R. C. BRANDT.

CONTROLLING DEVICE FOR AEROPLANES.

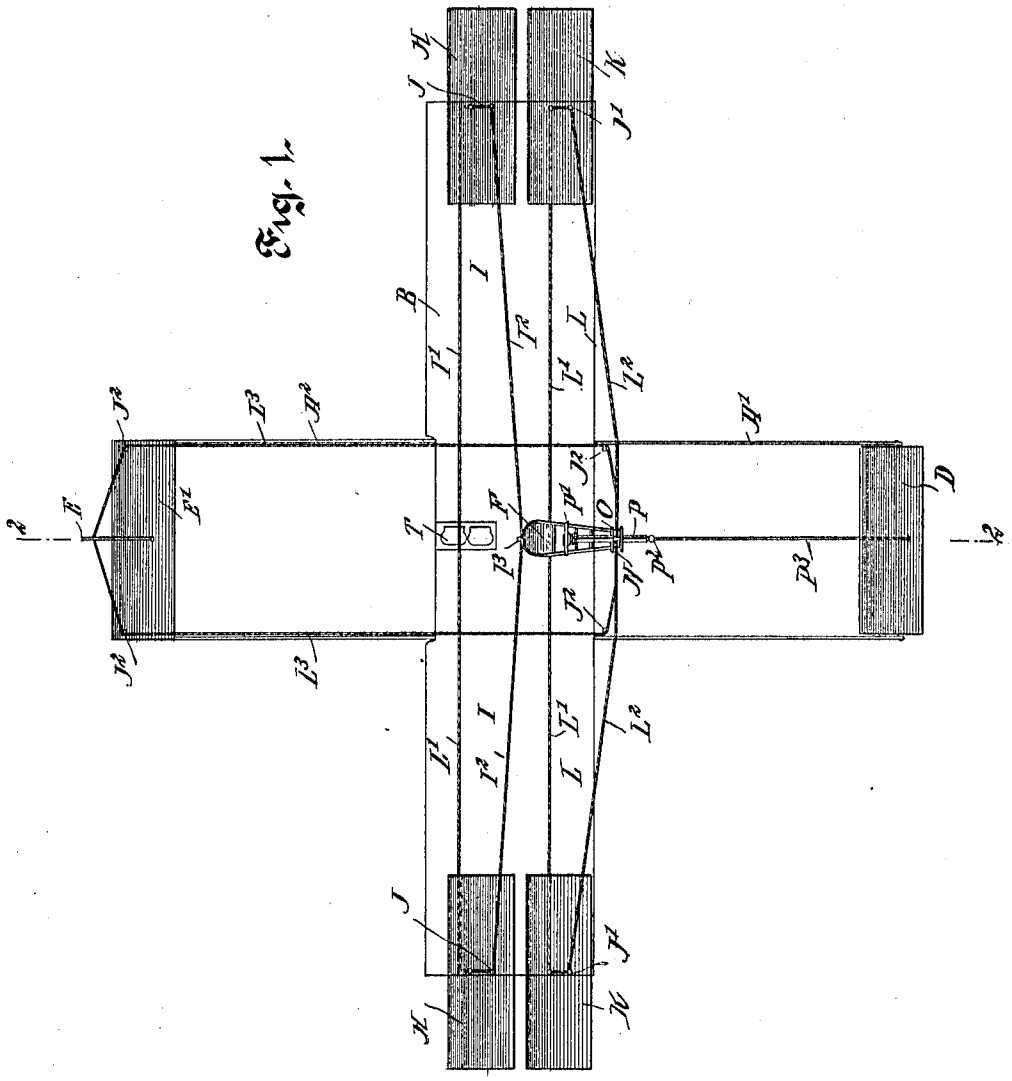
APPLICATION FILED FEB. 3, 1911.

1,020,342.

