March 20, 1945. R. BEDDOW 2,371,670

AIRCRAFT PACKAGE DELIVERY

Filed June 29, 1942

Fig. 1.

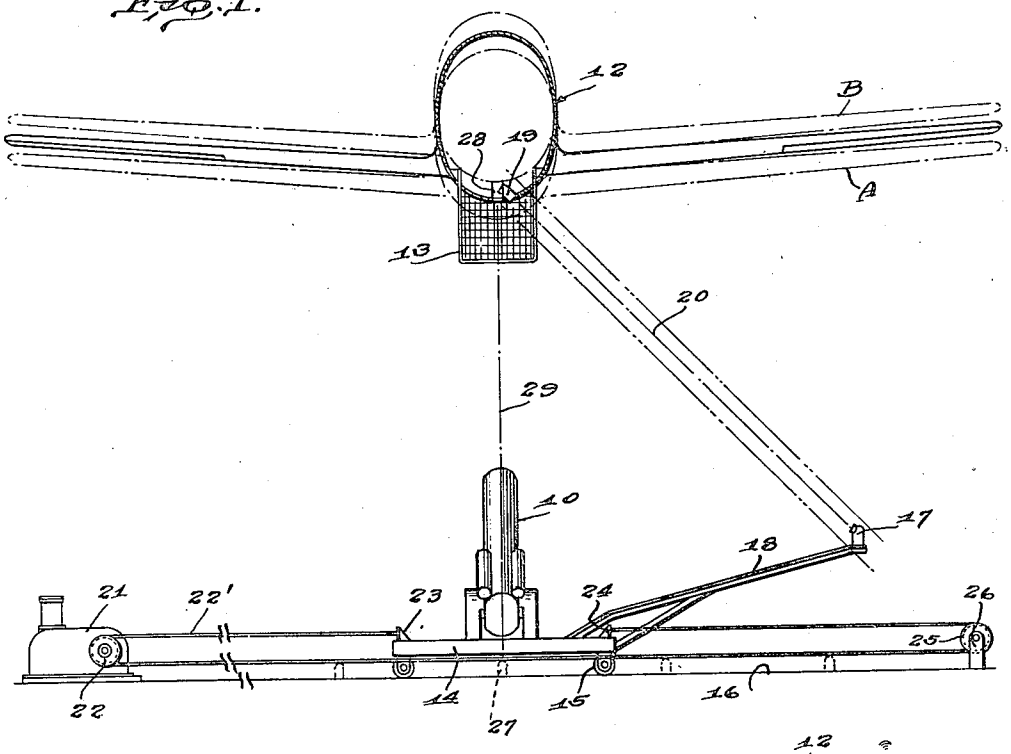
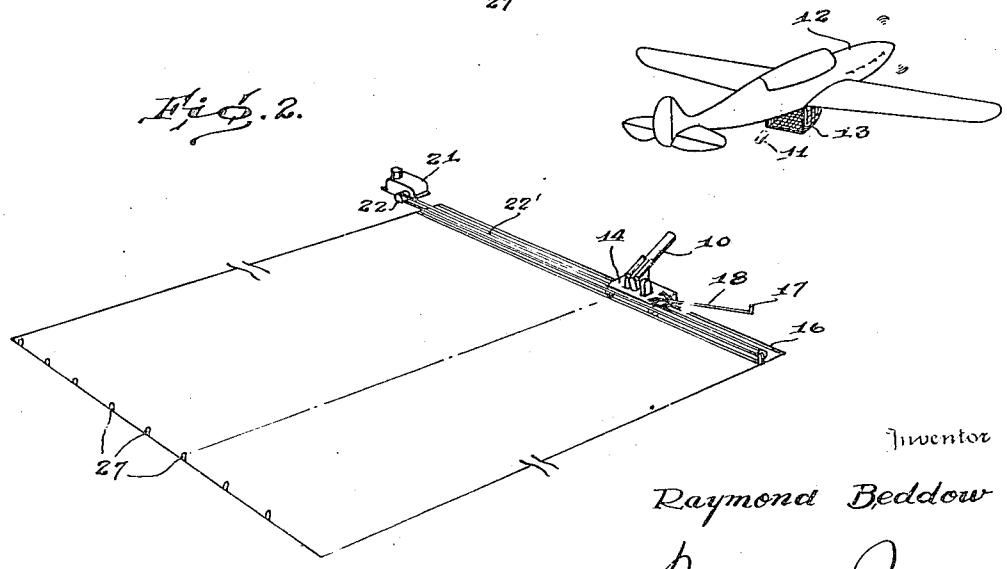


