V. DE DOMINICIS AND F. A. REIP.

AEROPLANE CONTROL.

APPLICATION FILED DEC. 20, 1919.

1,348,548. Patented Aug. 3, 1920.

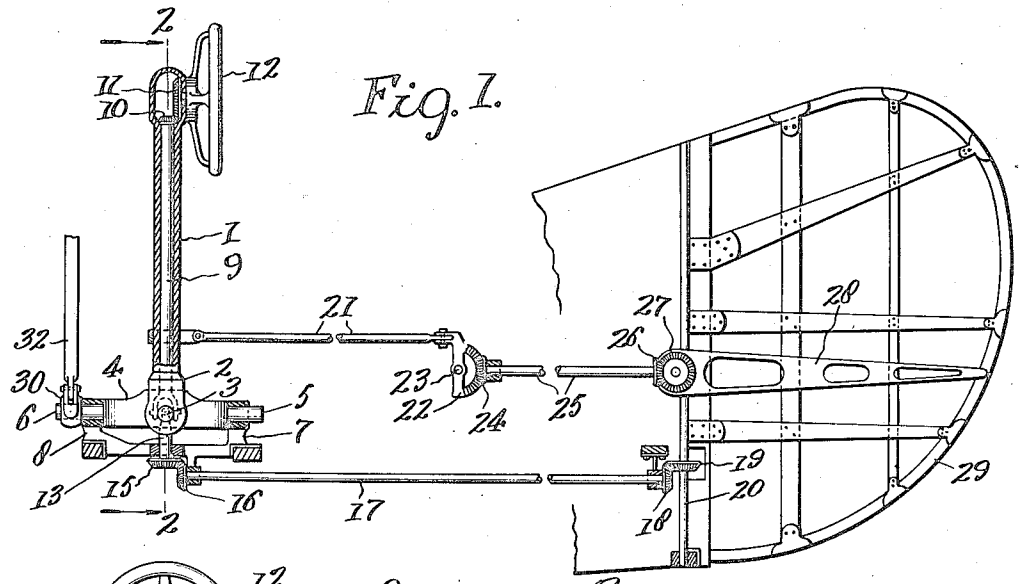


Fig. 1.

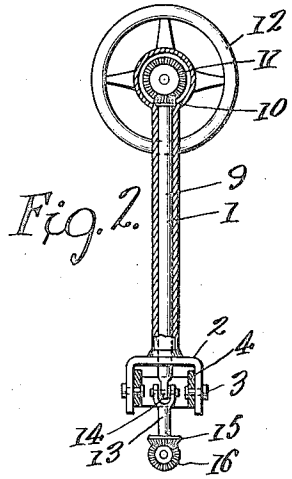


Fig. 2.

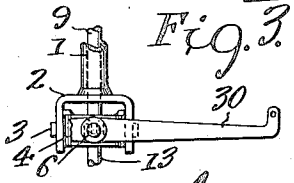


Fig. 3.

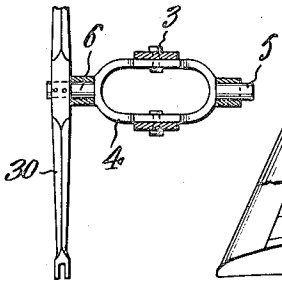


Fig. 4.

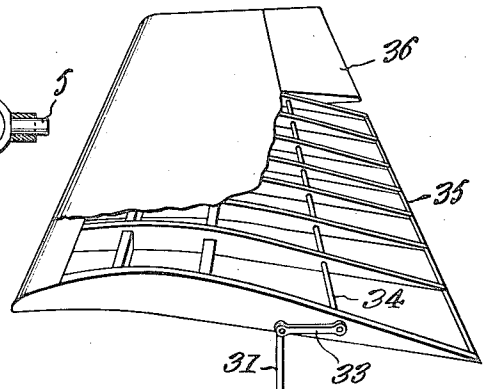


Fig. 5.