Patented Mar. 12, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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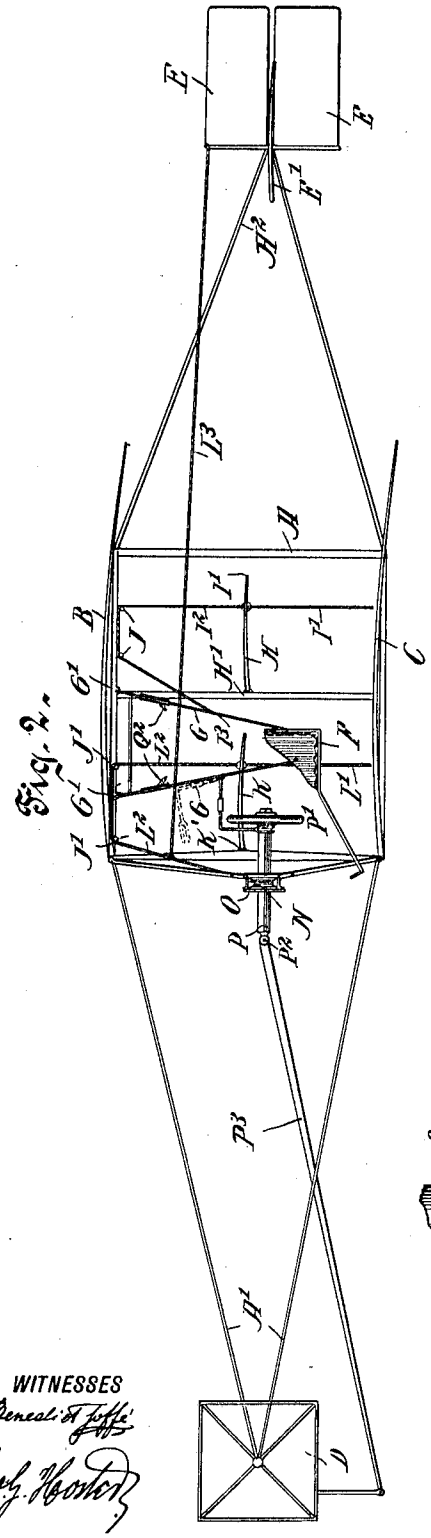

Fig. 2.

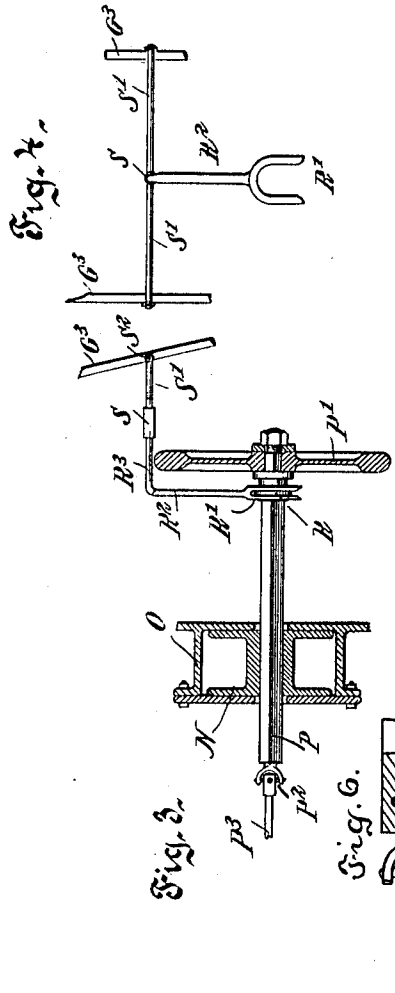

Fig. 4.

Fig. 3.

Fig. 6.

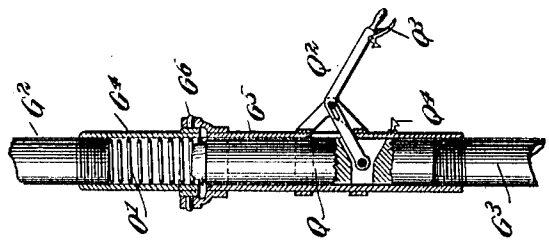

Fig. 5.

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CONTROLLING DEVICE FOR AEROPLANES.

1,020,342. Specification of Letters Patent. Patented Mar. 12, 1912.

Application filed February 3, 1911. Serial No. 606,295.

