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OR 1,814,115
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July 14, 1931. W. E. BLAIN 1,814,115

AEROPLANE

Filed Jan. 11, 1930 4 Sheets-Sheet 1

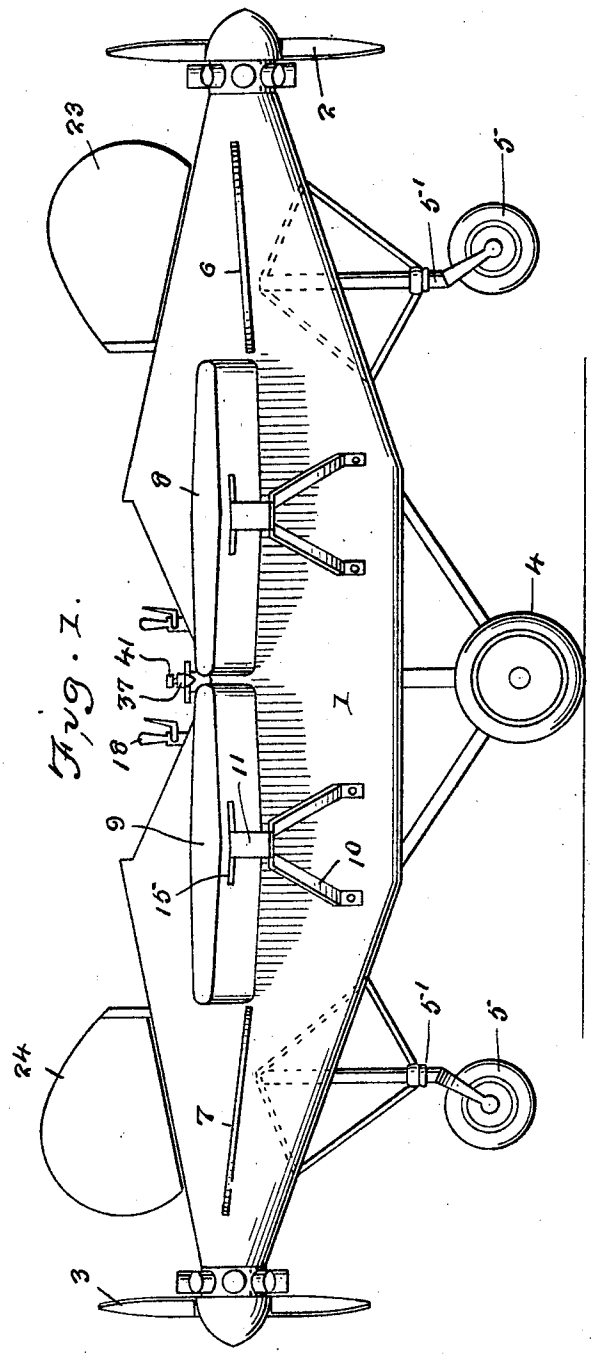


Fig. 1.

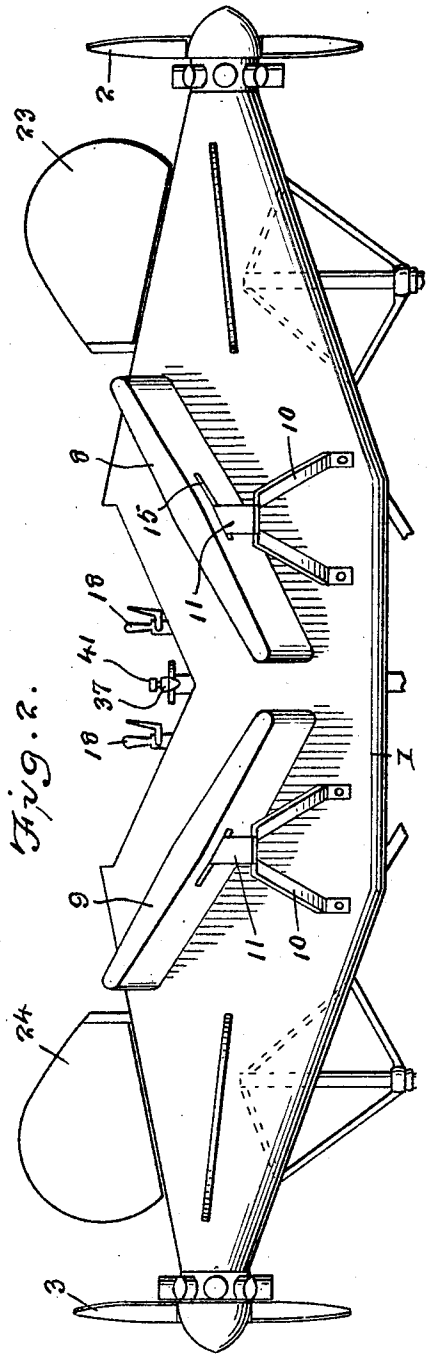


Fig. 2.