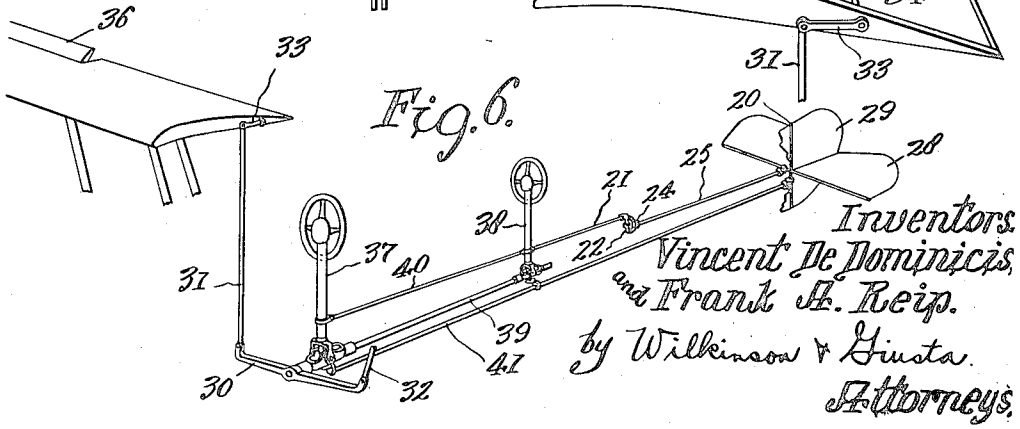


Fig. 6.

Inventors.
Vincent De Dominicis,
and Frank A. Reip.
by Wilkinson & Giusta.
Attorneys.

UNITED STATES PATENT OFFICE.

VINCENT DE DOMINICIS AND FRANK A. REIP, OF EAST ORANGE, NEW JERSEY.

AEROPLANE CONTROL.

1,348,548. Specification of Letters Patent. Patented Aug. 3, 1920.

Application filed December 20, 1919. Serial No. 346,338.

To all whom it may concern:

Be it known that we, VINCENT DE DOMINICIS and FRANK A. REIP, citizens of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Aeroplane Control; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to aeroplane controls, and has for an object to assemble the control of the ailerons, the elevators and the rudder so that the same may be grouped for actuation from a single stick.

The present invention dispenses with the rudder bar and with all wiring and cables employed in other controls, and provides an improved unitary control for the various devices that is easy and simple both in construction and operation.

In the accompanying drawings forming a part of this application, and in which similar reference symbols indicate corresponding parts in the several views:

Figure 1 is a side elevational view with the parts in section and parts broken away showing an improved control constructed in accordance with the present invention.

Fig. 2 is a vertical sectional view taken on the line 2—2 in Fig. 1.

Figs. 3 and 4 show fragmentary views of details.

Fig. 5 is a perspective view with portions broken away showing one of the plans and the aileron connection; and

Fig. 6 is a perspective view with parts broken away showing a tandem control.

Referring more particularly to the drawings, 1 designates a tubular stick having its lower end forked, as indicated at 2 in Fig. 3, the two branches of the fork being pivoted as indicated at 3 in Figs. 3 and 4 to the opposite sides of a yoke 4. The yoke has trunnions 5 and 6 by which it may rock transversely in bearings 7 and 8 supported in any suitable manner on the aeroplane. The stick 1 is also capable of swinging longitudinally of the aeroplane on the pivots 3 without disturbing the position of the yoke 4.

Arranged within the stick 1 is a rotatable shaft 9 having a bevel pinion 10 at its upper end meshing with a bevel gear wheel 11 turned by a rotatable steering wheel 12 mounted in the upper end of the stick 1, the stick being hollowed out at the top portion to form a housing for the gears 10 and 11.

The lower end of the shaft 9 is coupled to a stub shaft 13 by means of a universal joint indicated at 14. The universal joint is in transverse alinement with the pivot pins 3 on which the stick 1 swings longitudinally and also in longitudinal alinement with the trunnions 5 and 6 of the yoke 4 on which the stick 1 swings in transverse direction.

The lower end of the stub shaft is provided with a bevel pinion 15 meshing with a similar pinion 16 on a shaft 17 which runs longitudinally of the aeroplane and carries at its rear end another bevel pinion 18 in mesh with a similar pinion 19. The pinion 19 is fixed on the rudder stem 20 and is adapted to turn the rudder to the right or left in accordance with the motion imparted to the pinion 19 from the hand wheel 12.

In this manner the control of the rudder is had through the shafts 9 and 17 from the hand wheel 12 carried by the stick 1 and such control of the rudder may be had at all times, irrespective of the position of the stick 1, by reason of the use of the universal joint 14 which allows the stick to swing in either longitudinal or transverse directions.

