

June 23, 1925.

J. C. HARRIS ET AL

1,543,566

AEROPLANE BRAKE

Filed Nov. 23, 1923

2 Sheets-Sheet 1

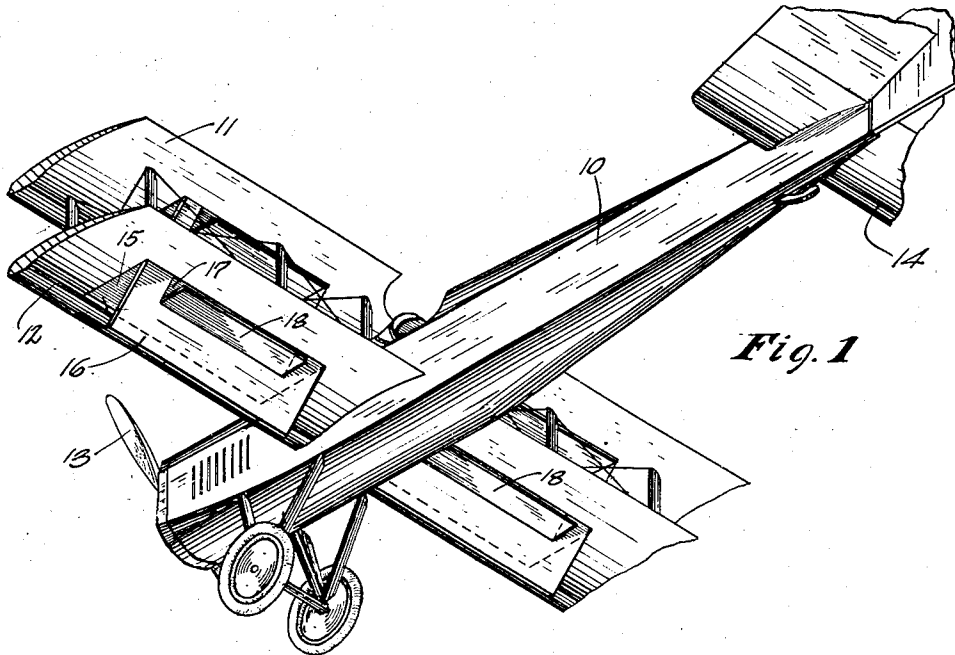


Fig. 1

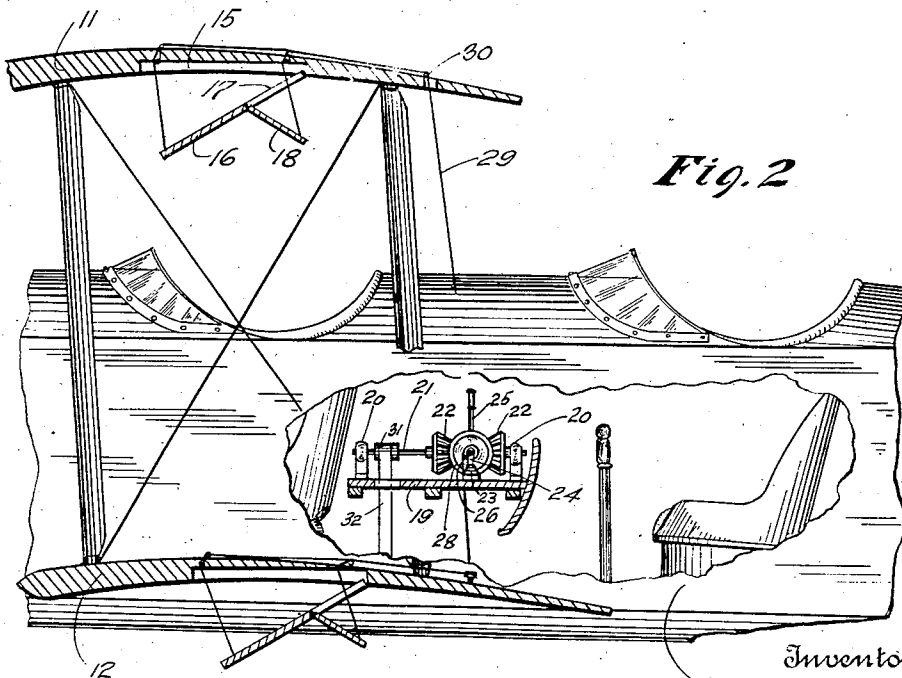


Fig. 2

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2 Sheets-Sheet 2

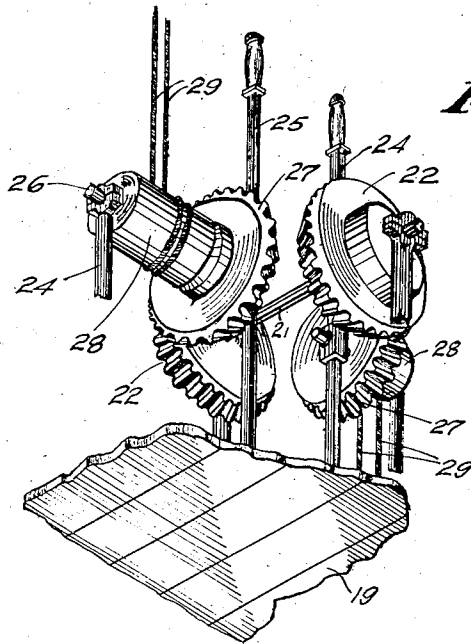


Fig. 3

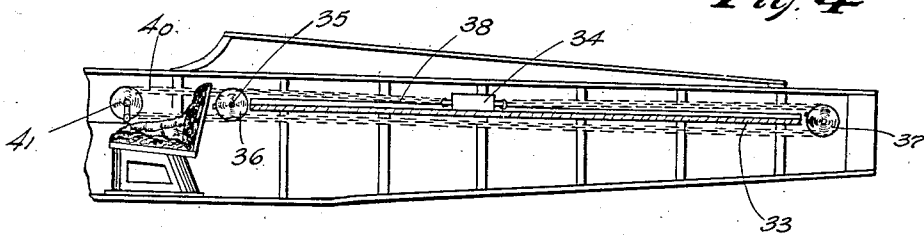


Fig. 4

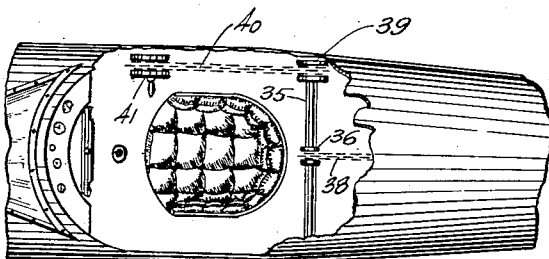


Fig. 5

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UNITED STATES PATENT OFFICE.

JOHN C. HARRIS AND CLARENCE N. MAYFIELD, OF RICHLAND CENTER, WISCONSIN.

AEROPLANE BRAKE.

Application filed November 23, 1923. Serial No. 676,592.

To all whom it may concern:

Be it known that we, JOHN C. HARRIS and CLARENCE N. MAYFIELD, citizens of the United States of America, and residents of Richland Center, in the county of Richland and State of Wisconsin, have invented certain new and useful Improvements in Aeroplane Brakes, of which the following is a specification.

10 This invention relates to flying machines and has special reference to a brake for aeroplanes.

It is a well understood fact that the landing of an aeroplane is a critical operation and that this is especially so in making landings on restricted fields as often happens when the pilot is compelled, from any cause, to make a forced landing.

One object of the present invention is to provide an improved aeroplane having a novel braking appliance adapted, when brought into service, to stop the forward movement of the aeroplane quickly and without shock.

25 It is also common in landing, in some instances, to make a sharp turn to the right or left to avoid obstructions.

A second important object of the invention is to provide an improved form of aeroplane braking device adapted to be used to retard the movement of one side of the aeroplane while not retarding the movement of the other side, thus causing the machine to turn sharply to the right or left, as desired.

35 A third object of the invention is to provide an improved wing brake for aeroplanes and an engine driven means for controlling the brake.

40 The use of wing brakes under certain conditions has a tendency to cause the tail of the aeroplane to rise with the possibility of the machine turning over end for end.

A fourth object of the invention is to provide an improved arrangement of wing brake and compensating device to prevent lifting of the tail.

50 With the above and other objects in view as will be hereinafter apparent, the invention consists in general of certain novel details of construction and combinations of parts hereinafter more fully described, illustrated in the accompanying drawings, and specifically claimed.

