Oct. 28, 1930. J. A. ROCHÉ 1,779,855

GLIDER

Filed May 12, 1925

FIG. 1.

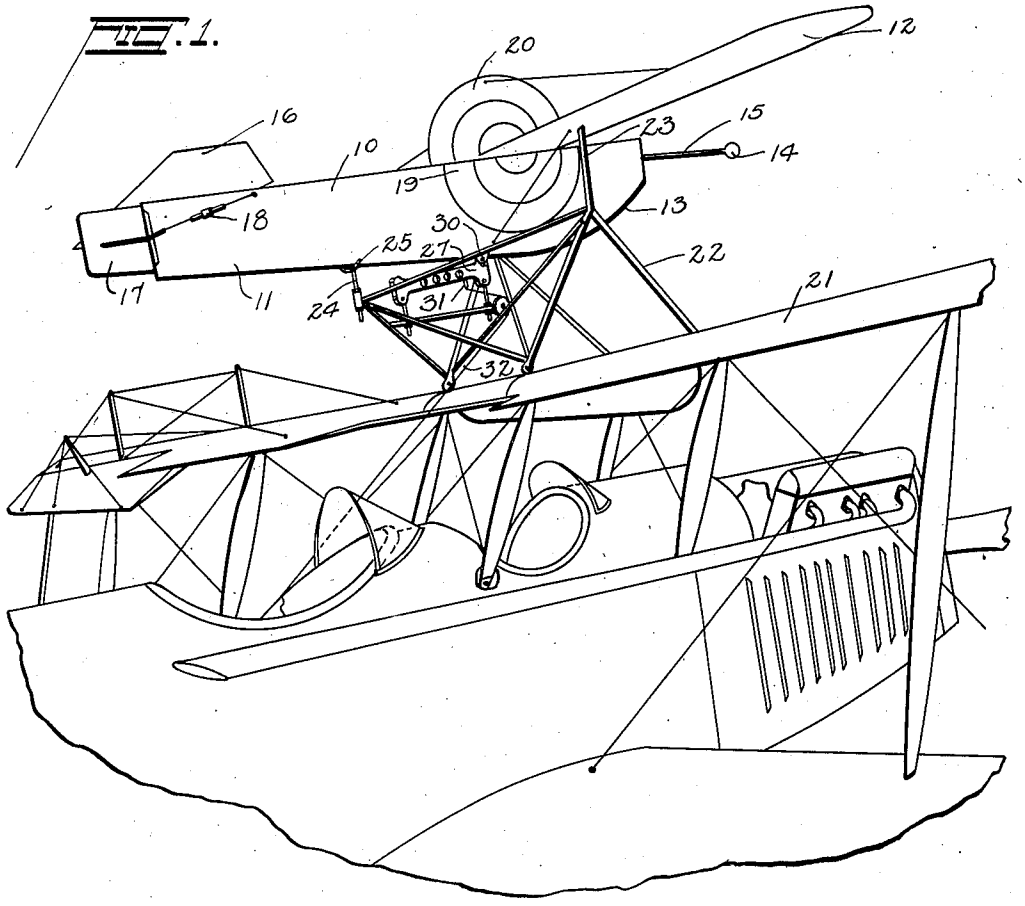
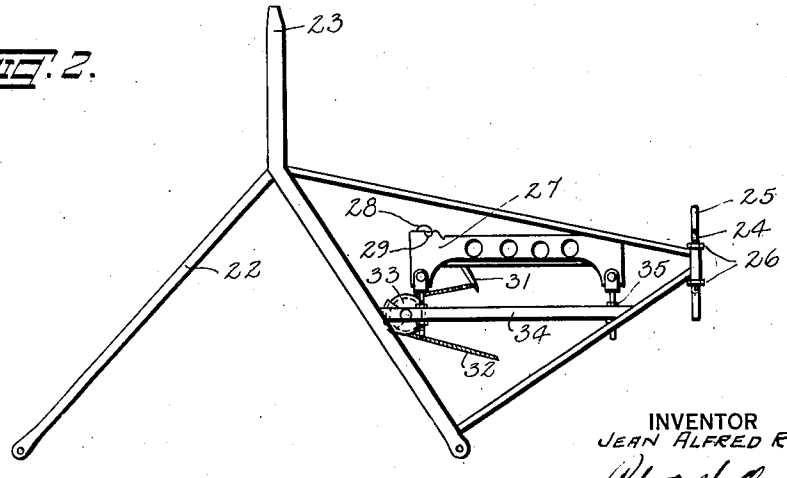


FIG. 2.



INVENTOR
JEAN ALFRED ROCHE
BY Robert H. Young
ATTORNEY

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JEAN ALFRED ROCHÉ, OF DAYTON, OHIO

GLIDER

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This invention relates to gliders, and more particularly target gliders adapted to be released from aircraft for use in the training of pilots in aerial combat.

