May 13, 1930. L. S. ADAMS 1,758,880

RETARDING DEVICE FOR AIRCRAFT

Filed May 21, 1928

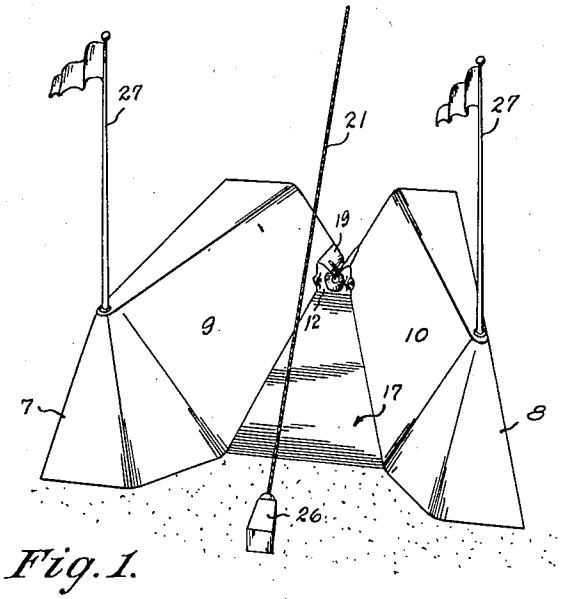


Fig. 1.

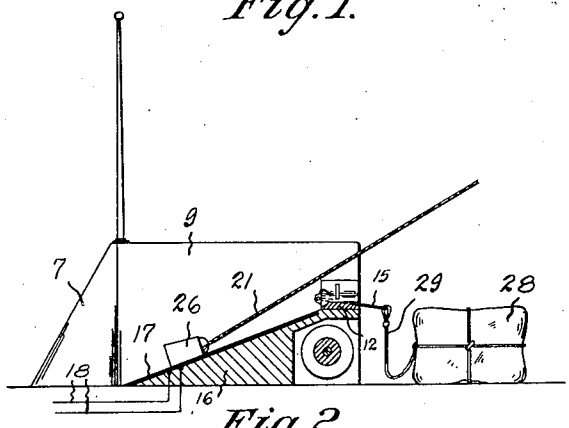


Fig. 2.

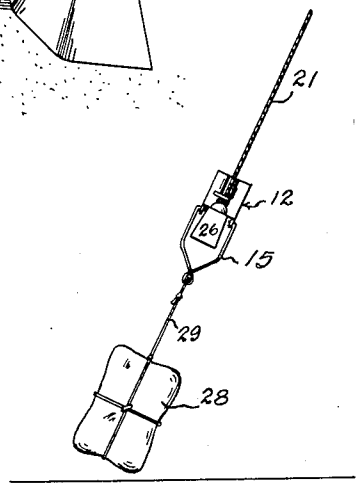


Fig. 3.

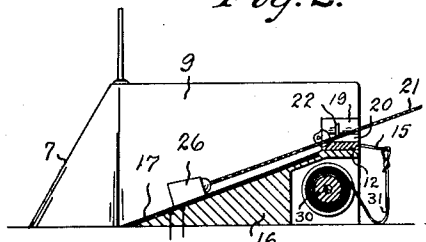


Fig. 4.

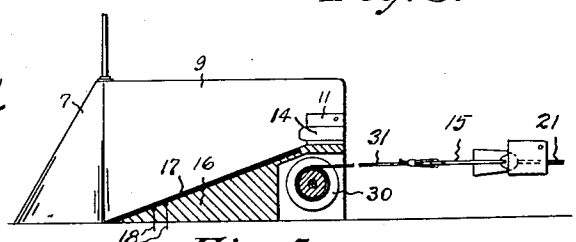


Fig. 5.

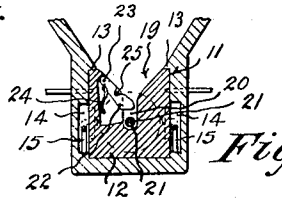


Fig. 6.

INVENTOR
Lytle S. Adams
BY
Frank Warren
ATTORNEY

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UNITED STATES PATENT OFFICE

LYTLE S. ADAMS, OF SEATTLE, WASHINGTON, ASSIGNOR TO AIRWAYS PATENT CORPORATION, A CORPORATION OF DELAWARE

RETARDING DEVICE FOR AIRCRAFT

Application filed May 21, 1928. Serial No. 279,320.

My invention relates to improvements in landing devices and the object of my invention is to provide simple and efficient means by which a moving aeroplane or other aircraft while in the air is enabled to pick up a ground tackle to connect itself with a retarding device by which the landing speed of the aeroplane may be retarded and the aeroplane quickly brought to a stop as it lands.

