Aug. 11, 1931. L. S. ADAMS 1,818,956

GRAPPLE FOR AIRPLANE PACKAGE TRANSFER APPARATUS

Filed May 10, 1929

Fig. 1.

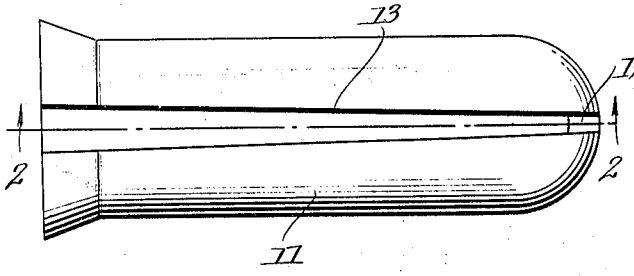


Fig. 4.

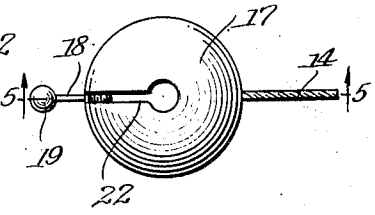


Fig. 2.

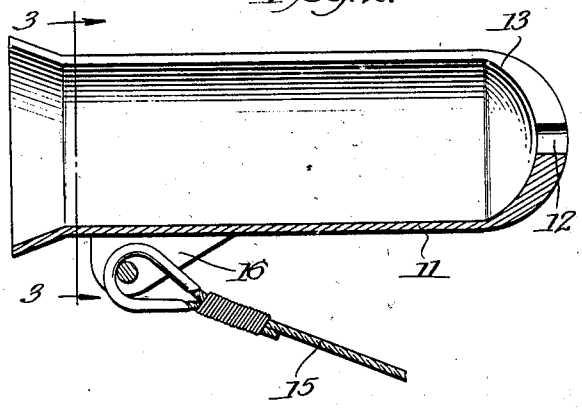


Fig. 5.

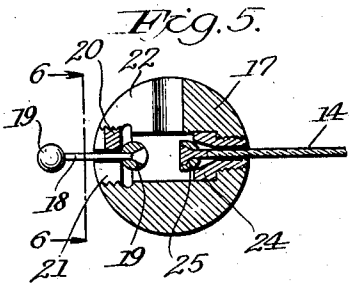


Fig. 6.

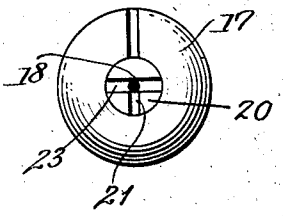
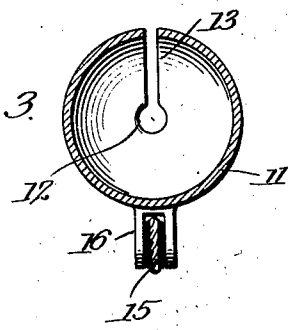


Fig. 3.



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UNITED STATES PATENT OFFICE

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GRAPPLE FOR AIRPLANE PACKAGE TRANSFER APPARATUS

Application filed May 10, 1929. Serial No. 361,958.

This invention relates to package transfer apparatus of the type disclosed in my pending application Ser. No. 305,970, filed September 14, 1928, wherein the airplane is provided with a trailing suspension cable for lowering and lifting the package carrier and suitable grapple means for automatically disconnecting one carrier and attaching another at a transfer station.

The invention aims to improve the grapple means to insure reliability of performance under varying conditions of operation.

Other aims and advantages of the invention appear in connection with the following description of the preferred embodiment illustrated in the accompanying drawings, wherein

Fig. 1 is a side view of the package carrier, which forms one of the members of the grapple device;

Fig. 2 is a longitudinal section, and Fig. 3 is a cross-section of the same on the lines 2—2 in Fig. 1 and 3—3 in Fig. 2, respectively, showing the end of the cable for attaching the package;

Fig. 4 is a side view of the cable anchor or trailer, which worms the airplane member of the grapple device, showing the end of the attaching cable, and also showing a part of the frangible connection to the carrier;

Fig. 5 is an axial cross-section of the cable anchor, on the line 5—5 of Fig. 4, showing the end of the cable and the frangible connection in side elevation; and

Fig. 6 is an end view of the cable anchor, showing the frangible connection in cross-section on the line 6—6 in Fig. 5.

The package carrier 11, shown in Figs. 1, 2 and 3, is substantially the same as the corresponding member of said earlier application, therein termed a "socket" member because of its shape, and consists of an elongated tubular receptacle having one end open and provided with a flared extremity, and the opposite end closed and provided with a central aperture 12. A slot 13 extends along one side from the open end to the aperture 12 for permitting the suspension cable 14 to pass into the aperture. A flexible cable 15 is secured to a lug 16 on the side of the carrier opposite the slot 13, to which the package is attached.