A rod 21 is connected to the stick 1 and extends longitudinally of the aeroplane and in a rearward direction from the stick, the rear end of the rod 21 carrying a bevel segment or half circle 22 rocking about a center 23 and engaging a bevel pinion 24 on a shaft 25 which carries a second bevel pinion 26 in mesh with a like pinion 27 carried by the elevator shaft and adapted to raise and lower the elevators 28 accordingly as the stick 1 is moved in a forward or rear direction. The rudder is indicated at 29.

The front trunnion 6, as indicated in Figs. 1 and 4, is extended beyond its bearing 8 and receives a rocker 30 connected by rods 31 and 32 to the ailerons of opposite planes. In Fig. 5, the rod 31 is shown as connecting to a crank arm 33 which is secured to a shaft 34 journaled in the plane 35, which is partially broken away to show the shaft 34. The aileron is indicated at 36, and is pivotally mounted in the plane 35 in the usual manner, the same rocking on and being fast to the shaft 34 so that a movement communicated to the rocker 30 will be transmitted to the rod 31 and crank arm 33 to the shaft 34

and its aileron 36, the ailerons of the two planes being arranged for alternate operation by the rods 31 and 32. This aileron control is therefore had by swinging the stick 1 transversely in either direction, which causes the yoke 4 to rock on the trunnions 5 and 6, transmitting a like rocking motion to the rocker 30.

In Fig. 6, we have shown the device as useful in connection with tandem controls wherein 37 and 38 indicate two different controlling sticks connected to rock together transversely through a shaft 39 by which motion may be communicated to the rocker 30 when the stick 38 is swung transversely. In like manner a rod 40 connects the two sticks 37 and 38 so that the longitudinal swinging movement of the forward stick 37 may operate to pull or push the rod 21 and cause the operation of the elevators 28.

Furthermore, the shaft 17, which transmits movement to the rudder 29, is continued forwardly by an extension shaft 41 to the forward stick 37 where such shaft is turned by gearing similar to the gearing 15 and 16 heretofore described.

We claim:

1. In aeroplane control, the combination of a hollow stick, means whereby said hollow stick may be supported to swing both longitudinally and transversely, connections between said stick and the ailerons and affected only by the transverse swinging of said stick to cause adjustment of the ailerons, connections between said stick and the aeroplane elevators and adapted to be actuated only when the stick is swung longitudinally for raising and lowering the elevators, a steering shaft journaled in said hollow stick, a steering wheel on the stick for turning said shaft, and connections between said shaft and the aeroplane rudder for steering the aeroplane from said stick, said last named connections including a universal joint for allowing the movement of the stick longitudinally and transversely without disturbing the rudder control, substantially as described.

2. In aeroplane control, a hollow stick, a yoke to which said stick is pivoted for longitudinal swinging, means for mounting said yoke for horizontal swinging together with said stick, connections between the yoke and the ailerons of the aeroplane, connections between said stick and the elevators of the aeroplane, a steering shaft journaled in said hollow stick, a steering wheel carried by the stick for turning said shaft, connections between said steering shaft and the rudder of the aeroplane and including a universal joint mounted within said yoke and in alinement with both the stick and yoke pivots, substantially as described.

3. In aeroplane control, a hollow stick, a yoke, said stick being pivoted on said yoke and adapted to swing longitudinally thereon, trunnions carried by the yoke at substantially right angles to the pivots of the stick and journaled to permit transverse swinging of the yoke and stick together, connections whereby transverse swinging of the yoke and stick may actuate the ailerons of the aeroplane, connections between said stick and the elevators of the aeroplane for moving the same when the stick is swung longitudinally, a steering shaft journaled in the stick, means on the stick for turning said shaft, and connections between said shaft and the rudder of the aeroplane and including a universal joint in alinement with the trunnions of the yoke and the pivots on which the stick swings longitudinally, substantially as described.

4. In aeroplane control, a stick mounted to swing transversely and longitudinally, a rod connected to said stick and adapted to be moved forward and backward by the longitudinal swinging of said stick, a shaft, gear connections between said rod and shaft for turning the latter when said rod is shifted, and gear connections between the shaft and the elevators of the aeroplane for moving the same when the stick is swung longitudinally, a rocker adapted to be moved when said stick is swung transversely, connections between the ends of said rocker and the ailerons of the aeroplane, and steering apparatus carried by said stick and connected to the rudder of the aeroplane whereby the direction of the aeroplane may be controlled from said stick, substantially as described.

VINCENT DE DOMINICIS.
FRANK A. REIP.