More specific objects are to provide means by which a weighted cable suspended from an aeroplane or other aircraft while moving in the air may be guided to, and caused to engage with, a device for taking hold of said cable, hereinafter termed a grappling device, that is supported in a fixed and stationary position to thereby effect a connection through the grappling device with any object or with any retarding means which it is desired to connect to the aeroplane.

Other objects are to provide a grappling member of simple and efficient construction that may be readily engaged by a cable; to provide efficient means for releasably supporting the grappling member; to provide guide means for aligning the cable with the grappling member; and to provide magnetic means for insuring the engagement of the cable within the grappling member.

Other and more specific objects will be apparent from the following description taken in connection with the accompanying drawings, wherein—

Figure 1 is a perspective view of apparatus constructed in accordance with my invention.

Fig. 2 is a longitudinal sectional view of the same, parts being shown in elevation.

Fig. 3 is an elevation showing the grappling member and a package connected with a cable.

Fig. 4 is a longitudinal section showing a retarding device connected with the grappling member for retarding the speed of an aeroplane in landing, the cable being shown in the act of engaging with the grappling member.

Fig. 5 is a view similar to Fig. 4 except that the cable has picked up the grappling member and the retarding device or brake is in operation.

Fig. 6 is a cross section on a larger scale through the grappling member and the holder or receptacle for the same.

In a general way my invention consists in providing on the ground a pick up station affording two converging side walls, a magnetized bottom wall, and in providing a grappling device supported at the narrowest place between the side walls and in providing, on the aeroplane, a cable capable of being lowered and raised and having a weight of magnetic material on its lower end, the converging side walls and the magnetic bottom wall serving to guide the cable into the grappling device so that said grappling device will be picked up bodily by the cable.

Like reference numerals indicate like parts throughout the drawings wherein I show a pick up station embodying two abutments 7 and 8 affording two side walls 9 and 10 that are closer together at the bottom and farther apart at the top and that afford a wide opening at the cable intake end and converge to form a narrow opening at the cable exit end.

A receptacle 11 is formed between the convergent ends of the walls 8 and 9 for the reception of a cable grappling device designated by the numeral 12. The shape of this receptacle is more clearly shown in Fig. 6, the same having overhanging top edges 13 and having its side walls recessed as at 14 affording room for a bail member 15 that is connected with the grappling member. The bail 15 is large enough so that it will swing entirely over the grappling member.

A bottom wall 16 is disposed between the side walls 9 and 10 and extends at an incline up to the receptacle 11 and a plate 17 of electromagnetic material is provided on said bottom wall and connected with electric circuit wires 18 by which current for magnetizing said plate 17 may be supplied.

The top side of the grappling member 12 is in the form of a trough 19 at the bottom of which it a groove 20 for the reception of a cable 21 that may be suspended from an aeroplane, not shown. A releasable pawl 22, shown in Fig. 6, mounted on a pivot 23 and urged outwardly by a spring 24 toward a

stop 25, permits the cable to readily enter the slot 20 but prevents the release of said cable except when the pawl 22 is manually depressed. A weight 26 of magnetic material is secured to the bottom end of the cable 21. Flags 27 may be placed at the outer ends of the abutments 7 and 8 to serve as markers for the benefit of the pilot who is seeking to engage his cable within the grappling member 12 of the pick up station.

In the operation of the invention, the object 28 to be picked up is secured by a cable 29 to the bail 15 of the grappling member, the object or load 28 being placed adjacent the end of the pick up station and being shielded by said station from direct contact with the cable 21 and weight 26. As the aeroplane approaches the pick up station the pilot lowers his cable 21 until the weight 26 touches or almost touches the ground and at the same time maneuvers his aeroplane so that the cable will be drawn between the walls 9 and 10 and will be guided to the grappling device 12 which has previously been placed in the receptacle 11. As the weight 26 is drawn onto the magnetized plate 17 it will be attracted and retarded thereby and prevented from bouncing and the cable 21 will be drawn taut and as the weight approaches the grappling device 12 the cable will be drawn into the slot 20 and locked there by the pawl 22. When the weight 26 is drawn against the grappling device 12 said grappling device will be drawn out of its receptacle and together with the load 28 that is connected therewith will be picked up and may be drawn up to the aeroplane. As the grappling device 12 is drawn out of its receptacle 11 the bail 15 drops down and straightens out as shown in Figs. 3 and 5.

