March 25, 1930. W. A. LAMKEY 1,752,010

TARGET TOWING AND RELEASING DEVICE

Filed May 22, 1928 2 Sheets-Sheet 1

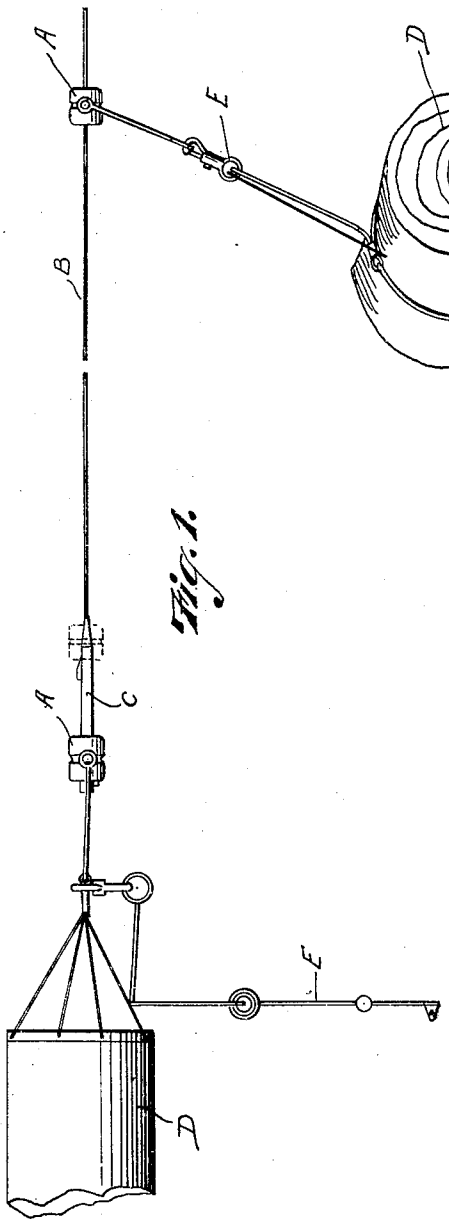

Fig. 1.

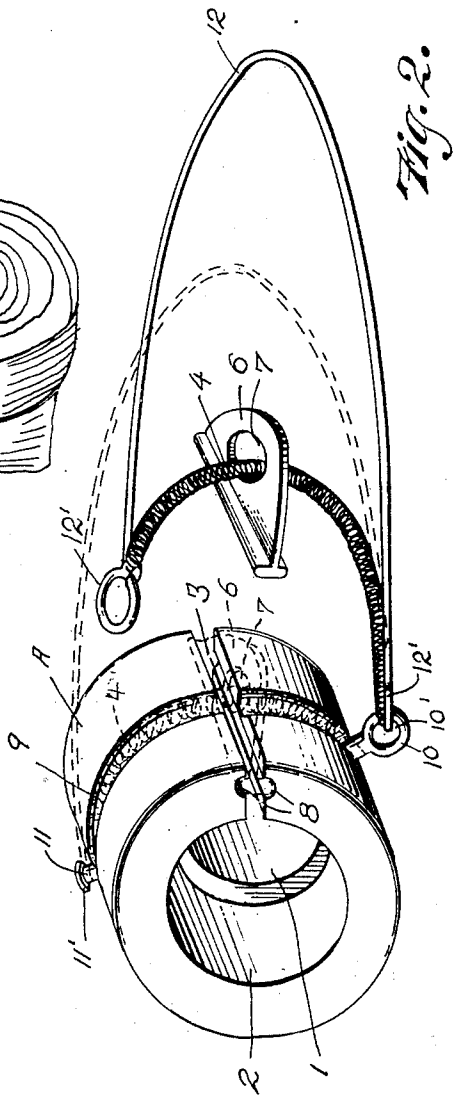

Fig. 2.