Fig. 2.



Inventor

Raymond Beddow

By Malcolm W. Fraser

Attorney

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AIRCRAFT PACKAGE DELIVERY

Raymond Beddow, Toledo, Ohio

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1 Claim. (Cl. 258—1.6)

This invention relates to the delivery to aircraft while in motion in the air, packages or the like thereby obviating the necessity of landing the aircraft for such purpose.

An object is to produce a new and improved means for forcefully projecting a package or the like to a flying aircraft in response to a beam of light from the aircraft.

A further object is to produce mechanism of the above character which is automatically propelled to the desired position beneath the aircraft transversely of the line of flight and subsequently to cause the package to be automatically shot or expelled to the aircraft when the latter is at the desired predetermined elevation.

Other objects and advantages of the invention will hereinafter appear and for purposes of illustration but not of limitation, the invention is shown schematically on the accompanying drawing in which:

Figure 1 is a diagrammatic view partly in elevation and partly in section, showing a gun for projectng packages or the like and an airplane, the latter having a net to receive the same and having a light beam for energizing a photoelectric cell carried by a movable carriage on which the gun is mounted, the gun being shown on tracks and being cable actuated by a reversible motor along the same; and

Figure 2 is a diagrammatic view showing a series of photoelectric cells which are designed for moving the gun carriage from one position to another transversely of the line of flight of the airplane in response to a light beam from the airplane.

The illustrated embodiment of the invention comprises a gun 10 of any suitable type which is adapted forcefully to eject packages toward the airplane 12, the latter being equipped with a suitably arranged net 13 on the underside for receiving the package 11. The packages may be shot from the gun 10 in any suitable or well-known manner such as by compressed air or by spring pressure but since the construction of the gun forms no part of the present invention and is well-known in the art, detailed description and illustration thereof is not considered necessary.

The gun 10 is mounted on a carriage 14 which is supported by wheels 15 mounted to travel along tracks 16. The firing mechanism for the gun 10 whether by a trigger to release the spring pressure or by actuating a valve in case of a compressed air operated gun, is controlled by a photoelectric cell 17 which is carried by a laterally extending bracket 18 connected to the carriage 14. The photoelectric cell operates in the usual manner through a suitable relay (not shown) for electrically actuating or controlling the operation of the firing mechanism so that in obedience to a beam from an airplane, the firing mechanism is operated. The detail mechanism which is responsive to the photoelectric cell 17 is not illustrated but the same will be readily understood by anyone skilled in this art and since it forms no part of this invention, description and illustration thereof is not given. Suffice it to say that a beam of light from the airplane energizes the cell 17 which is operatively connected to operate the gun 10.

