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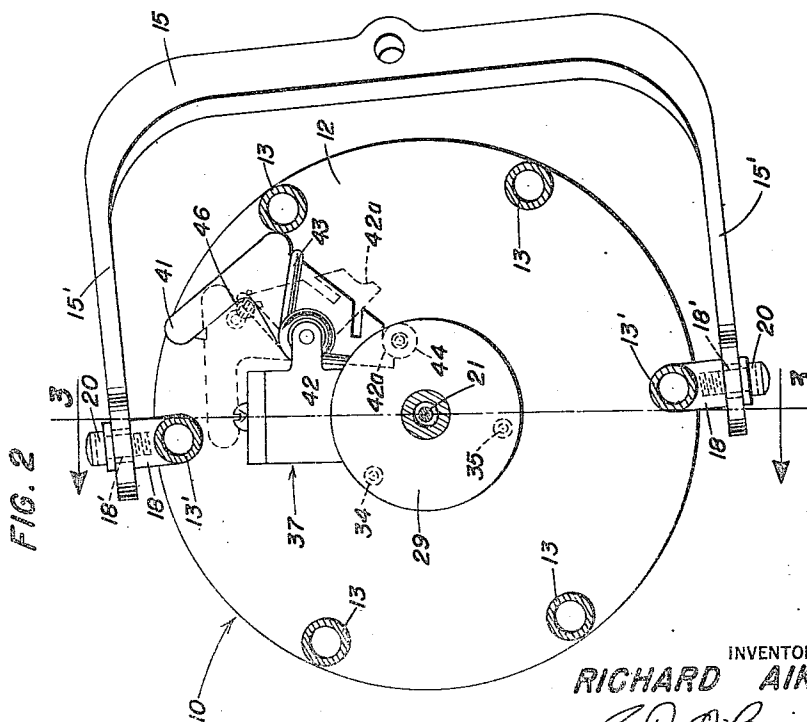
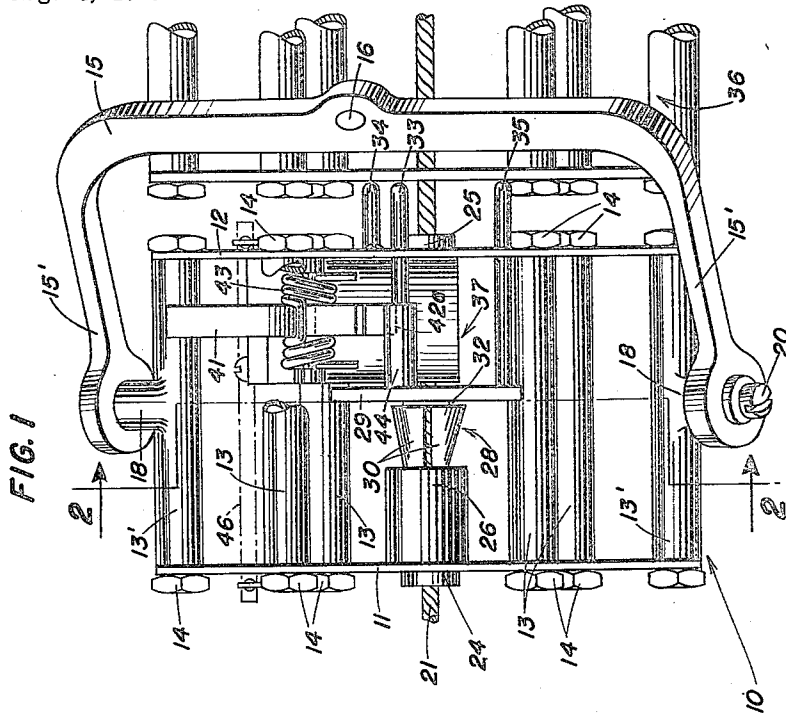
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2,567,170