To all whom it may concern:

Be it known that I, ROBERT C. BRANDT, a citizen of the United States, and a resident of Oroville, in the county of Butte and State of California, have invented a new and Improved Controlling Device for Aeroplanes, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved controlling device for monoplanes, biplanes and other forms of aeroplanes, and arranged to insure stability of the aeroplane and to permit proper steering without danger of upsetting while passing around sharp curves.

For the purpose mentioned, the aviator's seat is pivotally supported from the framework carrying the supporting plane or planes, and ailerons or stability planes are mounted to swing on the sides of the aeroplane and are connected with the said seat to impart a swinging motion to the said ailerons on the tilting of the supporting plane or planes. Use is also made of a rudder under the control of the aviator and connected with another or a second set of ailerons or stability planes mounted to swing on the sides of the supporting planes, so that on turning the rudder the second set of stability planes is moved into an angular position relative to the supporting planes.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a plan view of the controlling device as applied to a biplane, shown in outline; Fig. 2 is a longitudinal central section of the same on the line 2—2 of Fig. 1; Fig. 3 is an enlarged longitudinal central section of the steering mechanism and part of the controlling device; Fig. 4 is a plan view of the shifting fork for connection with the steering shaft; Fig. 5 is an enlarged sectional side elevation of the locking device for rigidly connecting the sections of the said steering rods with each other and Fig. 6 is a detail view showing the connection between the forward end of the drum shaft and the universal joint.

The framework A, as illustrated in Fig. 2, carries a top-supporting plane B and a bottom supporting plane C, but it is distinctly understood that the controlling device may be used on other forms of aeroplanes besides the biplane on which the controlling device is shown in the present instance. The framework A is provided with a forward extension A′, on which is pivoted the elevating plane D of the usual construction, and the framework A is provided with a rearward extension A^2 in which is mounted to swing the rudder E, and, if desired, a tail E′. The seat F for the aviator is attached to the lower ends of supporting rods G pivotally connected at their upper ends at G′ to the framework A, so that when the supporting planes B and C are tilted sidewise then the seat F remains supported in a vertical position owing to the pivotal connection of the rod G with the framework A. On the sides of the framework A at or near the tips of the supporting planes B and C is arranged a pair of ailerons H pivoted at their forward ends at H′ on the framework (see Fig. 2), so as to swing up and down whenever the supporting planes B and C are tilted sidewise. An endless rope I is connected with the ailerons H in such a manner that the lower run I′ of the said endless rope I connects the ailerons H with each other while the upper run I^2 passes over guideways J and is attached at I^3 to the rear supporting rods G of the seat F, so that when the aeroplane tips sidewise as previously explained then a pull is exerted on the upper run I^2 of the rope I to swing the ailerons H up or down according to the side in which the aeroplane is tilted. By the arrangement described the ailerons H are automatically actuated on the sidewise tilting of the supporting planes B and C. A second set of ailerons K are pivoted at K′ on the framework A similar to the ailerons H and preferably in front of the same, as indicated in Fig. 1, and the said ailerons K are operated by an endless rope L having its lower run L′ connecting the ailerons K with each other, while the upper run L^2 extends over guideways J′ to wind and unwind on a drum N held in a housing O attached to the framework A. The drum N has a polygonal bore engaged by a correspondingly-shaped shaft P extending longitudinally and free to slide in the direction of its axis in the said drum N. The rear end of the shaft P is provided with a hand wheel P′ under the control of the aviator seated on the seat F to permit the avia-

tor to slide the shaft P forward and aft or to turn the said shaft with a view to rotate the drum N to wind up and unwind the run L^2 of the endless rope L with a view to impart an up and down swinging motion to the second set of ailerons K. A rope L^3 is connected with the rudder E and extends forward over guides J^2 held on the framework A, and the forward ends of the rope L^3 are attached to the upper run L^2 of the rope L at a point near the drum N so that when the ailerons K are swung up or down on turning the shaft P and the drum N then a corresponding sidewise swinging motion is given to the rudder E to steer the aeroplane in the desired direction, it being understood that when the rudder E is turned, say to the left, the aeroplane turns to the left and is tilted sidewise, that is, the right-hand side of the aeroplane rises while the other side tilts downward and consequently the aeroplane readily turns without danger of upsetting.

