Sept. 14, 1926. 1,600,079

B. D. THOMAS

ADJUSTING DEVICE FOR AILERONS OF AIRPLANES

Filed Dec. 19, 1922 2 Sheets-Sheet 1

Fig. 1.

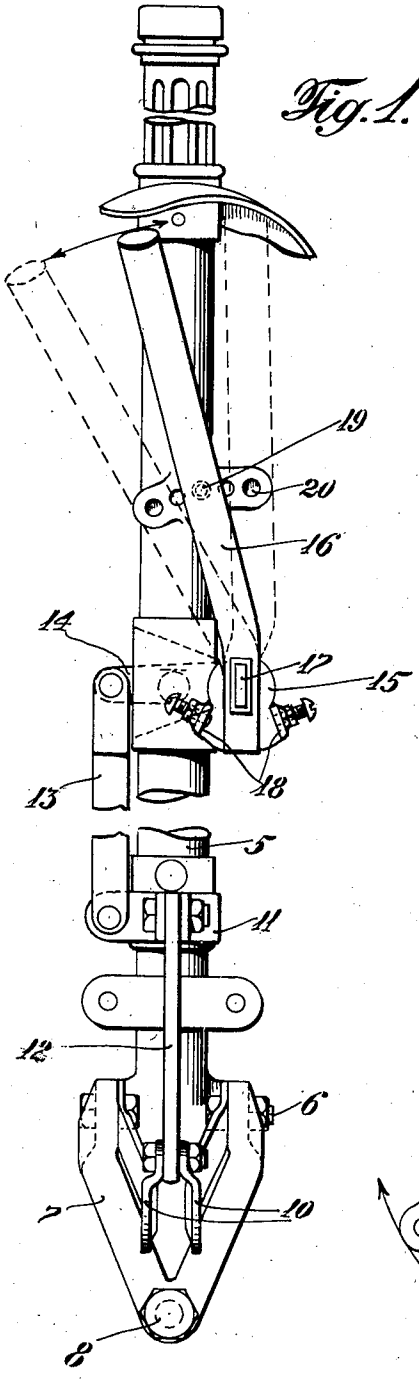
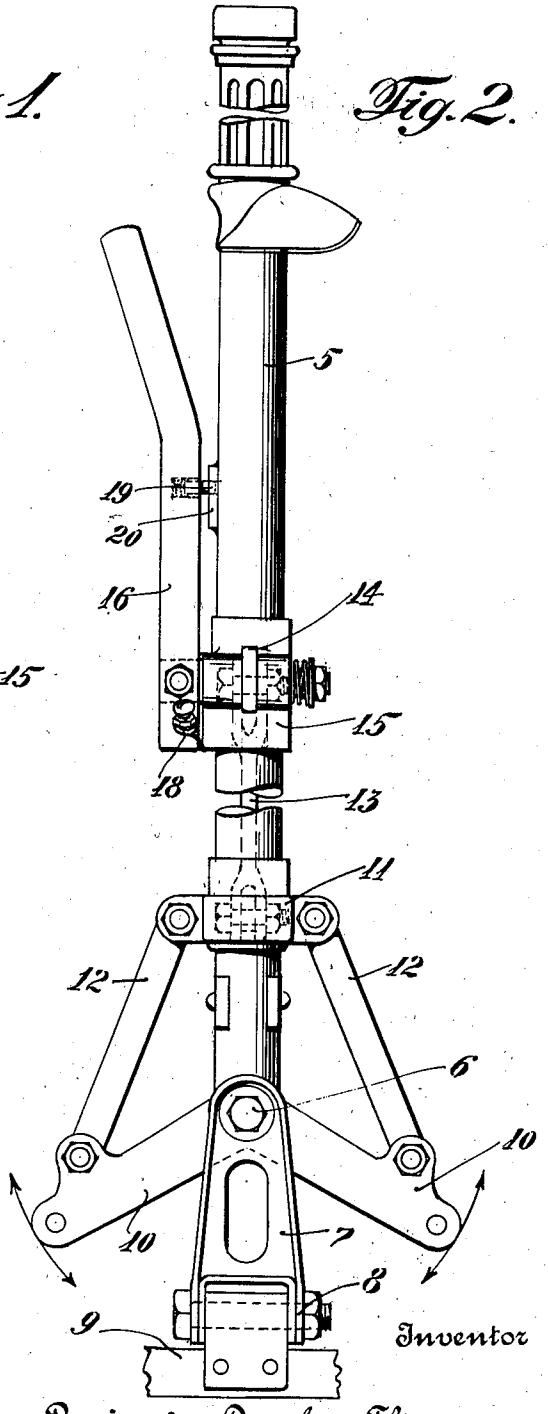


Fig. 2.



Inventor

Benjamin Douglas Thomas

By Edward A. Wright Attn.