55 In the accompanying drawings, like characters of reference indicate like parts in the several views, and:

Figure 1 is a perspective view of an aeroplane constructed in accordance with this invention, the view being from beneath the machine and to the rear and side thereof; 60

Figure 2 is a detail showing a section through the wings and also showing a portion of the fuselage with the side broken away to disclose the apparatus in the cock pit; 65

Figure 3 is a perspective view of a certain gearing used herewith;

Figure 4 is a longitudinal section through the rear portion of the fuselage showing the compensating device; and 70

Figure 5 is a plan of one of the cock pits, part of the fuselage being broken away.

In the embodiment of the invention herein disclosed, there is shown a biplane having a fuselage or body 10, upper wings 11 and lower wings 12. The biplane is driven by a suitable engine actuating a propeller 13, and is provided with the ordinary rudders 14. 75

The under side of each wing or aerofoil 80 is provided with a pocket 15, which extends longitudinally of the wing and is located about half way between the leading and trailing edges. To the rear edge of each pocket is hinged a brake wing or aileron 85 is provided at its rear edge between the hinges, with a cut out portion 17, to the forward edge of which is hinged the forward edge of a secondary brake wing or aileron 18 normally housed in the cut out portion 17. 90

In one of the cock pits forward of the pilot's or observer's seat is positioned a platform 19 whereon are bearings 20 supporting a shaft 21 on which are fixed the confronting bevel gears 22. At 23 are other bearings to which are pivotally connected the lower ends of arms 24 and 25, the latter forming operating levers. Each arm and its corresponding arm 25 have journaled thereon a shaft 26 in which is fixed a bevel gear 27 and a winding drum 28. Around each drum are wound the control cords or cables 29 which pass over idler pulleys 30 respectively, connecting with the main and supplemental or secondary ailerons, the arrangement being such that when the cords are wound up the ailerons will be housed in the pockets 15. It will now be understood that the levers 25 may be swung in one direction or the other to bring the gears 27 selectively into engagement with either of 110

the gears 22 at will, engagement with one gear 22 serving to wind up the cords, and engagement with the other gear serving to unwind said cords. The shaft 21 carries a belt pulley or sprocket 31 connected to the engine shaft (not shown) by a belt 32.