The forward end of the shaft P is connected by a universal joint P^2 with a forwardly extending link P^3 pivotally connected with the operating arm D′ of the elevating plane D, as plainly indicated in Fig. 2. As shown in Fig. 6 the universal joint P^2 is connected at one end with the link P^3, the other end of the joint fitting in a socket in the end of the shaft P, and the parts are held together by a pin engaging a groove in the joint P^2. This connection permits the link P^3 to move longitudinally with the shaft P while allowing the shaft P to turn without turning the universal joint or the link. Thus when the aviator having hold of the hand wheel P′ slides the shaft P forward and backward then the elevating plane D is operated in the usual manner to raise or lower the aeroplane.

An automatic forward and aft sliding movement can be given to the shaft P from the supporting rods G of the seat F, and for this purpose the following arrangement is made:

The rods G are each made in upper and lower sections G^2, G^3 (see Fig. 5), and the sections are provided at their adjacent ends with tubular members G^4, G^5 pivotally connected with each other at G^6, so that the lower section G^3 can swing forward and aft on the upper section G^2. In the tubular member G^5 is mounted to slide a locking bolt Q adapted to engage the tubular member G^4 so as to lock the section G^3 rigidly to the section G^2 to prevent forward and aft swinging movement. A spring Q′ is coiled in the tubular member G^4 and presses against the upper end of the bolt Q, and the latter is pivotally connected with a hand lever Q^2 under the control of the aviator seated on the seat F, so that when the aviator presses the handle end of the lever Q^2 downward the bolt Q is moved upward into engagement with the tubular member G^4, at the same time pressing the spring Q′. A latch Q^3 is arranged on the handle end of the lever Q^2 and is adapted to engage a catch Q^4 held on the tubular member G^5, to lock the lever Q^2 in position at the time the bolt Q engages the tubular member G^4 for the purpose previously mentioned. When the operator releases the latch Q^3 from the catch Q^4 the spring Q^5 forces the bolt Q downward out of engagement with the tubular member G^4 so that the section G^3 is free to swing forward and aft on the section G^2.

On the shaft P is secured a shifting collar R engaged by a shifting fork R′ having its shank R^2 terminating in a horizontally-extending rod R^3 mounted to turn in the sleeve S held on the forward end of a fork S′ pivoted at the terminals of the fork members at S^2 on the sections G^3 of the forward supporting rods G. Now when the aeroplane assumes an inclined position in a longitudinal direction and the bolts Q are in unlocked position as shown in Fig. 5, then the seat F in maintaining its vertical position causes the shifting fork R′ to act on the collar R and thus shift the shaft P in a longitudinal direction whereby the elevating plane D is correspondingly turned. When the bolts Q are in locked position the aviator can swing the shifting fork R′, sleeve S and fork S′ upward into dormant position, as indicated in dotted lines in Fig. 2, thus disengaging the fork R′ from the collar R.

It is understood that the shifting fork R′ is free to swing sidewise on the sidewise tilting of the aeroplane on account of having the member R^3 of the shifting fork R′ turning in the sleeve S.

From the foregoing it will be seen that the desired stability of the aeroplane is maintained when tilted sidewise or in a longitudinal direction, and the rudder E and the ailerons K operate in unison whenever the hand wheel P′ is turned for steering the aeroplane to one side or the other.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An aeroplane provided with a supporting plane, a framework for the same, an elevating plane mounted on the framework, a rudder mounted to swing on the said framework, a shaft, a drum mounted to turn with the shaft, and in which the shaft is free to slide longitudinally, a link connected with the elevating plane, a universal joint connection between the shaft and the link, to permit the shaft to turn relative to the link, ailerons mounted to swing on the sides of the supporting planes, and means for actuating the rudder and the said ailerons from the said drum.

2. An aeroplane, comprising a framework, a supporting plane fixed on the said framework, a seat pivotally supported from the said framework, an elevating plane mounted on the front of the framework, a rudder on the rear of the framework, two pairs of ailerons mounted to swing on the sides of the framework, a connection between one pair of ailerons and the said seat, an operating device for the said elevating plane and the said rudder, and a connection between the second pair of ailerons and the said operating means.