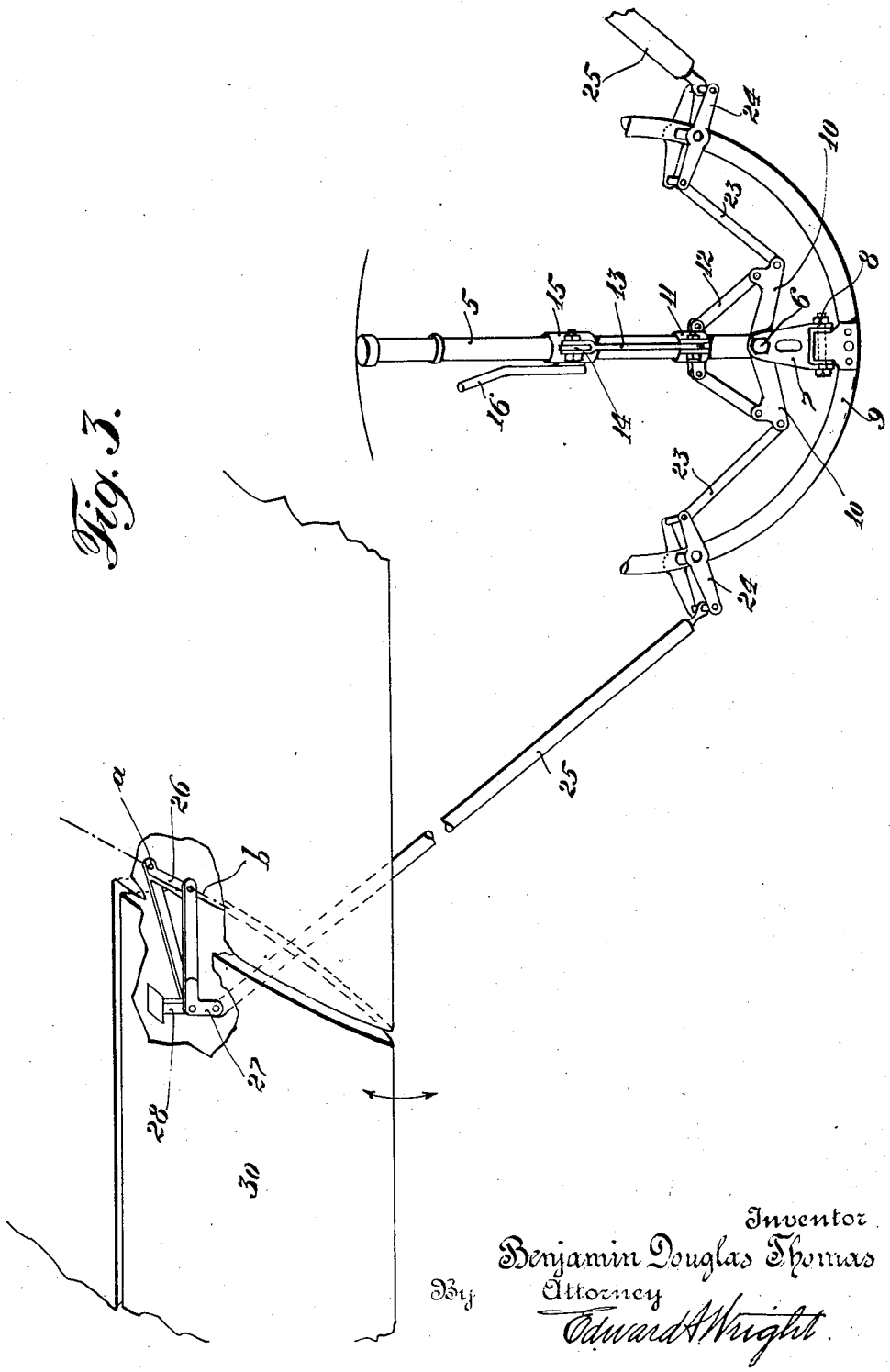
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Fig. 3.



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UNITED STATES PATENT OFFICE.

BENJAMIN DOUGLAS THOMAS, OF ITHACA, NEW YORK, ASSIGNOR OF ONE-TENTH TO THOMAS-MORSE AIRCRAFT CORPORATION, OF ITHACA, NEW YORK, A CORPORATION OF NEW YORK.

ADJUSTING DEVICE FOR AILERONS OF AIRPLANES.

Application filed December 19, 1922. Serial No. 607,761.

This invention relates to devices for adjusting the position of the ailerons of airplanes, which adjustment is independent of the usual lateral control.

The object of my invention is to provide for varying the speed of airplanes, and also for balancing the same in a longitudinal direction by adjusting the setting of the ailerons relative to the wing curve. By means of my improvement, the ailerons may be set to any one of a plurality of positions, either above or below the normal or neutral position; as for instance, in order to permit an increased or higher rate of speed, the ailerons may be raised, or for a decreased or slower speed, as when landing, the ailerons may be depressed or lowered below the neutral position. When raised, the centre of lift is further forward than when the ailerons are in neutral position, but when the ailerons are lowered, the centre of lift is further back. Consequently, if the airplane should be somewhat nose heavy, this unbalanced condition can be readily corrected by setting the ailerons to a raised position, while if the heaviness should be at the tail, correction can be made by setting the ailerons to a lowered position.

