

May 11, 1943.

R. G. STAMBACH

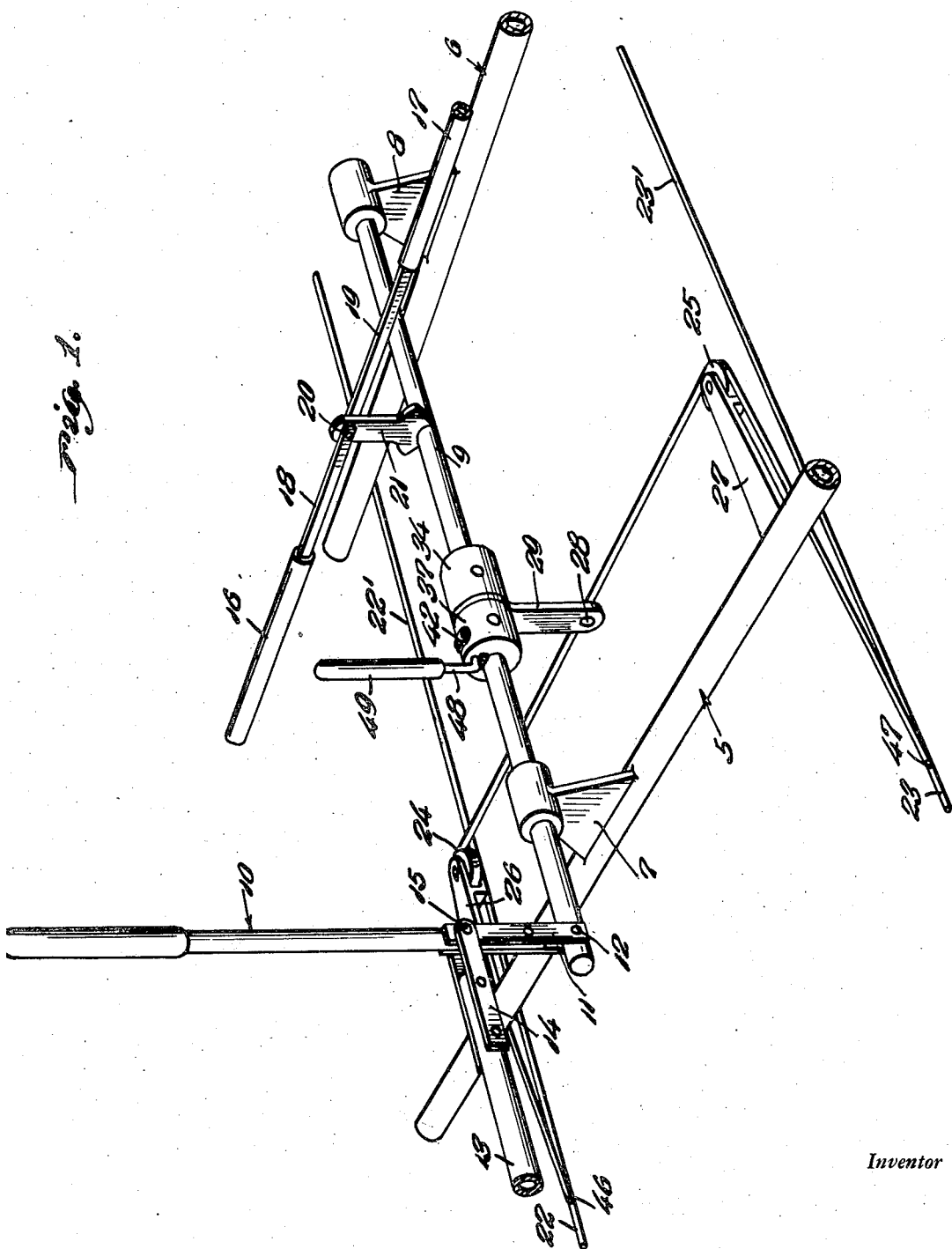
2,318,833

AEROPLANE CONTROL

Filed Feb. 17, 1942

2 Sheets-Sheet 1

Fig. 1.