The principal object of the invention, aside from its special significance as relates to target gliders, is to mount a ship having a lighter wing loading and a slower flying speed upon a ship of heavier wing loading having a higher flying speed, and providing a detachable connection therefor.

Another object of the invention is to provide a detachable mounting for a light craft on a heavier craft, as for example, a dispatch ship on a carrier ship, together with means for adjusting the angle of incidence of the dispatch ship with respect to its carrier. An object in this connection is to provide a three point mounting consisting of two laterally spaced points for lateral stability and a rearwardly spaced point for longitudinal stability, with a single point detachable connection intermediate the points of support, the rearward point being adjustable vertically for varying the incidence of the dispatch ship and the intermediate point of connection being adjustable vertically to vary the tension of the connection between the dispatch ship and the carrier.

A further object having special reference to the application of the invention to target gliders consists in the provision of a target representation on the glider at a point corresponding to the vital portion of an actual aircraft, and the provision of adjustable control surfaces capable of being locked in adjusted position with the purposes of producing different maneuvers of the glider in flight, to give practice to the pilots in aerial combat with the "enemy" going through different maneuvers.

The invention embraces other objects which will be made to appear in the progress of the following specification wherein reference is made to the accompanying drawing, in which

Fig. 1 is a perspective view illustrating a target glider made in accordance with my invention mounted on an aircraft to be released when the ship is in flight, and

Fig. 2 is a detached side view of the glider mounting.

It is well known that gliders have been released from the underside of lighter-than-air craft in the air but in these instances the glider merely dropped due to the negligible airspeed of the carrier, and only levelled off in flight when and if the proper speed was obtained. The principal feature of the present invention is to provide a carrier such as an airplane having an appreciable airspeed on which a glider of lighter wing loading and lower flying speed may be detachably mounted and released in mid air for immediate flight when released which more closely approximates the flight of an actual airplane. Due to its light wing loading and its slower flying speed the glider is under tension toward zooming up off the carrier ship, and immediately upon release flies up clear of the ship to dissipate its excess of kinetic energy and establish a flying speed proper to its own wing loading. While the invention has particular utility for use in connection with target gliders used in the training of pilots of the U. S. Army and Navy Air Service in aerial combat practice, it is capable of further adaptations and applications as will be pointed out hereinafter.

Referring to the drawing, the glider 10 constructed of miniature proportions and very light, consists of a fuselage portion 11 and monoplane wing surfaces 12. The forward under surface of the fuselage 11 is rounded as shown at 13 to simply skid across the surface of the ground as no landing gear is provided and the glider has a comparatively low landing speed. The nose of the glider is provided with a bumper knob 14 projected forwardly to a sufficient distance on a rod 15 to avoid injury to the glider in the event the same noses to earth. The tail surface 16 which is suitably adjustable and may be fixed in adjusted position, serves as the elevators and stabilizer portions, while the rudder 17 pivoted vertically to the rear end of the fuselage portion is likewise capable of lateral deflection and may be held fixed in its adjusted position suitably by short guy wires 18. The forward portion of the fuselage 11 has a bull's-eye

target representation 19 encircling the portion where the pilot's cockpit and the fuel tanks are located on an actual ship, so that a hit in this portion would be considered vital. The target representation is carried half upon the fuselage and half upon a vertical fin 20 above the fuselage. The latter may serve the purpose of the usual tail fin so that the latter may or may not be dispensed with as desired. Depending on what setting is given the control surface the glider will simulate different maneuvers of actual aircraft, such as would be encountered in aerial combat. Thus dives, spirals and other movements have been secured in the use of the glider of my invention in training pilots for combat service.

The aircraft 21, on the upper wing of which the glider 10 is mounted, so as to zoom up clear of the ship when released, has a trapeze 22 of a suitable trussed form to give the desired strength and rigidity. It provides two laterally spaced points of support 23 and a single rearwardly displaced point of support 24, the former giving lateral stability so that the glider is not subject to destructive fluttering when carried in the flight of the ship 21, and the latter providing longitudinal stability. The supports 23 engage on the underside of the wings 12 of the glider and the support 24 has a crotch 25 to receive the lower edge of the fuselage portion 11. In this way the angle of incidence of the glider may be varied and fixed as desired in relation to the carrier ship. Intermediate the forward lateral supports and the rearward longitudinal support a single point detachable connection 27 is provided by a shackle mechanism of the type commonly used for the release of bombs from aircraft. A latch 28 in this form of device closes a notch 29, in which a clip 30 on the device to be released, in this case the glider, is engaged. Upon the pull of the trigger 31, the latch 28 uncovers the notch 29 and the glider is set free.