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AEROPLANE

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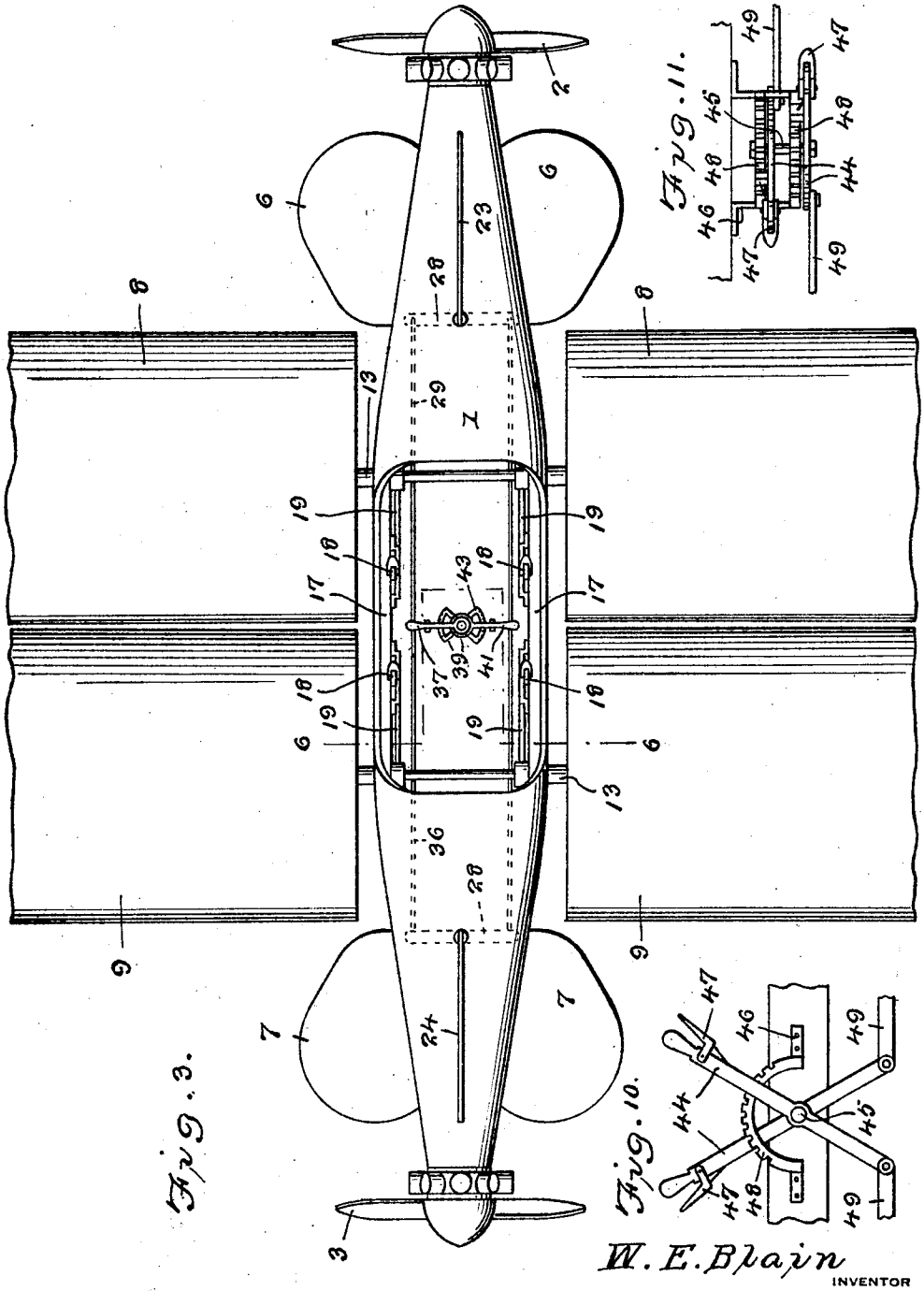


Fig. 3.