Inventor

Robert G. Stambach
By Clarence A. O'Brien
and Harvey E. Jacobson
Attorneys

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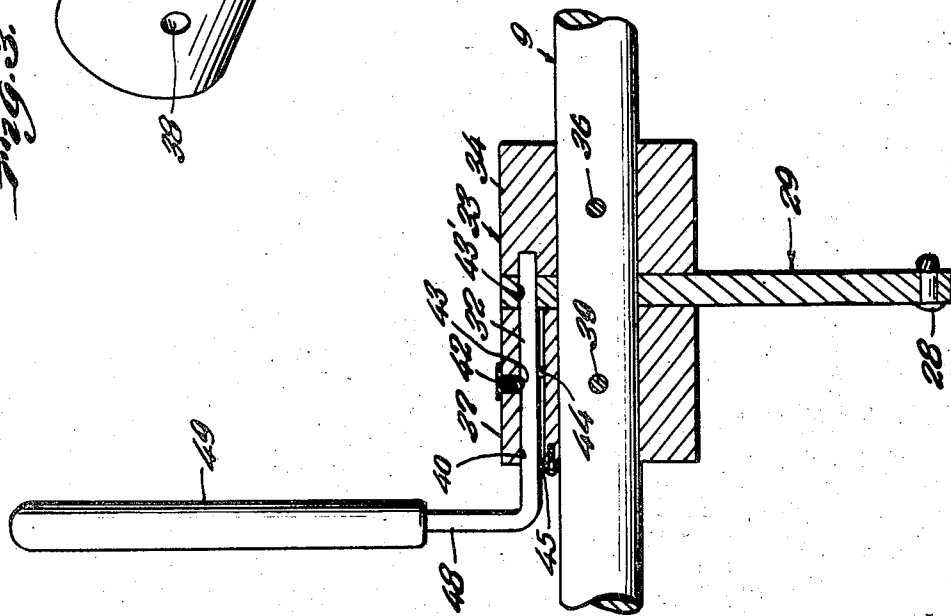
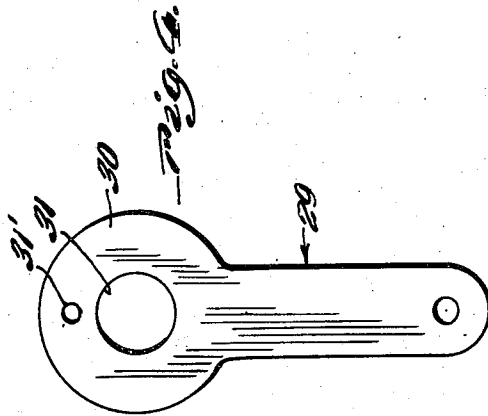
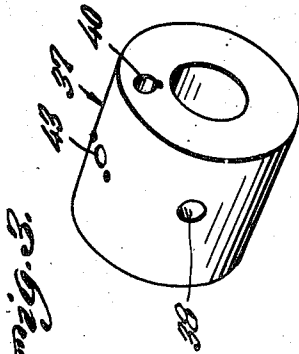
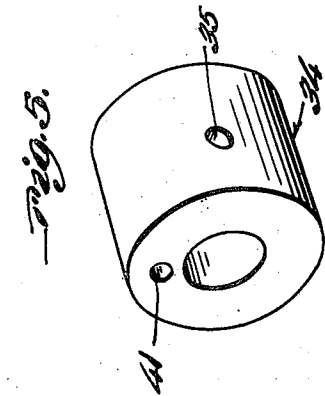
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2 Sheets-Sheet 2



Inventor

Robert G. Stambach

By

Clarence A. O'Brien
and Harvey B. Jacobson
Attorneys

UNITED STATES PATENT OFFICE

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AIRPLANE CONTROL

Robert George Stambach, Pekin, Ill.

