wire anchoring and releasing unit as defined in claim 1 wherein said wire anchoring means includes a base, a plurality of jaws pivoted to said base, and resilient means urging said jaws to a closed position.

5. An antenna wire tension and ejecting unit comprising a barrel closed at one end and open at the other end, a turnbuckle sleeve closed at one end and open at the other end, the open ends of said barrel and said sleeve being in telescoping threaded engagement, a rod received within said barrel and projecting through the closed end thereof, pivoted jaw means attached to the projecting end of said rod, first resilient means biasing said jaw means to a closed position, a second resilient means bearing

against the closed end of said barrel and the end of said rod within said barrel, said jaw means defining cam surfaces, and trigger means mounted on said barrel adapted to cooperate with said cam surfaces to pivot said jaw means to an open position against said first resilient means in response to withdrawal of said rod into said barrel under the influence of said second resilient means.

6. An antenna wire tension and ejecting unit as defined in claim 5 wherein a nut is threaded onto said sleeve adapted to be jammed against the open end of said barrel.

7. An antenna wire tension and ejecting unit as defined in claim 5 wherein said second resilient means is a compression spring.

8. An antenna wire tension and ejecting unit as defined in claim 5 wherein said first resilient means is a spring member including a hub portion and leaf portions.

9. An antenna wire tension and ejecting unit as defined in claim 8 wherein each said leaf portion is of a double bend configuration with the lower bend of said leaf portion bearing against said jaw means and the upper bend of said leaf portion lies in the space between said jaw means in a position to be engaged by an element gripped by said jaw means.

10. An antenna wire tension and ejecting unit as defined in claim 5 further including a safety lock barrel received on the closed end of said barrel and defining a slot having a portion inclined to the axis of said barrel, a pin fixed in said barrel and received in said slot and a torsion spring fixed at one end to said barrel and at its other end to said safety lock barrel whereby rotation of said safety lock barrel will cause the same to advance axially of said barrel to lift said jaw means out of engagement with said trigger means against the force of said second resilient means to permit said first resilient means to bring said jaw means to a closed position.

11. A wire anchoring and releasing unit comprising a barrel member, an axially movable rod projecting through an aperture in said barrel member, wire anchoring means attached to the end of said rod projecting from said barrel member, resilient means biasing said rod into the barrel member, such being the direction tending to bias said wire anchoring means into engagement with said barrel member, and safety lock means intermediate said wire anchoring means and said barrel member, said wire anchoring means comprising a plurality of jaw members adapted to grip the end of a wire to be anchored, means biasing said jaw members into gripping relation, and means on said jaw members defining cam surfaces, upstanding members on said barrel member surrounding said aperture and arranged to engage said cam surfaces of said jaw members and to move them in the wire-releasing direction when said wire anchoring means has been moved into a position adjacent said barrel member, said safety lock means being rendered inactive by movement of said wire anchoring means away from said barrel member in response to a wire gripped by said anchoring means being placed under tension, whereby if a tensioned wire gripped by said jaw member breaks, said wire anchoring means will be biased toward said barrel member, with the engagement of said cam surfaces by said upstanding members causing said jaw members to move so as to release the end of said wire.

12. The wire anchoring and releasing unit according to claim 11 including mounting means for said barrel member and tightening means associated with said mounting means for causing a wire gripped by said wire anchoring means to be placed under tension.

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