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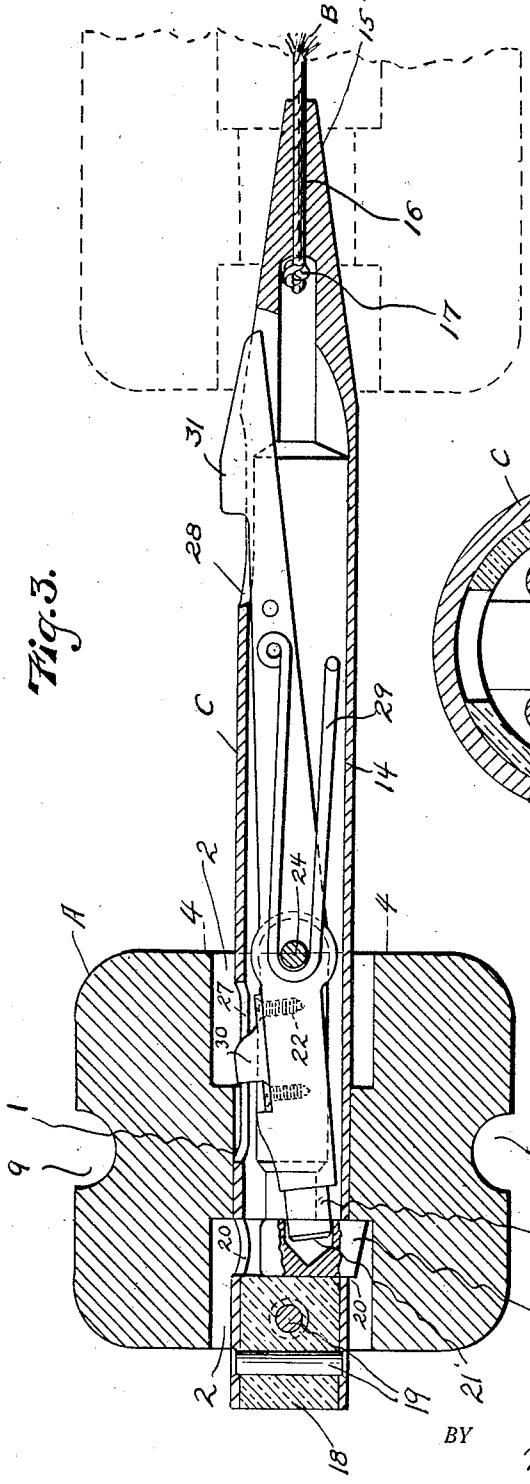

Fig. 3.

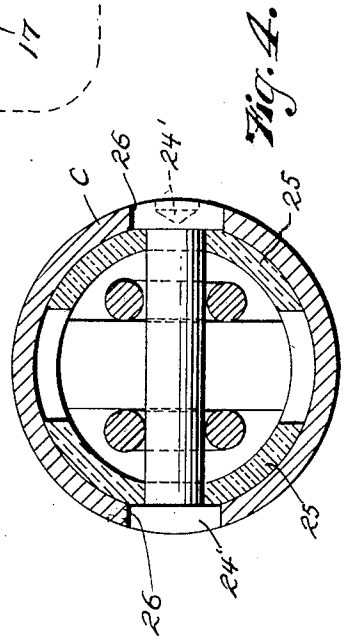

Fig. 4.

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UNITED STATES PATENT OFFICE

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TARGET TOWING AND RELEASING DEVICE

Application filed May 22, 1928, Serial No. 279,823, and in France August 12, 1927.

My invention relates to a device for unfurling and releasing target and more particularly to one that is being towed by an aircraft.

It has been proposed in the towing of targets by aircraft, to provide a towing cable attached to the aircraft; a supporting or carrying means for the target, which is so constructed that it can be easily threaded on the cable and providing the towing end of the cable with a releasable catch device which engages and holds the target support or carrier to permit the target to be towed over the ground area desired and which is adapted to release the target carrier when desired to permit the target to fall to the ground. The release of the target support or carrier is effected by the action of a second support or carrier which has been threaded on the cable at the aircraft and which after traveling over the cable when it comes to a point adjacent the catch device operates the mechanism of the catch to release the towed target, and which catch device, by its structure stops and holds said second carrier and in the same manner as above described the target carried by said second carrier is towed over a designated ground area. Such a device is shown in my co-pending application Serial No. 177,106, filed March 21, 1927.

The objects of this invention are an improvement in my said prior application.

An object of this invention is to provide improved means for threading and securing the target carrier on the cable.

A further object is to provide a new catch and releasing device which is simpler in construction and more certain in its operation and which will be positive in its action to catch and hold the releasing carrier after the catch has been operated to release the used target.

Reference is to be had to the accompanying drawings forming a part of this specification, and in which:—

Fig. 1 is a diagrammatic view of the manner in which the target is towed by an aircraft.

Fig. 2 is a perspective view of the target carrier or support.

Fig. 3 is a transverse section showing the position of the two supports or carriers prior to the releasing of the towed target, the releasing carrier being shown in dotted lines.

Fig. 4 is a cross section of the releasing catch on the line 4—4 of Fig. 3.

Referring to the figures of the drawing, A denotes the target carrier or support consisting of the tubular block having the center bore 1 and the end bores 2 arranged in concentric alinement, the end bores 2 having a larger diameter than the center bore 1, all of of said bores being arranged symmetrically of the block and to each other. The wall of the target carrier A is provided with a transverse opening, wide enough to permit threading of the carrier on a cable secured to the aircraft. The walls of this opening are provided with oppositely disposed semi-circular recesses 8 whose purpose will be hereinafter more particularly set forth.