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3 Claims. (Cl. 244—83)

My invention relates to improvements in airplane control means, and particularly to an improved arrangement wherein the three main control elements of the airplane, that is, the elevators, rudder and ailerons, may be operated all by the hands alone, or through adjustments, so that the rudder is operated by the feet and the ailerons by the hands, and the primary object of my invention is to provide a simple and mechanically efficient arrangement of this character.

Other important objects and advantages of my invention will be apparent from a reading of the following description taken in connection with the appended drawings, wherein for purposes of illustration I have shown a preferred embodiment of my invention.

In the drawings:

Figure 1 is a general perspective schematic view showing an arrangement in accordance with the present invention adjusted so that operation of the stick controls the elevators, the rudder, and the ailerons of the airplane.

Figure 2 is a fragmentary enlarged sectional elevational view showing the removable pin in place to adjust the arrangement so that operation of the stick controls the elevators, the rudder, and the ailerons, the pin being removable to disconnect the stick from the rudder so that the rudder may be operated by the feet without interfering with the operation of the stick.

Figure 3 is a perspective view of the rear clutch member.

Figure 4 is a rear elevational view of the clutch element lever.

Figure 5 is a perspective view of the front clutch element.

Referring in detail to the drawings, the numerals 5 and 6 refer to the rear and front cross tubes of the fuselage frame work under the cabin or cockpit of the airplane. Intermediate portions of the cross tubes 5 and 6 have the corresponding journal brackets 7 and 8 rising therefrom in which the longitudinal horizontal tube 9 is rotatably supported. The stick which is generally designated 10 has a clevis portion 11 at its lower end which is pivoted to opposite sides of the rear end of the tube 9 as indicated by the numeral 12. The longitudinal tube 13 leading from the elevators (not shown) is pivotally connected to the stick 10 above the clevis 11 by a similar clevis 14 connected at 15, the elevators thereby being operated by a forward and backward motion of the stick 10. The transverse tubes 16 and 17 leading from the ailerons (not shown) have respective bars 18 and 19 projecting

from the inner ends thereof and pivoted as indicated by the numeral 20 at the upper end of an arm 21 projecting upwardly from and secured to the longitudinal tube 9, by which means the ailerons are controlled by sidewise movement of the stick 10.

The rudder (not shown) is controlled by the wires 22 and 23 which run longitudinally not only from the rudder foot bars (not shown) but also around the pulleys 24 and 25 which are on the front ends of the rearwardly projecting brackets 26 and 27 which are secured to the front side of the rear transverse tube 5, and connect as indicated by the numeral 28 with the lower end of the clutch lever 29.

The clutch lever 29 has an annular hub portion 30 whose opening 31 rotatably receives the longitudinal tube 9 and is rotatable on this tube. The upper part of the hub 30 has an eccentric axial opening 31' formed therein to receive the round cross section pin 32 in the manner indicated in Figure 2 of the drawings.

The clutch lever 29 is part of the clutch mechanism which is generally designated 33 and which consists of the annular front member 34 which has diametrical openings 35 therein to accommodate a locking pin or key 36 which secures the same non-rotatably and non-slidably on the tube 9; and the heavy annular rear element 37 which has diametrical openings 38 accommodating the locking pin or key 39 which traverses the tube 9 and locks the element 37 non-rotatably and non-slidably thereon. The facing ends of the elements 34 and 37 are sufficiently spaced with respect to the opposite sides of the hub portion 30 of the clutch lever 29 to permit the clutch lever to turn relative to the elements 37 and 34, while the removable pin 32 is in a withdrawn position.