3. An aeroplane, comprising a framework, a supporting plane fixed on the said framework, a seat pivotally supported from the said framework, an elevating plane mounted on the front of the framework, a rudder on the rear of the framework, two pairs of ailerons mounted to swing on the sides of the framework, a connection between one pair of ailerons and the said seat, a shaft mounted to turn and to slide longitudinally, a connection between the said shaft and the said elevating plane to operate the latter on imparting a sliding motion to the shaft, a drum mounted to turn with the said shaft and in which drum the shaft is free to slide, and a rope winding on the said drum and connected with the said rudder and the second pair of ailerons to actuate the rudder and the said second pair of ailerons simultaneously on turning the said shaft.

4. An aeroplane, comprising a framework, a supporting plane fixed on the said framework, a seat, supporting rods for the said seat and pivoted on the said framework to rock sidewise, the said supporting rods being made in sections having tubular members pivotally connected with each other to allow the seat to rock forward and aft, and a locking bolt mounted to slide in one of said tubular members and adapted to engage the other tubular member to lock the sections rigidly together.

5. An aeroplane, comprising a framework, a supporting plane fixed on the said framework, a seat, supporting rods for the said seat and pivoted on the said framework to rock sidewise, the said supporting rods being made in sections pivotally connected with each other to allow the seat to rock forward and aft, and manually-controlled means for locking the said rod sections together to hold the seat against swinging forward and aft.

6. An aeroplane, comprising a framework, a supporting plane fixed on the said framework, a seat, supporting rods for the said seat and pivoted on the said framework to rock sidewise, the said supporting rods being made in sections pivotally connected with each other to allow the seat to rock forward and aft, an elevating plane, a shaft mounted to slide longitudinally and connected with the said elevating plane, and a shifting device engaging the said shaft and connected with the forward and aft swinging sections of the said supporting rods.

7. An aeroplane, comprising a framework, a supporting plane fixed on the said framework, a seat, supporting rods for the said seat and pivoted on the said framework to rock sidewise, the said supporting rods being made in sections pivotally connected with each other to allow the seat to rock forward and aft, an elevating plane, a shaft mounted to slide longitudinally and connected with the said elevating plane, a collar on the said shaft, a shifting fork engaging the said collar, a sleeve in which the said fork is mounted to turn, and an arm carrying the said sleeve and pivoted on the forward and aft swinging sections of the said supporting rod.

8. An aeroplane, comprising a framework, a supporting plane fixed on the said framework, a seat, supporting rods for the said seat and pivoted on the said framework to rock sidewise, the said supporting rods being made in sections pivotally connected with each other to allow the seat to rock forward and aft, a bolt mounted to slide on one of the said rod sections and adapted to engage the other rod section to lock the sections against swinging one on the other, a lever for actuating the said bolt, a spring pressing the said bolt, and a catch for locking the said lever in position when the bolt is in active position and compresses the said spring.

9. An aeroplane provided with a supporting plane, a framework for the same, a rudder mounted to swing on the said framework, ailerons mounted to swing on the sides of the supporting plane, an endless rope having its lower run connecting the ailerons with each other, an elevating plane, a link connected at one end with the elevating plane, a shaft, a drum on which the upper run of the rope winds and unwinds, the said drum being mounted to turn with the shaft and in which the shaft is free to slide longitudinally, a connection between the shaft and the other end of said link to move the link longitudinally with the shaft, the said connection permitting the shaft to turn relative to the link, guides over which the said upper run of the rope extends, and a rope connected with the rudder and extending over guides on the framework, the forward ends of said rope being attached to the upper run of the first mentioned rope at a point adjacent to said drum.

10. An aeroplane, provided with a supporting plane, an elevating plane having an operating arm, a rudder mounted to

swing, a shaft, a drum mounted to turn with the shaft and in which the shaft is free to slide longitudinally, a link pivotally connected at one end with the arm on the elevating plane to operate the elevating plane on imparting a sliding motion to the shaft, a universal joint connection between the shaft and the other end of said link, ailerons mounted to swing on the supporting plane, and a connection between the drum and the said rudder and ailerons to actuate the rudder and ailerons on turning the shaft.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT CHRISTOPHER BRANDT.

Witnesses:
MAUD DARRAH,
CARLETON GRAY.