TOW TARGET CABLE ATTACHMENT

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2 Sheets-Sheet 1



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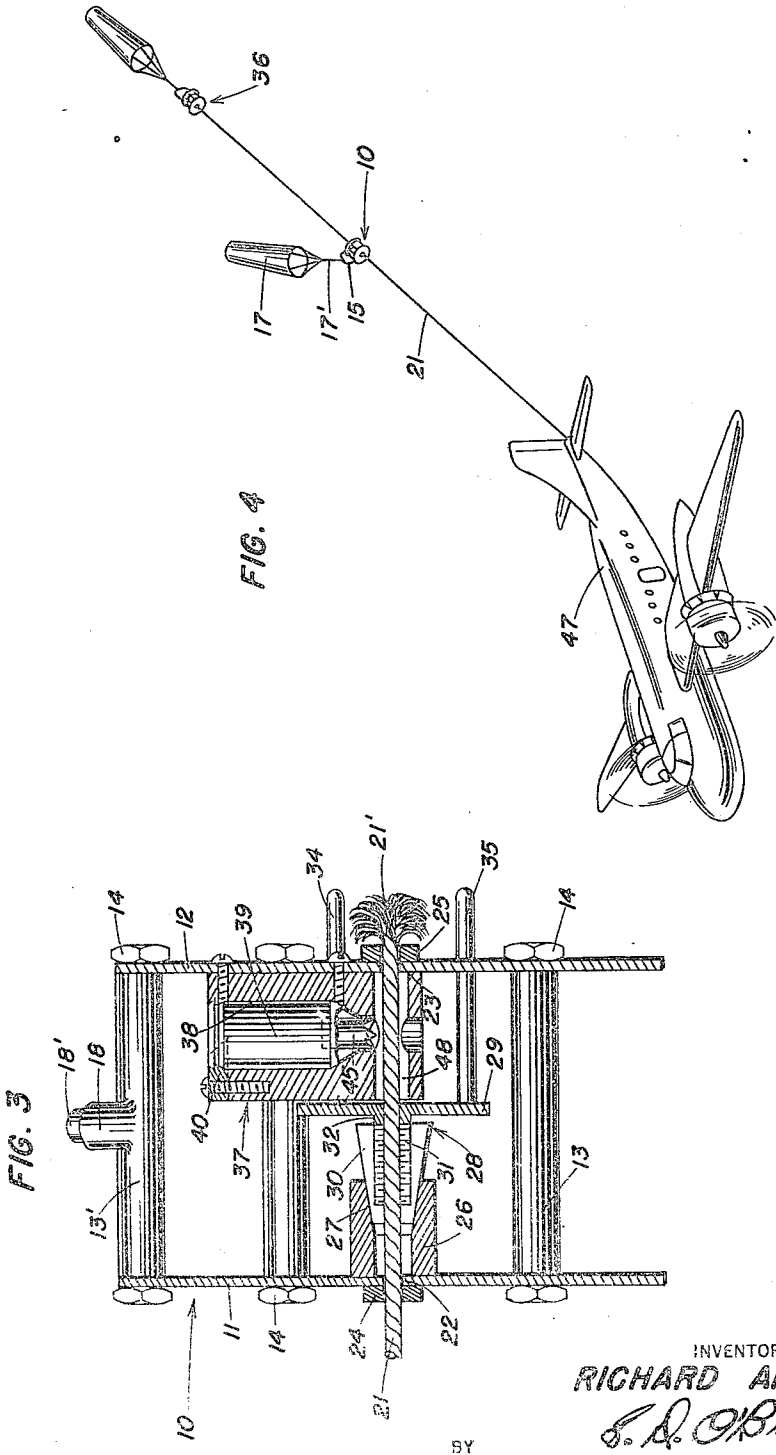
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2 Sheets-Sheet 2



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TOW TARGET CABLE ATTACHMENT

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This invention relates to means for connecting objects to, and disconnecting objects from cables, lines or the like, and more particularly to means whereby such operations may readily be performed at an inaccessible point in a cable.

The present invention is particularly adapted to use on aerial tow lines as in target practice activities wherein a target sleeve is towed behind an airplane. In such use the invention may be employed to release an old target sleeve, to affix a new one to the tow cable, or both. In the specification this invention will be described in such use, however, it will readily be appreciated that it is applicable to any employment wherein cable severing or object affixing tasks must be performed in normally inaccessible places along a cable length.

In aerial gunnery practice it is customary to tow through the air a cloth sleeve called a "target sleeve" and this sleeve is towed a great distance behind the towing airplane, frequently as much as one mile. When a target sleeve becomes so riddled by gunfire that it is unusable then it must be discarded and replaced by a new sleeve. This is a tedious and time consuming operation since it is necessary to reel in the tow cable each time replacement of the sleeve is necessary and, therefore, there have been proposed various means whereby a new target may be secured to a ring which encircles the cable which ring may be released at the tow plane and permitted to slide along the cable until it reaches the cable end.

Such slides sometimes include cutting means to sever the leader of the used target and separate the target from its slide, however, after several targets have thus been released the end of the cable becomes heavy due to the accumulation of slides. This is objectionable. Furthermore, such devices are likely to jam during flight and make further target exchange impossible.

Frequently, it is desirable to drop a used target without replacing it with a new one. In the past, this has required special cable severing devices which are released from the plane and are designed to cut the tow cable at the target. When the cable has been severed the cutting device falls to the ground and is often lost since it does not become attached either to the used target or to any length of cable that might serve as a marker.