Midway between the ends of the target carrier there is provided a semi-circular recess entirely encircling the carrier and at opposite sides of the carrier and within said recess are provided the pins 10 and 11, one of which has the eye 10′ and the other the head 11′. As a means for closing the opening so that the carrier will not accidentally become unthreaded from the cable there is provided a filler member 4 consisting of the rod 5 to which is secured the handle 6 provided with the eye 7. The filler member 4 is adapted to be placed in the opening 3 with the rod 5 extending into the oppositely disposed recess 8 in the walls of the opening. As the bores 2 of the carrier are symmetrical with respect to the bore 1 the carrier can be placed on the cable with either end towards the towed target.

As a means for supporting a target D by means of the harness E the structure and operation of which is more particularly shown and described in my copending application, there is provided a bail 12 having eyes 12′ in its ends. One of said eyes is secured to the eye 10′ of the pin 10 and the other of which is adapted to engage the other pin 11 by passing over the head 11′. A coil spring 13 secured at one end to the eye 10′

and at its other end to the eye on the free end of the bail 12 is passed through the eye 7 in the handle 6 of the filler member 5.

This spring when the filler is in place in the opening in the target carrier and the free end of the bail is secured to the pin 11 rests in the slot 9 and as it is under tension prevents the filler member from becoming accidentally disengaged from the opening.

So far applicant has described his target carrier and the manner in which it operates to carry a target and the structure thereof whereby it can be threaded and secured to a cable carrier by an aircraft. The further construction of the target carrier and its operation with the catching and releasing device mounted on the free end of the cable will now be had.

The catch and releasing member C consists of the hollow cylindrical member 14 having the pointed end 15 provided with the bore 16 through which the cable B passes and to which the cable is secured by a knot 17 formed in the end thereof or by other suitable and equivalent means.

The member 14 is provided at its opposite end with a filler 18 secured by rivets 19. At the inner end of the filler 19 the cylinder 14 is provided with openings 20. Through one of said openings 20 projects the sliding detent 21 which can be retracted to lie entirely within the cylinder 14. The inner surface of the filler 19 acts as a bearing for the detent 21. The opposite wall of the detent 21 is provided with a recess 21′ which provides a socket into which extends an end 23 of the lever 22 which lever is adapted in the operation of the device to retract and project the said detent. The lever is pivoted intermediate its ends by means of the pin 24 which is secured by riveting or other equivalent means to the section plate members 25 secured to the inner walls of the cylinder 14 by spot welding or any other equivalent means, the ends or heads 24′ of the pin 25 fitting in openings 26 formed in the wall of the cylinder 14 and having their outer ends flush with the outer surface of the cylinder 14. Openings 27 and 28 are provided on opposite sides of the fulcrum pin of the lever through which project cam surfaces 30 and 31 formed one on each of the arms of the lever 22. A spring 29 secured to one arm of the lever 22 engages the wall of the cylinder 14 normally tending to hold the lever in one position with the pin 21 projected and the cam 31 extending through the opening 28. This spring can be dispensed with, or if for any reason it does not operate as intended, the cam 30 provides a means to positively move the detent to projected position as will be more particularly described in the following paragraph.

The operation of the device is as follows: When a target is being towed and it is desired to release such target and substitute another target, a carrier provided with a target is threaded on the cable as described above, the target carrier moves over the cable toward the towed target and when it reaches the member C the bore of the carrier rides up the pointed end thereof and by the engagement of the wall of the bore 1 with the cam 31 moves the lever on its fulcrum and retracts the locking pin 21 permitting the towed target to be released. Further movement of the carrier along the member C permits the lever to move under the influence of the spring 29 to project the locking pin 21 which catches against the wall formed between the bores 1 and 2 and holds the carrier on the member C until a repetition of the described operation releases it. As a means of ensuring that the pin 21 will be in a position to stop the carrier in case the spring fails to function or no spring is provided the cam surface 30 which would then project through the opening 27 is engaged by the wall of the bore 1 and the locking pin 21 is positively moved to its projected position.

Also if for any reason the towed target carrier does not release when the locking pin 21 is moved, the second carrier will strike it and will help to force it off and the cam 30 will ensure movement of the locking pin to prevent the second carrier from following the released carrier off.

Having described my invention, what I claim is:

1. In combination, a cable having one end attached to a moving body, a target support, said target support being provided with a bore through which the cable is adapted to pass, a catch device mounted on the free end of said cable, and means carried by said catch device whereby the target support can be released.

2. In combination, a cable having one end attached to a moving body, a target support, said target support being provided with a bore through which the cable is adapted to pass, a catch device mounted on the free end of said cable and by means of which the target support is adapted to be held to said cable, and means mounted on said catch device adapted to be engaged by another target support to release the target support so held.