It will now be plain that either or both sets of ailerons may be dropped at the will of the pilot or observer and that the dropping of the ailerons presents a heavy head resistance to the forward movement of the aeroplane so that it may be quickly brought to rest. Moreover, if the aileron on one side only be dropped, the head resistance on that side will cause the aeroplane to turn in that direction.

In order to compensate the tendency of the tail to rise under these conditions, certain counterweight mechanism is provided as best seen in Figures 4 and 5. This mechanism includes a guide 33 extending longitudinally of the fuselage and supporting a counterweight 34. At the forward end of the guide is a transverse shaft 35 whereon is fixed a chain pulley 36, a similar chain pulley 37 being mounted at the rear end of said guide. Around these pulleys runs a chain 38 having its ends connected to the counterweight 34. On the shaft 35 is fixed a second chain pulley 39 connected by a chain 40 with an operator's wheel 41. Thus by rotating the wheel in one direction or the other, the counterweight may be drawn in desired direction along the guide, it being obvious that the further the counterweight is moved toward the rear or tail of the aeroplane the greater will be its tendency to hold the tail down. The counterweight is thus not only useful in landing but may also be used to assist the elevator rudder, or even to take its place in case of accident in flying.

There has thus been provided a simple and efficient device of the kind described and for the purposes specified.

It will be obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, therefore, desired to confine the invention to the exact form herein shown and described, but it is wished to include all such as properly come within the scope claimed.

We claim:

1. In an aeroplane having wings, braking ailerons for each wing consisting of plane surfaces which are hinged at their rear and end portions to the under side of the wings, said braking ailerons having openings through the same which are located in close proximity to the under side of the wings when said braking ailerons are out of line with the under side of the wings, and secondary ailerons hinged to the braking ailerons to swing in an opposite

direction from the same when not overlying the openings between the wings and braking ailerons.

2. In an aeroplane, a wing having a pocket in its under side, a braking aileron having its rear edge hinged to the rear edge of the pocket and normally housed therein, said aileron having its rear edge portion cut away between the hinged portions, a secondary aileron having its forward edge hinged to the forward edge of the cutaway portion, and means to control the position of the ailerons.

3. In an aeroplane having upper and lower wings, braking ailerons attached in pairs to the under side of each of the wings, means for hinging the braking ailerons at their rear ends to the under side of the wings, spaces or gaps in the braking ailerons extending from the rear ends thereof forwardly, and secondary ailerons hinged to swing in line with the walls of the gaps, and independent means for moving the ailerons on their hinges to change their position.

4. In a biplane, a pair of vertically spaced wings each having a pocket in its under side, a braking aileron for each wing having its rear edge hinged to the rear edge of the respective pocket and normally housed therein, each aileron having the center portion of its rear edge cut away to provide a gap in said aileron, a secondary aileron filling in each of said gaps to swing into and out of alinement with the respective first aileron, and means to control the positions of the ailerons in the upper and lower wings in synchronism.

5. In a biplane, a pair of vertically spaced wings, a braking aileron for each wing having its rear edge hinged to the rear edge of the respective pocket and normally housed therein, secondary ailerons pivotally connected at their forward ends to rear portions of the braking ailerons, means to control the positions of the ailerons in synchronism, and a compensating weight mounted to travel longitudinally along the fuselage of the aeroplane to compensate the tendency to the elevation of the tail of the aeroplane caused by said braking ailerons.

6. In a biplane, a pair of vertically spaced wings each having a pocket in its under side, a braking aileron for each wing having its rear edge hinged to the rear edge of the respective pocket and normally housed therein, each aileron having the center portion of its rear edge cut away to provide a gap in said aileron, a secondary aileron filling in each of said gaps to swing into and out of alinement with the respective first aileron, means to control the positions of the ailerons in the upper and lower wings in synchronism, and a compen-

sating weight mounted to travel longitudinally along the fuselage of the aeroplane to compensate the tendency to the elevation of the tail of the aeroplane caused by said
5 braking ailerons.

7. In an aeroplane, braking ailerons comprising plane surfaces which are hinged at their rear portions to the under surface of the aeroplane wings, the connection with
10 the wings being such that the front edge has a tendency to swing downward, the

portions of the ailerons adjacent to the wings having gaps or openings, supplement braking ailerons hinged to the forward walls of the gaps and adapted to swing in
15 an opposite direction from the ailerons by which they are carried, and flexible means for adjusting the primary and secondary ailerons independent of each other.

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