For retarding the speed of the aeroplane and bringing the same to a stop in less distance in landing I provide a friction drum 30 mounted for rotation below the grappling device 12 and having a cable 31 wound thereon that is connected with the bail 15 of the grappling device. When the apparatus is used as a retarding means, in landing, the aeroplane flies low over the pick up station and lands just after it has passed over said station and the cable 21 picks up the grappling device and unwinds the cable 31 on the drum 30 as shown in Fig. 5. Any desired amount of resistance may be exerted by the drum 30 as may be required to bring the aeroplane to a quick stop without damage to the same.

The retarding means may be used in a similar manner for stopping lighter-than-air craft and holding them against a heavy wind, thereby dispensing with the services of a part of the ground crew required for handling such craft.

The foregoing description and accompanying drawings clearly disclose a preferred embodiment of my invention, but it will be understood that this disclosure is merely illustrative and that changes in the same may be resorted to within the scope and spirit of the following claims.

No claim is made herein for the pick up device as applied to raising a load from the ground to be transferred to the aircraft, that being reserved for a divisional application.

What I claim is:—

1. In aeroplane pick up apparatus, a cable having a weight on its lower end and adapted to hang from an aeroplane, a grappling device arranged to receive said cable and be picked up thereby, and a support for the grappling device having an upwardly inclined surface and forwardly converging guides for guiding the weight to the grappling device.

2. In aeroplane pick up apparatus, a cable arranged to hang from a moving aeroplane and having a weight on its lower end, a grappling device arranged to receive said cable and be picked up by the cable and a trough shaped support for the grappling device having overhanging top edges.

3. In apparatus for making connection with a cable that is suspended from a moving aeroplane, a pick up station located on the ground, a grappling device supported by the pick up station and means in the pick up station for guiding the cable upwardly and laterally to the grappling device.

4. In apparatus for making connection with a cable that is suspended from a moving aeroplane in the air and that has a weight on its bottom end, a pick up station having two convergent guide walls and an upwardly sloping bottom between and over which the weight may pass and a grappling device supported between the convergent ends of said walls and at the upper forward end of the bottom for receiving and attaching itself to the cable.

5. In aeroplane pick up apparatus, a cable arranged to hang from a moving aeroplane, a weight of magnetic material on the lower end of said cable, a grappling device arranged to receive said cable and be picked up thereby, a support for the grappling device, means for connecting a device on which a pull is to be exerted to the grappling device, means for guiding the cable to the grappling device and a magnetized plate in the bottom of the guiding means for attracting said weight and drawing said cable into said grappling device.

6. In aeroplane pick up apparatus, a cable arranged to hang from a moving aeroplane, a weight of magnetic material on the lower end of said cable, a pick up station embodying two abutments having two side guide walls divergent from bottom to top and convergent toward one end of the station, means forming a receptacle between the convergent ends of said walls, a grappling device arranged to

be removably disposed within said receptacle and having a V shaped trough in its top side that terminates in a cable receiving slot, a pawl for holding a cable within said slot, means connecting the grappling device with apparatus for exerting a pull on said grappling device and an electromagnetic floor between said two guide walls for attracting the weight on said cable.

7. The apparatus as described in claim 6 in which a bail member large enough to permit the grappling device to turn therein is secured to the grappling device and the sides of the grappling device receptacle are recessed to afford clearance for said bail.

8. In aeroplane pick up apparatus, a cable arranged to hang from a moving aeroplane, a grappling device arranged to be picked up by said cable having an automatically set lock, and means connected with the grappling device for exerting a retarding force on the aeroplane in landing.

9. In aeroplane pick up apparatus, a cable arranged to hang from a moving aeroplane, a grappling device arranged to be picked up by said cable, a friction brake drum adapted to offer resistance to rotation and a cable wound on the drum and connected with the grappling device for exerting a retarding force on the aeroplane in landing.

10. In an airplane pick-up apparatus, a cable arranged to hang from a moving airplane, a weight on the lower end of the cable, a pick-up station embodying two abutments having side guide walls convergent toward one end of the station, and forming a receptacle between the convergent ends of said walls, a grappling device disposed within said receptacle and having a trough terminating in a cable receiving slot, means connecting the grappling device with the apparatus for exerting a pull on the grappling device and an upwardly inclined ground floor between said two guide walls for directing the weight on said cable to said grappling device.

11. In aeroplane pick up apparatus, a cable arranged to hang from a moving aeroplane, a weight on the lower end of said cable, a grappling device arranged to receive said cable and to be picked up thereby, a support for the grappling device, and upwardly and laterally converging guide means associated with said support for guiding the cable to the grappling device.

In witness whereof, I hereunto subscribe my name this 15th day of May, A. D. 1928.

LYTLE S. ADAMS.