It is therefore an object of the present invention to provide a device which can travel along a cable to an obstruction and there affix itself so as to secure a leader or another cable at that point.

An additional object of the present invention is

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to provide an attachment of the above character which may readily be used on towing cables for the exchange of objects being towed.

Another object of the invention is to provide a target towing device which may be used to stream a new target when a tow cable has been accidentally severed.

A further object of the invention is to provide a device for severing a cable at a point remote from its secured end.

A still further object of the invention is to provide a device of the above type which is safe, cannot pile up in numbers at the end of the tow cable, and is easily recoverable when dropped during aerial towing operations.

Other objects and advantages will become apparent as the following detailed description is read in conjunction with the accompanying drawings wherein:

Fig. 1 is a side elevation of one embodiment of the present invention;

Fig. 2 is a transverse section partly in elevation of the embodiment illustrated in Fig. 1 taken on a line substantially corresponding to line 2-2 of Fig. 1 and showing the firing hammer in a dotted line changed position.

Fig. 3 is a longitudinal sectional view of the embodiment illustrated in Figs. 1 and 2 taken along a line substantially corresponding to line 3-3 of Fig. 2; and

Fig. 4 is a perspective view of a target towing plane with an exchange target on the tow cable, certain parts being shown relatively enlarged for purposes of illustration.

In the embodiment illustrated in the drawings the device comprises a traveler 10 having a front plate 11 and a rear plate 12 held in spaced relation by a plurality of circumferentially disposed rods 13 secured by nuts 14. A yoke or bail 15 having an aperture 16 in which the leader 17 of a target 17, Fig. 4, may be secured, is swingably mounted on any two diametrically opposite spacing rods such as rods 13'-13'. This may be done in any convenient manner as by the provision of outwardly projecting internally threaded bosses 18-18 welded or otherwise secured to the spacers 13'-13'. The bosses may be reduced at their outer ends 18'-18' and are pivotally supported in suitable apertures in the ends of yoke arms 15'-15'. Shoulder screws and washers 20-20 may be used to retain the yoke on the bosses, as shown.

A target tow cable 21, which may be attached at one end to a tow plane in a conventional manner, extends through centrally aligned apertures

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22 and 23 in spaced plates 11 and 12 respectively, the apertures being reinforced with guide rings 24 and 25, which may be made of any wear resistant material such as Carboloy or the like, spot-welded or otherwise secured to the outer faces of the plates.

Secured to the rear face of the front plate 11 is a grip cone 26 having a tapered bore 27 in registry with the central aperture 22 as illustrated in Fig. 3. Cooperating with the grip cone 26 is a grip member 28 which comprises a radially disposed plate 29 with a plurality of tapered jaws 30 on its forward face. The jaws 30 have serrations 31 on their inner faces and are integral with the plate 29 although a groove 32 weakens the connection at the junction with the plate whereby the jaws may converge on the cable when they are forced into the tapered bore 27 of the grip cone 26.

Clutch operating pins 33, 34, and 35 are secured to the rear face of plate 29 and extend rearwardly through and beyond suitable apertures in the rear plate 12. When the outer ends of these pins strike an object such as a preceding target towing device 36 already secured to the remote end of the tow cable 21 as illustrated in Fig. 1, they drive plate 29 forward and jam the jaws 30 into tight engagement with the tow cable. The serrations 31 on the inner faces of the jaws bite slightly into the cable and positively prevent further rearward movement of the traveler.

It should be noted that if the cable is severed in any manner such as by gunfire thereby releasing the preceding towing device, the attendant threshing around of the free end of the tow cable will unstrand it and cause a snarl 21' to be formed (Fig. 3). This snarl will serve to stop the traveler and stream a new target.

In addition to means for gripping the cable the traveler is provided with means for severing the cable behind the cable gripping jaws and this means will now be described. On the inner face of the rear plate 12 is mounted in any convenient manner a pistol 37 comprising a cartridge receiving chamber 38 adapted to receive a percussion fired cartridge 39. A cartridge latch 40 is tenoned in the top of the pistol and suitably grooved to engage the annular flange on the base of a cartridge as illustrated in Fig. 3.

As will be noted in Fig. 2 the cartridge is fired at the appropriate moment by means of a hammer 41 pivotally mounted at 42 to one side of the pistol as shown. The hammer is urged toward the base of the cartridge by a spring 43 and is retained in cocked position by engagement of a tip 42a with an enlarged shoulder 44 on the contact pin 33. It will be apparent that when the pin 33 contacts any obstruction such as a towing device, it will move axially to disengage tip 42a and permit spring 43 to cause the hammer 41 to strike the cartridge 39, as shown in outline in Fig. 2, firing it to propel a slug 45 having serrated cable cutting edges against the tow cable, which extends through a suitable passageway 48 in the lower portion of the pistol immediately beneath the slug as illustrated in Fig. 3, severing the cable to release the preceding target towing device and its attached target.