Fig. 11.

Fig. 10.

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July 14, 1931. W. E. BLAIN 1,814,115

AEROPLANE

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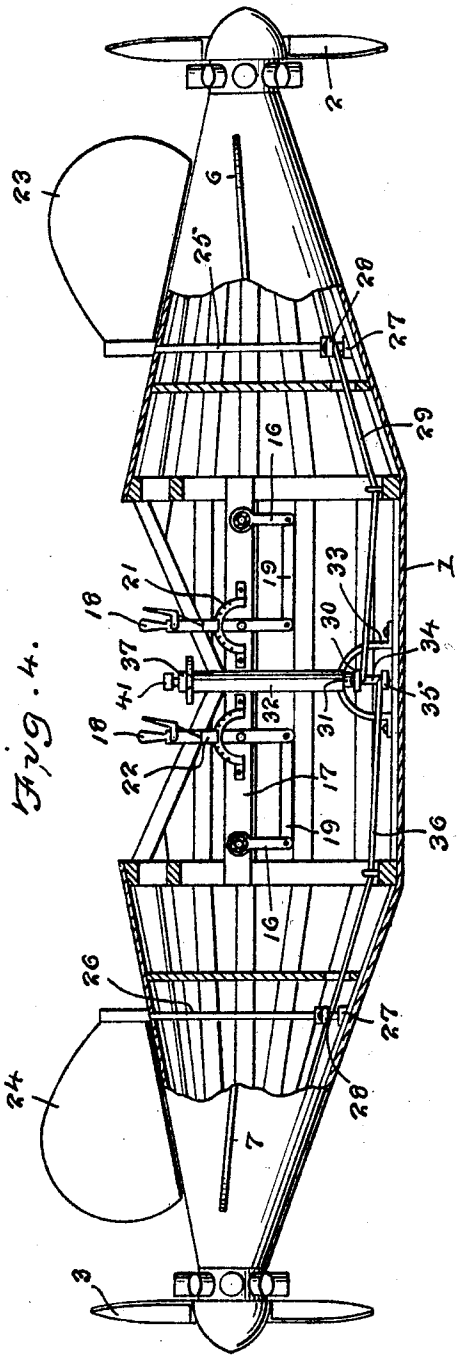


Fig. 4.

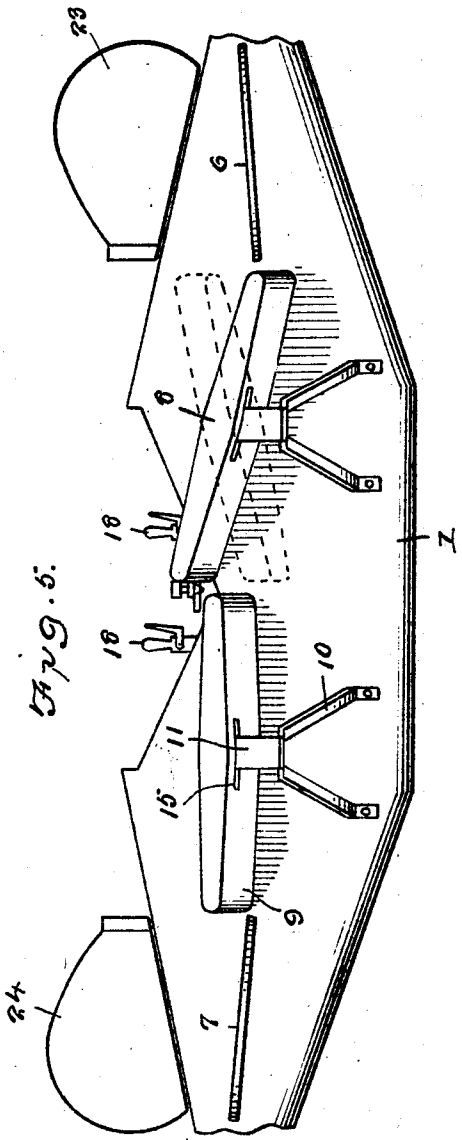


Fig. 5.