3. In combination, a cable having one end attached to a moving body, a target support mounted on said cable to move along said cable, a catch device mounted on the free end of said cable to hold said target support to said cable end to permit the target to be towed, said catch device comprising a hollow tubular member, a movable detent adapted to project beyond the walls of said catch device and means mounted in said tubular member adapted to retract said movable detent to release said target.

4. In the combination as claimed in claim 3 in which the means to retract the movable

detent is provided with means adapted to be engaged by another target support to release the towed target support.

5. In the combination as claimed in claim 3 in which the means to retract the movable detent is provided with means adapted to be engaged by another target support to release the towed target support, and with further means to be engaged by said other target support to project said detent after the first target support has been released.

6. A catch and releasing device for a towed target comprising a hollow tubular member, a movable detent adapted to project beyond the wall of the tubular member, means supported within said tubular member adapted to retract and project said movable detent, comprising a lever pivoted within said tubular member, one end of said lever engaging in a recess in said movable detent, cam surfaces on said lever adapted to project through openings in the wall of said tubular member, one of said surfaces adapted when engaged by external means to project the detent and the other of said cam surfaces adapted when engaged by external means to retract said detent.

7. A target support for use with a towing cable, comprising a hollow cylindrical block having a transverse opening through the wall of said block, the walls of said opening being provided with circular grooves, a filler adapted to be placed in said transverse openings, said filler having projecting portions adapted to seat in said grooves and means to hold said filler in place.

8. A target support for use with a towing cable comprising a hollow cylindrical block, having a transverse opening through the wall of said block, a filler member adapted to be placed in said transverse opening, and means to hold said filler in place, said holding means including a coil spring secured at its ends to the block and passing through an eye formed in said filler.

9. A target support as claimed in claim 7 in which the means for holding the filler in place comprises a coil spring secured at its ends to the block and passing through an eye formed in said filler.

10. A target support for use with a towing cable comprisnng a hollow cylindrical block having a transverse opening through the wall of said block, a circular groove formed on the outer wall and extending around said block substantially midway between its ends, a coil spring secured at its ends to said block and adapted to lie in said groove, and a filler member or said transverse opening secured to said coil spring.

11. A target support as claimed in claim 10 in which the walls of the transverse opening are provided with circular grooves and projecting parts on said filler member adapted to engage in said circular grooves.

12. The combination with a target support including a hollow cylindrical block having its hollow portion defined by circular walls of different diameters symmetrically arranged relative to each other, the internal diameter of the ends being greater than the diameter of the central portion whereby connecting walls are formed between each two adjacent circular walls of a cable having one end attached to a moving body, a catch and release device mounted on the free end of said cable comprising a hollow cylindrical member, means for securing said member to said cable, a movable detent adapted to be projected through the wall of said member, and to be engaged by the wall between two adjacent circular walls of the hollow support, means to project and retract the movable detent comprising cam surfaces adapted to be engaged by the wall of the lesser diameter of the hollow support.

13. The combination with a target support including a hollow cylindrical block having its hollow portion defined by circular walls of different diameters symmetrically arranged relative to each other, the internal diameter of the ends being greater than the diameter of the central portion whereby connecting walls are formed between each two adjacent circular walls of a cable having one end attached to a moving body, a catch and release device mounted on the free end of said cable comprising a hollow cylindrical member, means for securing said member to said cable, a movable detent adapted to be projected through the wall of said member, and to be engaged by the wall between two adjacent circular walls of the hollow support, means to project and retract said movable detent comprising a lever within the hollow cylindrical member pivoted thereto, cam surfaces on said lever projecting through openings in said hollow cylindrical member adapted to be engaged by a second target carrier to retract and project said movable detent.

14. The combination with a target support including a hollow cylindrical block having its hollow portion defined by circular walls of different diameters symmetrically arranged relative to each other, the internal diameter of the ends being greater than the diameter of the central portion whereby connecting walls are formed between each two adjacent circular walls of a cable having one end attached to a moving body, a catch and release device mounted on the free end of said cable comprising a hollow cylindrical member, means for securing said member to said cable, a movable detent adapted to be projected through the wall of said member, and to be engaged by the wall between two adjacent circular walls of the hollow support, means to project and retract said mov-

able detent comprising a lever within the hollow cylindrical member pivoted thereto, cam surfaces on said lever projecting through openings in said hollow cylindrical member adapted to be engaged by a second target carrier to retract and project said movable detent, said cam surfaces being located on opposite sides of the pivot of said lever.

In testimony whereof I have affixed my signature.

WILLIAM ANTHONY LAMKEY.