To prevent accidental firing of the pistol 37, a safety pin 46 is interposed in the path of movement of the hammer as shown in Figs. 2 and 3. If it is desired to sever an object from

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the cable at its remote end, the safety pin is removed just before the traveler is launched from the plane. However, if for any reason it should not be desired to sever the cable, as for instance when the traveler is to engage a snarl formed by accidental cutting of the tow line, the safety pin is left in place.

The operation of the device is as follows:

Prior to take-off a number of loaded and cocked travelers are strung onto the tow cable and a target is attached by a suitable clamp (not shown) or by another traveler to the end of the tow cable. After the plane is in flight and it has become necessary to replace the first target, the leader 17' of a new target 17 is secured to the bail 15 of a traveler, the safety pin 46 is removed, and the traveler 10 and target 17 are launched from the plane as in Fig. 4, to slide along the cable until the contact pins 33, 34, and 35 engage the clamping means for the first target. The impact causes the jaws 30 to be jammed into the grip cone 26 and the pistol 37 to be fired as above-described, thereby releasing the first target which floats to earth to be picked up by a ground crew. Later target replacements are made in a similar fashion, and the travelers severed from the cable can be easily recovered since each will be attached to a target sleeve which will serve as a marker.

Should a traveler and its attached target be cut loose by gunfire a new traveler with its safety pin left in place may be released from the plane to engage the usual snarl as above-described and stream a new target from that point.

When towing operations have been concluded, a traveler without an attached target may be launched from the plane to cut the cable at its remote end and release the last target. This permits the cleared tow cable, with this last traveler attached, to be more easily reeled into the aircraft.

It is to be understood that though the device specified above is designed for use with aerial tow targets, it may, with slight modification be used in any operation where it is desirable to sever any cable at a point remote from its secured end. Hence, this specification is merely illustrative of the invention and changes may readily be made by those skilled in the art within the scope of the appended claims.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

What is claimed is:

1. The combination with a cable having an obstruction thereon of a traveler adapted to slide on the cable and strike the obstruction, means operated by impact of the traveler with the obstruction to secure the traveler to the cable, and means operated by said impact to sever the cable behind the securing means whereby the obstruction is separated from the cable.

2. A cable severing device comprising a traveler adapted to slide upon the cable, means for guiding the traveler along said cable, means operated by the impact of the traveler with an obstruction to stop and hold the traveler on the cable at the point of impact, and means operated by the impact of the traveler with the obstruction to sever the cable behind the stopping and holding means but in front of the obstruction.

3. A cable severing device comprising a traveler adapted to slide upon a cable, means for guiding the traveler in its movement along the cable,

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means operated by impact of the traveler against an obstruction to anchor the traveler to the cable at the point of impact said anchoring means comprising a bushing attached to the traveler and having a tapered bore through which the cable extends, and tapered jaws surrounding the cable and positioned so that they may be jammed into the tapered bore and be caused to grip the cable so as to prevent further movement of the traveler when the traveler impacts the obstruction.

4. A cable severing device comprising a traveler adapted to slide along a cable, means for guiding the traveler in its movement along said cable, means operated by impact of the traveler against an obstruction to anchor the traveler on the cable at the point of impact, and means operated by the impact of the traveler with said obstruction to sever the cable, said severing means including a cartridge receiving chamber disposed adjacent the cable, a firing hammer adjacent the cartridge chamber, and detent means against which the trigger is spring urged when it is in cocked position, said detent means being operable by the impact of the traveler with the obstruction to release the trigger and fire the cartridge to sever the cable.

5. A tow target exchange device comprising a traveler adapted to slide upon a tow cable, means for attaching a tow target to the traveler, means for securing the traveler to the tow cable upon impact with a preceding target towing device on the end of the cable, and means for severing the tow cable to free the preceding target towing device with its attached target, said severing

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means being operated by the impact of the traveler with the preceding target towing device.

6. A device for connecting objects to and disconnecting objects from cables, lines or the like comprising a front plate, a rear plate, means for supporting said plates in spaced relation, each of said plates having a cable receiving opening therethrough, cable gripping means for securing the traveler to the cable, and operating means for actuating the cable gripping means upon contact of the traveler with an obstruction.

7. A cable severing device which may slide along a cable comprising a traveler frame, means for guiding the frame along the cable, means operated by impact of the traveler against an obstruction to anchor the traveler on the cable, and means operated by said impact to sever the cable beyond the anchoring means said last-named means including a cutter, explosive means for actuating the cutter, and firing means for firing the explosive upon said impact whereby the cable is severed.

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