As above mentioned, the photoelectric cell 17 is disposed at a point remote from the gun 10. Although the exact distance of the cell 17 from the gun is not critical, it is desirable that it be disposed at a substantial distance from the gun. In order for the package 11 to be propelled into the net 13 carried by the plane 12, it is necessary that the plane be at a predetermined height above the gun 10 in order not only that the package 11 reach the net 13 as the plane is in flight but also that it is not too close to the gun so that the impact of the package 12 will cause no damage. For this purpose, the aircraft 12 carries a light source 19 for creating a beam of light 20 which extends at an angle to the vertical, for example at an angle of 45 degrees. This angle may be varied but the beam must not be straight down from the plane and it is believed that an angle of the order of 45 degrees is preferable. In the event that the airplane is lower to the ground or in the dotted line position A, the beam 20 would not be focused upon the cell 17 but would strike inwardly from it. If the aircraft were above the predetermined height or at the dotted line position B, it is clear that the light source would not be directed upon the cell 17 but would strike outwardly of the cell. The angularity of the light source 19 may be varied considerably but manifestly if the beam 20 were straight up and down or vertical with respect to the gun 10, the difference in elevation of the plane (within certain limits) would make no difference and as a consequence, firing of the gun would result in the package failing to reach the airplane or striking it with excessive force. On the other hand, by inclining the beam 20 with respect to the vertical, the difference in elevation of the plane 12 above or below a critical height results in the failure to discharge the gun.

It is therefore necessary that the plane 12 be at a predetermined height above the gun 10 before

the beam 20 energizes the photoelectric cell 17. In this manner it is apparent that in no case will the gun 10 be discharged until the plane 12 is at the proper position with relation to the gun 10 so that the discharged package 11 will reach the net 13. Of course, it will be understood that the gun 10 will be preliminarily adjusted to expel the package with sufficient force to reach the plane. If desired, any suitable means may be provided for drawing the net 13 up into the body of the plane so that access to the package shot into the net can be readily had.

As above pointed out, the gun carriage 14 has wheels 15 mounted on tracks 16 which are arranged transversely to the line of flight of the plane 12. The carriage 14 is moved along the track 16 by a reversible electric motor 21 suitably connected to operate a cable drum 22. Wound upon the cable drum 22 is a cable 22', one end of which is anchored at 23 to the carriage 14 and the opposite end is anchored at 24 to the front end of the carriage. This length of cable then passes about a sheave 25 connected to a support 26 and thence back to the cable drum 22. The arrangement is such that when the cable drum is rotated in one direction, the carriage is moved in one direction along the track and when rotated in the opposite direction, the carriage is moved in the opposite direction.

The operation of the motor 21 is controlled by a series of laterally spaced photoelectric cells 27 which are arranged a predetermined distance, 200 feet for example, in rear of the gun 10 and along the intended line of flight of the airplane 12. The airplane 12 carries a source of light 28 to create a vertical beam 29 which, as it flies toward the gun 10, focuses upon one or another of the photoelectric cells 27. These cells are connected through relays (not shown) to operate the motor 21 in such manner as to cause the motor 21 to move the gun carriage or platform in one direction or the other in response to the particular cell upon which the light beam focuses. The series of photoelectric cells 27 may be arranged several hundred feet in advance of the gun 10 to afford sufficient time for the motor to shift the gun to the desired position according to which one of the cells 27 has received the beam of light from the airplane 12.

The particular form of relays and controls for the motor 21 is no part of this invention but the same will be readily apparent to those skilled in the art. The characteristic feature resides in the provision of a series of photoelectric cells which act in obedience to a vertically disposed light beam from the airplane for moving the gun carriage transversely of the line of flight for positioning the same properly with respect to the plane. However, under some circumstances the gun carriage may be stationary but in this instance greater care must be exercised by the pilot in maneuvering the plane.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claim.

What I claim is:

Apparatus of the class described comprising an aircraft, receiving means carried by an underportion of the aircraft, means on the ground for propelling an article into engagement with said receiving means, a photoelectric cell associated with said propelling means and operatively connected thereto for actuating same in response to a light beam from the aircraft, said photoelectric cell being spaced laterally from said propelling means in a direction at substantially right angles to the intended line of flight of said aircraft, and means on the aircraft for creating a light beam inclined substantially from the vertical in a lateral direction toward said photoelectric cell to impinge a light beam thereon when the aircraft flies directly over said propelling means at a predetermined height above same.

RAYMOND BEDDOW.