In the accompanying drawings: Figures 1 and 2 are side and end elevations, respectively, of my improved construction, as applied to the control stick of an airplane; and, Fig. 3, is a diagrammatic view, illustrating the connections for adjusting the positions of the ailerons from the control stick, the operating rod and aileron at one side being broken away.

In the construction shown, the control stick, 5, is pivoted at 6 to the lower section or jaw, 7, which, in turn, is hinged at 8 to the U rib 9, which is a transverse brace member of the fuselage, the pivot 6 being at right angles to the hinge 8. For the operation of the elevators, the stick is oscillated longitudinally upon the hinge, 8, in the usual way. The operation of the ailerons for the usual lateral control is obtained by swinging the stick laterally upon the pivot, 6.

According to my improvement, the device for adjusting the setting of the ailerons is associated with the connections between the control stick and the ailerons in such a manner that the said connections may be adjusted as desired for the purpose above specified. Although various different forms of mechanism may be designed for this purpose, I have shown a preferred construction comprising the arms, 10, pivotally mounted on the pin, 6, and extending at opposite sides, the arms being connected to a sliding sleeve, or yoke, 11, on the control stick, by means of the links, 12. The position of the sliding sleeve, 11, on the control stick and the corresponding elevation of the pivoted arms, 10, may be adjusted by the link, 13, operated by a crank arm, 14, on shaft, 17, mounted in a fitting or bracket, 15, fastened upon the control stick, and having an adjusting lever, 16, which may be held in any one of its several positions by means of the spring actuated stop pin, 19, engaging in the holes or depressions in the plate, 20, mounted on the control stick.

The operating connections from the arms, 10, to the ailerons, 30, include the links, 23, levers, 24, and rods, 25. For attaching the push and pull rod, 25, to the aileron various means may be employed. A preferred construction for this purpose comprises a triangular brace, 26, which is hinged along the axis *a*—*b* to the stationary portion of the wing adjacent to the innerboard side of the aileron and has its pointed end which extends within the aileron, provided with a downward projection, 27, pivoted to the upper end of the rod, 25. A short link, 28, connects the end of the hinged brace with the upper surface of the aileron.

When the hand lever, 16, occupies its central or neutral position, as shown in full lines, with the control stick vertical, the connections are such as to hold the ailerons in the neutral position in which they are continuous with the trailing edge of the wing. The hand lever, 16, may then be adjusted in one direction from the neutral position for setting the ailerons at both sides simultaneously upward to a position above neutral, or may be turned in the opposite direction, for lowering both ailerons below the neutral position, as may be required by an unbalanced condition of the airplane, or by the conditions of flight. When the parts are in the neutral position, the lateral control of the airplane is obtained by swinging the control stick laterally, and thereby raising one aileron and depressing the other in the usual way. This lateral control may also be

effected in the same way when the setting of the ailerons has been adjusted by moving the lever, 16, to any one of its other positions. The extreme positions for the hand lever, 16, are indicated in dotted lines in Fig. 1, and, if desired, adjustable stops, 18, may be provided for limiting the movement of the lever. Any desired number of positions may be provided for the adjusting lever, two at each side of the neutral position being shown in Fig. 1 of the drawings. The action of adjusting the setting of the ailerons is independent of the lateral control, and may be made at any time without interfering with the usual method of controlling the airplane.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In an airplane, the combination of a control stick, oppositely extending arms having connections for operating the ailerons, links connected to said arms, a sliding sleeve mounted on the control stick and attached to said links, and means for adjusting the position of said sleeve vertically upon said stick.

2. In an airplane, the combination of a control stick pivoted for lateral movement, oppositely extending arms also mounted on said pivot, a sleeve slidingly supported on said stick, links connecting said arms with said sleeve, and means for adjusting the position of the sleeve upon the stick.

3. In an airplane, the combination of a control stick pivoted for lateral movement, oppositely extending arms also mounted on said pivot, a sleeve slidingly supported on said stick, links connecting said arms with said sleeve, and a lever fulcrumed upon the control stick for adjusting said sleeve.

4. In an airplane, the combination of a control stick pivoted for lateral movement, oppositely extending arms also mounted on said pivot, a sleeve slidingly supported on said stick, links connecting said arms with said sleeve, a fitting fastened on said stick, a lever fulcrumed on said fitting, and a connection operated by the lever for raising and lowering the sleeve.

5. In an airplane, the combination with the wing and aileron, of a brace hinged upon a stationary portion of the wing at the innerboard side of the aileron and extending within the same, a connection to the aileron at the outer end of the brace, and an operating rod also connected to said hinged brace.

6. In an airplane, the combination with a wing and aileron, of a triangular brace hinged upon a stationary portion of the wing at the innerboard side of the aileron and extending within the same, a link connecting the pointed end of the brace with the upper portion of the aileron, and an operating rod also connected to the end of said triangular brace.

In testimony whereof I have hereunto set my hand.

BENJAMIN DOUGLAS THOMAS.