In Figure 2 of the drawings the pin 32 is shown in an engaged position in which it is passed through the keyhole shaped bore 40 in the rear clutch element 37, through the opening 31' in the clutch lever and into the socket 41 in the rear end of the rear clutch element 34. A spring-pressed ball detent 42 is arranged through the opening 43 in the rear clutch element 37 to engage a depression in the upper side of the pin 32 to hold the same yieldingly in place in the engaged position, this ball detent being operative to engage another depression 43' further forward on the pin 32 to hold the pin in place in the withdrawn position. A lug 44 on the bottom of the pin works in the slot of the key-hole-shaped bore 40 and acts as a stop when

engaged with the removable abutment 45 on the rear end of the clutch element 37 to prevent the pin 32 from being drawn too far outwardly. When the pin 32 is drawn out rearwardly to the limit, the clutch lever 29 is free on the tube 9 so that the stick 10 can be operated laterally without operating the rudder wires 22 and 23, and the rudder wires can be operated by the foot rudder controls (not shown) independently of the stick. It will be noted that continuations 22' and 23' of the rudder cables 22 and 23, respectively, pass forwardly from the arrangement described, the attachment of the two sets of wires being indicated by the numerals 46 and 47. It is obvious that a quick and easy forward or rearward pressure by the hand of the operator on the handle 49 which is attached to the pin 32 by the arm 48, will either engage or disengage the pin 32, so that the pilot can readily switch back and forth between control of all of the control elements of the airplane by the stick 10 or to control of the rudder by the feet with the other controls remaining under the guidance of the stick.

Although I have shown and described herein a preferred embodiment of my invention, it is to be definitely understood that I do not wish to limit the application of my invention thereto except as may be required by the scope of the subjoined claims.

Having described the invention, what is claimed as new is:

1. Apparatus for controlling the elevators, the rudder, and the ailerons of an airplane having support members and push-pull elements operatively connected to the elevators, the rudder, and the ailerons, respectively, said apparatus comprising forward and rearward journal brackets on said support members, a longitudinal shaft rotatably supported in said journal brackets, a stick pivoted to rise from the rearward part of said shaft for forward and rearward movement relative to said shaft, a pivotal connection on said stick for the push-pull element of the elevators projecting rearwardly from said stick at a point above the lower end of the stick, an arm rising from a forward portion of said shaft and to which the transversely arranged push-pull elements of the ailerons are connected for operation by side-wise movement of the stick accompanied by rotation of said shaft in opposite directions, and a

clutch member on said shaft having a clutch lever operatively connected to the transversely extending push-pull elements of the rudder to work the rudder by lateral swinging of said stick and corresponding rotation of said shaft.

2. Apparatus for controlling the elevators, the rudder, and the ailerons of an airplane having support members and push-pull elements operatively connected to the elevators, the rudder, and the ailerons, respectively, said apparatus comprising forward and rearward journal brackets on said support members, a longitudinal shaft rotatably supported in said journal brackets, a stick pivoted to rise from the rearward part of said shaft for forward and rearward movement relative to said shaft, a pivotal connection on said stick for the push-pull element of the elevators projecting rearwardly from said stick at a point above the lower end of the stick, an arm rising from a forward portion of said shaft and to which the transversely arranged push-pull elements of the ailerons are connected for operation by side-wise movement of the stick accompanied by rotation of said shaft in opposite directions, and a clutch member on said shaft having a clutch lever operatively connected to the transversely extending push-pull elements of the rudder to work the rudder by lateral swinging of said stick and corresponding rotation of said shaft, said clutch member comprising a pair of blocks secured on said shaft and longitudinally spaced from each other, said clutch lever having an annular hub portion turning freely on said shaft between said blocks and formed with an eccentric pin accommodating opening, and a locking pin inserted through an eccentric passage formed through the rearward block, passing through said eccentric opening, and entering an eccentric socket formed in the rear end of the front block to operatively connect said blocks and said clutch lever to afford said stick sole control of the elevators, the rudder, and the ailerons of the airplane.

3. Apparatus according to claim 2 wherein said clutch locking pin is rearwardly withdrawable out of engagement with said forward block and said clutch lever to free said clutch lever on said shaft to permit operation of the rudder independently of said stick.

ROBERT GEORGE STAMBACH.