The cable 13 has swiveled on its end an anchor 17 in the form of a ball or other suitable shape (see Figs. 4, 5 and 6), which is adapted to fit within the carrier 13 when picking up a package, and is provided with a frangible connection 18 for separately attaching it to the end of the carrier when dropping a package. This frangible connection may consist of a short piece of plain or stranded wire of known breaking strength fitted with a swivelled ball 19 or other securing means at each end. It is preferably removably secured in the anchor by means of a threaded locking disk 20 screwed into an axial cavity in the anchor in alinement with the supension cable 14. This disk has a central passage for receiving the wire, and a slot 21 leading into it from one side through which the frangible connection may be inserted. In order to permit the insertion of the frangible connection without unscrewing the disk from the anchor cavity, a slot 22, conforming to the shape of the end of the connector, is made in one side of the anchor through which the connector may be inserted laterally.

By turning the disk until the slots 21 and 22 are in alinement the connector may be inserted, and locked in place by giving the disk a half turn, as shown in Fig. 5. A slot 23 may be cut across the outer end of the disk to receive a screw driver or other tool for rotating it.

The cable 14 may be swivelled in the anchor member by means of a bushing 24 loosely arranged on its end and prevented from pulling off by the hardened steel tubular thimble 25 secured on the end of the cable in any suitable manner, as by upsetting and welding the ends of the strands therein. The connection between the cable and anchor preferably should provide for relative rotation, so as to relieve the frangible connection from torsion due to spiraling of the carrier as it is drawn through the air with its attached load.

In using this improved grapple means, the carrier to be deposited is connected to the anchor by a connector having a breaking

strength adequate to prevent breakage in advance of the trapping of the carrier and anchor in the ground apparatus, as described in my prior application, Ser. No. 305,970, referred to above. The connector 18 is first secured in the anchor member, and thereafter the exposed ball end of the connector is led through the slot 13 into the closed end of the carrier member, where it seats in the aperture 12 and secures the two members together so long as it remains intact. Its strength is insufficient to withstand the shock due to the carrier being arrested in the throat of the chute leading from the hopper of the ground apparatus, and it breaks and permits the anchor to be pulled through the throat and into the waiting receiver in line therewith, as described in said prior application.

The device is free from springs or delicate parts or adjustable members subject to breakage or maladjustment, and is adaptable to the usual variations in weight of carrier and package by substitution of connectors of suitable strength. It is certain and reliable in its action.

The invention is not restricted to the construction shown in the drawings, but what is claimed is as follows:

1. A grapple for airplane package transfer apparatus comprising a cable anchor member and a package carrier member, and a frangible connection between said members adapted to support the weight of the package during transit and to give way under the shock of impact with the ground apparatus.

2. A grapple for airplane package transfer apparatus comprising a cable anchor member and a package carrier member, and a frangible connection between said members adapted to support the weight of the package during transit and to give way under the shock of impact with the ground apparatus, said connection providing a swivel means permitting relative rotation of said anchor and carrier members.

3. An automatically releasing connection for the carrier and suspending cable of an airplane transfer apparatus comprising an anchor for the cable having a socket, a socket in the extremity of the carrier, and a frangible element provided with enlarged ends for engaging said sockets.

4. An automatically releasing connection for the carrier and suspending cable of an airplane transfer apparatus comprising an anchor for the cable having a socket, a socket in the extremity of the carrier, and a frangible element of predetermined strength provided with enlarged ends for engaging said sockets.

5. A grapple device for airplane transfer apparatus comprising a trailing suspension cable and a carrier releasably attached thereto by means of a frangible connection, said cable having an anchor member provided with an axial bore and a slot, a rotatable seat member in said bore, said seat member having a slot leading to the seat from one side, and adapted to be alined with the slot in said anchor member, a connector having its end enlarged to engage said seat, and insertable in said anchor member through said alining slots, and retaining means in said carrier member for the opposite end of said connector.

6. A grapple device for airplane transfer apparatus comprising a trailing suspension cable and a carrier releasably attached thereto by means of a frangible connection, said cable having an anchor member provided with an axial bore and a slot, a rotatable seat member in said bore, said seat member having a slot leading to the seat from one side, and adapted to be alined with the slot in said anchor member, a connector having its ends enlarged to engage said seat, and insertable in said anchor member through said alining slots, and retaining means in said carrier member for the opposite end of said connector, said retaining means comprising an axial aperture for said connector surrounded by a seat for one of the enlarged ends thereof, said anchor member having a lateral slot communicating with said aperture to permit insertion of said connector therein.

7. A frangible connection for an airplane package transfer device comprising a trailing suspension member and a carrier to be dropped thereby, said connection embracing a short member of predetermined strength.

8. A frangible connection for an airplane package transfer device comprising a trailing suspension member and a carrier to be dropped thereby, said connection consisting of a tie wire of predetermined strength.

In testimony whereof, I have signed my name to this specification.

LYTLE S. ADAMS.