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AEROPLANE

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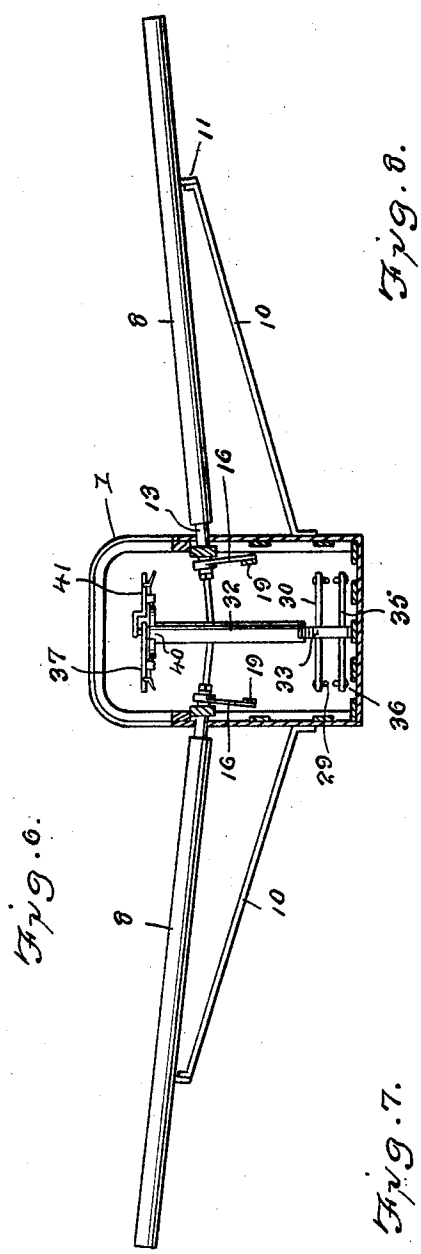


Fig. 6.

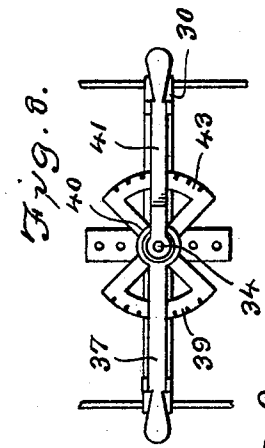


Fig. 8.

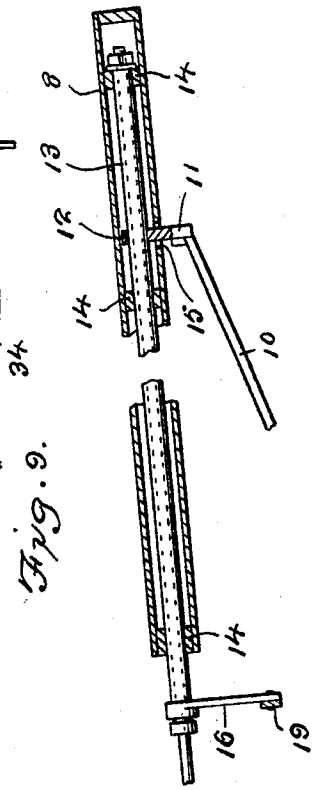


Fig. 9.

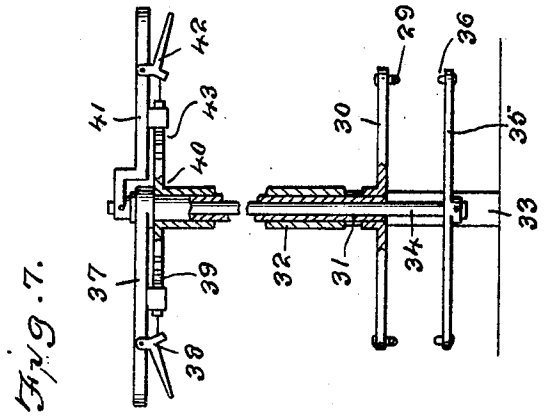


Fig. 7.

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244. AERONAUTICS

SEARCH ROOM

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Patented July 14, 1931 1,814,115

UNITED STATES PATENT OFFICE

WILLARD E. BLAIN, OF VAN BUREN, ARKANSAS

AEROPLANE

Application filed January 11, 1930. Serial No. 420,258.