It will be understood that due to the lighter wing loading of the glider, it is constantly under tension towards zooming up and the moment the latch 28 is released the glider zooms clear of the carrier ship. The trigger 31 is suitably operated by a cable 32 passing about a pulley 33 mounted in the support 34. The cable extends to the cockpit to be pulled by the pilot or observer at will. The support 34 for the release shackle provides for vertical adjustment of the shackle by adjustment of the nuts 35 similarly as in the case of the support 34. The tension of the glider toward zooming up may be thus counteracted by an adjustment of the tension of the shackle toward holding the glider to the carrier ship, and there will be no possibility of fluttering of the glider with the carrier ship in flight. The single point detachable connection insures instantaneous release of the glider when the pilot pulls the cable 32 and the location of the shackle intermediate the supports distributes the load of the tension of the shackle equally to the three points of support.

While I have described my invention as particularly applied to a target glider for release from airplanes or balloons or other lighter-than-air craft, it will be appreciated that it is capable of other applications. For example, light models of actual airplanes may be studied in free flight when constructed in true proportions and released in the manner of the target glider described. It is also within the contemplation of my invention that gliders or airplanes of light wing loading may be released from a carrier ship to enable the safer landing at a slower speed where the glider or airplane so dispatched contains freight or passengers. In this instance it is conceivable that the glider or airplane may be used as a substitute for a parachute and will have the advantage that there can be no failure to safe descent and also that the glider or airplane used in this way may be steered, assuming that the usual types of controls are provided. I have also considered that the invention might be applied in the releasing of a portion of the lifting surface of an airplane whereby to increase its speed and efficiency after the major part of the load necessitated by the greater lifting surface has been dispensed with, as in the case of a bomber. In this instance the cargo of bombs is released during the course of a raid and it becomes of advantage for the ship to be able to release the auxiliary surfaces, and proceed at a greater flying speed homeward after the raid and be less subject to pursuit and attack. It is further within the scope of my invention to utilize a scout airplane of light wing loading to be released from water craft such as cruisers or destroyers which travel at high speeds. In this case there is no necessity for the use of a catapult or running deck.

I claim:

1. The combination with a carrier aircraft, of a target aircraft having a lighter wing loading, and means for detachably mounting said target craft on top said carrier, said means being provided with an adjustable crotch forming one point of support for said target aircraft, said crotch permitting adjustment of the incidence of the dispatch craft.

2. The combination of a carrier aircraft, a dispatch aircraft having a lighter wing loading, two forward laterally spaced points of support engaging the underside of the wings of the dispatch aircraft, a rearward point of longitudinal support engaging the underside of the fuselage of the dispatch aircraft, and a single point detachable connection between said crafts intermediate said supports also serving to support the dispatch aircraft.

3. The combination of a carrier aircraft, a dispatch aircraft having a lighter wing load-

ing, two laterally spaced points of support for lateral stability of said dispatch craft on said carrier craft, a single point of support for longitudinal stability of said dispatch craft on said carrier craft between said spaced points of support and rearwardly displaced relative thereto, said longitudinal support being vertically adjustable for changing the incidence of said dispatch craft relative to said carrier craft, and a detachable connection between said crafts.

4. The combination of a carrier aircraft, a dispatch aircraft having a lighter wing loading, two laterally spaced points of support for lateral stability of said dispatch craft on said carrier craft, a single point of support for longitudinal stability of said dispatch craft on said carrier craft between said laterally spaced points of support and rearwardly displaced relative thereto, a detachable connection between said crafts, said single point of longitudinal support being intermediate the lateral and longitudinal supports, adjustable vertically to vary the tension with which said dispatch craft is fastened to said carrier craft.

5. The combination of a carrier aircraft, a dispatch aircraft having a lighter wing loading, two laterally spaced points of support for lateral stability of said dispatch craft on said carrier craft, a single point of support for longitudinal stability of said dispatch craft on said carrier craft between said spaced points of support and rearwardly displaced relative thereto, said longitudinal support being vertically adjustable for changing the incidence of said dispatch craft relative to said carrier craft, and a detachable connection between said crafts, intermediate the lateral and longitudinal supports adjustable vertically to vary the tension with which said dispatch craft is fastened to said carrier craft.

6. The combination of a carrier aircraft, and a target glider detachably mounted thereon to be released in mid-air, said glider having a vertical fin thereon with half of a circular bull's-eye target representation thereon standing above the fuselage portion of the glider and having the remainder of the bull's-eye on the fuselage at the point thereon corresponding to the vital part of an actual airplane.

7. The combination with an airplane having a main wing, of an auxiliary airplane of lighter wing loading detachably connected thereon and angularly adjustable thereto and in aerodynamic relation therewith for additionally supporting said airplane, said auxiliary airplane in position thereon for release and flight therefrom.

8. The combination with an airplane having a main wing, of an auxiliary airplane of lighter wing loading detachably connected thereon and angularly adjustable thereto, and in aerodynamic relation therewith so that when released said auxiliary airplane will zoom upward away from said airplane.

In testimony whereof I affix my signature.

JEAN ALFRED ROCHÉ.