This invention relates to improvements in aeroplanes and more particularly to an improved construction and arrangement of a controlling means for the planes and rudders, and the general object of the invention is to provide an arrangement such that the flight of the aeroplane may be conveniently controlled and the planes maneuvered more readily than is possible in the construction of most aeroplanes, and the invention further contemplates, as its most salient feature, an aeroplane which will be so constructed and embody such means that will permit of ready reversal of its direction of travel during flight.

Another object of the invention is to provide an aeroplane embodying a pair of balancing flight wings at each side of the fuselage and means whereby the wings may be independently or consonantly adjusted with respect to one another so as to govern the direction of flight of the aeroplane, and likewise to greatly facilitate banking of the aeroplane when this is found desirable.

Another salient and important object of the invention is to provide an aeroplane embodying an arrangement of wings and control means therefor so constructed as to provide for a vertical take-off of the aeroplane and likewise a vertical landing thereof.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing my invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is a view in side elevation of an aeroplane constructed in accordance with the present invention.

Figure 2 is a similar view illustrating the planes in a different position of adjustment from that shown in Figure 1.

Figure 3 is a top plan view of the aeroplane with the planes adjusted as shown in Figure 1.

Figure 4 is a longitudinal sectional view through the aeroplane.

Figure 5 is a similar view looking in a direction opposite to that of Figure 4.

Figure 6 is a vertical transverse sectional view taken on the line 6—6 of Figure 3.

Figure 7 is a view partly in elevation and partly in section illustrating the means provided for adjusting the rudders of the aeroplane.

Figure 8 is a top plan view illustrating said means.

Figure 9 is a longitudinal sectional view, of a fragmentary nature, illustrating the means for supporting the flight planes and stabilizing planes for rocking adjustment.

Figure 10 is a side elevation illustrating a modification of one of the control means.

Figure 11 is a top plan view of the modified structure.

The body of the aeroplane is indicated by the numeral 1 and, as illustrated in the drawings is tapered at both of its ends and, at the one end, there is a propeller indicated by the numeral 2, and, at the other end there is a propeller 3, these propellers being rotated in the usual manner. The usual landing wheels 4 are provided beneath the body of the aeroplane mid-way between the ends thereof, and other wheels 5 are mounted in swivelled bearing yokes 5′ near the ends of the body of the aeroplane, and, by reason of their swivelled mountings, constituting means for effecting, by contact with the ground surface, a turning of the aeroplane toward either side in a minimum space.

Flight planes, indicated by the numerals 6 and 7 are mounted at each side of the body 1 at the respective ends thereof and between these planes and at each side of the body, there are mounted flight and stabilizing planes, which are indicated in general by the numerals 8 and 9, the planes being hollow and of substantially rectangular marginal contour and having their end edges rounded so as to adapt them to more readily cleave through the air.

Struts 10 are mounted in stream line fash-

ion upon the outer side of the body 1 of the aeroplane and are arranged in pairs, one pair of said struts being associated with each of the wings 8 and 9 and these struts are inclined upwardly and inwardly toward each other and the struts of each pair are connected at their outer ends by a bearing plate 11 having an opening therein indicated by the numeral 12 through which a shaft 13 is rotatably fitted. Within each wing 8 or 9 there are arranged bearing members 14 and one of these members is located at the outer end of the respective shaft 13, another inwardly with respect to the bearing plate 11, which plate extends upwardly through a slot 15 in the under side of the respective plane, and other ones of the bearings 14 being arranged at intervals in that portion of the length of the shaft which extends within the respective plane, the inner end of each shaft being mounted in one of the said bearings 14 which is located at the inner end of the plane. The said shafts are arranged to extend longitudinally, medially, between the opposite end edges of the respective planes and a crank arm 16 is mounted upon the inner end of each shaft and extends at an angle therefrom and is located within the fuselage of the aeroplane. Supporting arms 17 are mounted within the fuselage at each side thereof and the shafts at the respective sides of the aeroplane are journalled at their ends in these bars. Hand levers 18 are also pivotally mounted, between their upper and lower ends, upon each bar 17 and a connecting rod 19 connects the end of each hand lever with the end of the respective crank arm 16. Segmental racks 21 are mounted upon each bar 17 concentric to the pivots for the respective levers 18, and hand actuated pawls 22 are supported by the levers and coact with the rack segments so as to hold the levers in the positions to which they are adjusted.

The aeroplane further embodies rudders indicated respectively by the numerals 23 and 24 and these rudders are mounted at the upper ends of shafts 25 and 26 which, at their lower ends, are mounted in bearings 27 within the fuselage at the bottom thereof. Fixed upon the lower end of each of the rudder shafts, is a cross bar 28 which extends laterally in opposite directions from the respective shaft, and cables 29 are connected to the cross bar 28 upon the shaft 25 and led rearwardly to and connected to the ends of a cross bar 30, which is mounted at the lower end of a sleeve shaft 31, which shaft is mounted for rotative movement in a tubular standard 32 supported by a bracket frame 33 upon the bottom of the fuselage. A shaft 34 is rotatably mounted in the sleeve shaft 31 and a cross bar 35 is fixed upon the lower end of this shaft and cables 36 are connected to the ends of the cross bar and to the corresponding ends of the cross bar 28, which is mounted at the lower end of the rudder shaft 26. A hand lever 37 is fixed to the upper end of the sleeve shaft 31 and carries a hand actuated pawl device 38 for coaction with a rack segment 39 provided at one side of a head 40 at the upper end of the tubular standard 32. A similar hand lever 41 is fixed to the upper end of the shaft 34 and extends in a direction opposite to that of the lever 37 and is provided with a hand actuated pawl device, indicated by the numeral 42 for coaction with the rack segment 43 at the other side of the said head 40.

It will now be evident that the levers 37 and 41 are capable of operation independently of each other and that rotative adjustment of the shaft 31 will swing the cross bar 30 so as to effect angular swinging adjustment of the rudder 23 and, similar adjustment of the lever 41 will effect angular adjustment of the rudder 24.

From the foregoing description of the invention it will be evident that by adjusting the planes 8 and 9 to assume the positions shown in Figure 2 of the drawings, the aeroplane may be caused to make a substantially vertical landing, and, by reversely adjusting the planes and, at the same time adjusting the controls for the propellers 2 and 3, to effect delivery of air currents from the propellers in the direction of the respective planes 8 and 9, the aeroplane may be caused to rise in a substantially vertical direction, due to the direction of forceful air currents against the oppositely inclined surfaces of the planes. It will be understood, of course, that the planes 8 and 9 may be adjusted so as to provide for take-off and landing of the aeroplane in the customary manner.

In the modification of the invention shown in Figures 10 and 11 of the drawings, the control levers for the flight and stabilizing planes 8 and 9, and which levers are indicated, in these figures, by the numeral 44, are both mounted on a common pivot 45 which in turn is mounted in spaced members of a suitable frame 46 arranged at each side of the fuselage of the aeroplane, and pawl members 47 are provided upon these levers and, for each respective pair of the levers, there are provided rack segments 48 likewise mounted upon the frame members 46, connecting rods 49 corresponding to the rods 19 of the previously described embodiment, being connected to the lower ends of the two levers of each set, and extending in opposite directions, it being understood that the levers of each set are independently operable.

What I claim is:—

1. In an aeroplane including the usual body tapered at each end, shafts mounted upright in the body adjacent the ends there-

of with their upper ends projecting above the body, a rudder upon the said end of each shaft a cross arm upon each shaft, within the body, a shaft mounted upright in the body between the first mentioned shafts, a sleeve shaft rotatably mounted upon the last mentioned shaft, a hand lever upon the upper end of each of the last mentioned shafts operable to rotate the respective shaft, a cross bar at the lower end of each of the last mentioned shafts, and rods connected to the ends of the said cross bars of each shaft and each to corresponding ends of the cross bar at the lower end of the shaft of a respective one of the rudders.

2. In an airplane, a body, stationary flight wings arranged upon opposite sides of the body adjacent the ends thereof, with the wings at opposite ends of the body inclined in opposite directions, pairs of simultaneously movable combined flight, stabilizing and banking means mounted upon opposite sides of the body between the flight wings, means to mount the combined wings for horizontal pivotal adjustment, whereby each pair of combined wings may be adjusted relatively and with respect to the stationary flight wings, and means to operate the wing adjusting means.

In testimony whereof I affix my signature.

WILLARD E. BLAIN.