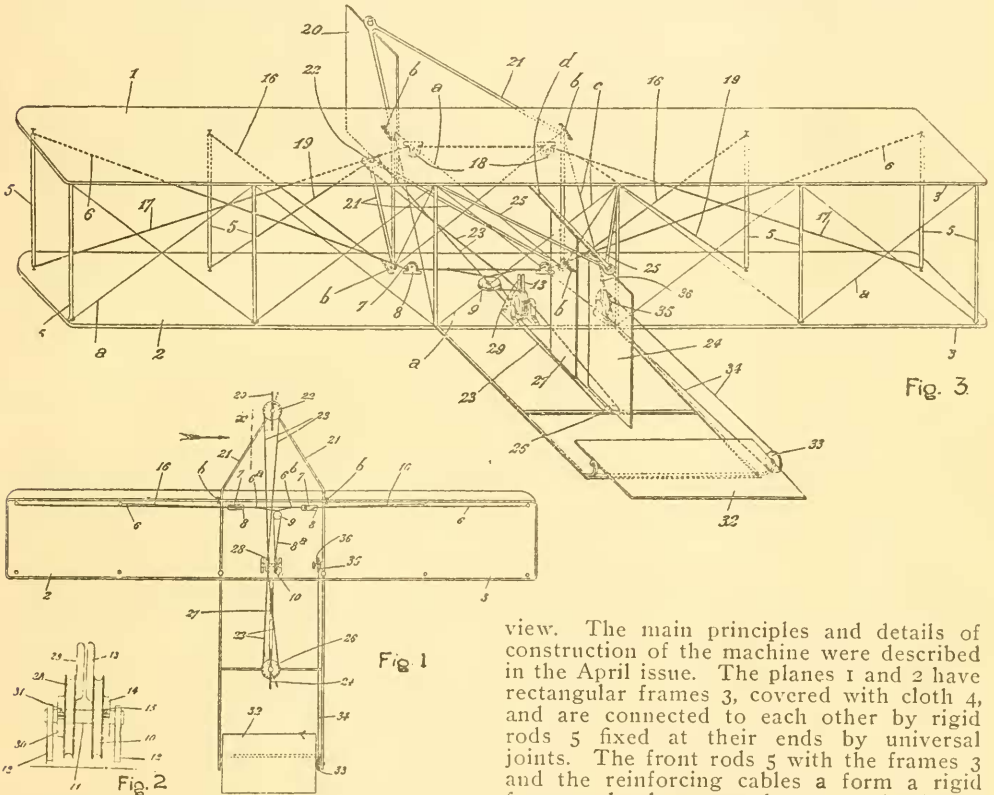


# LATEST WRIGHT PATENT.

The last patent allowed Wilbur and Orville Wright by the British patent office, No. 24076, application of Nov. 10, 1908, is of particular interest on account of the fact that it covers the application of anterior surfaces, or "wing tips" to aeroplanes for lateral stability. If the Canadian Aerodrome Co., in Nova Scotia, use wing tips in their machines as in the "Silver Dart," there may be some legal developments.

direction. To oppose the above rotary movement of the machine about a vertical axis, vertical rudders are arranged at the front and rear of the machine, and a fixed vertical surface at the front, and these rudders are set so as to compensate the injurious couple produced by the deformation of the wing.

Fig. 1 is a horizontal section; Fig. 2 a detail of mechanism; Fig. 3 a perspective



This patent is really precedent to that treated in the April issue of this magazine.

The use of the vertical rudders illustrated herewith is for the purpose of correcting the tendency of the machine to swerve from a direct path when the surfaces are flexed to maintain even keel.

In a flying machine comprising horizontal planes, the lateral balance is regulated by increasing the angle of incidence on the side which tends to descend and by decreasing the angle on the side which tends to rise, while avoiding the consequent rotary movement of the machine about a vertical axis by employing vertical rudders to produce a couple rotating in the opposite

view. The main principles and details of construction of the machine were described in the April issue. The planes 1 and 2 have rectangular frames 3, covered with cloth 4, and are connected to each other by rigid rods 5 fixed at their ends by universal joints. The front rods 5 with the frames 3 and the reinforcing cables a form a rigid framework; the rear rods 5 are only rigidly connected near the centre of the machine by the cables a; stretched cables c, near the centre, complete the rigid connection between the two planes. At the ends of this rear central rigid portion are mounted joints b; the parts of the frames beyond these joints may be "warped" by the cable 6 fixed to the rear corners of the upper plane and passing under guides 7 supported on bearings 8; traction is imparted to the cable by an auxiliary cable 8a, fixed to the cable 6 at 6a and 6b, and carried by a guide 9 on to a drum 10 mounted on a shaft 11 carried by brackets 12. The drum is provided with a handle 13 and can be held stationary on the shaft 11 by a brake consist-

ing of a split collar 14, a milled screw 15 regulating the friction between the collar 14 and the shaft 11. Auxiliary cables 16 are fixed to the cable 6 and the rear edges of the planes to prevent them from bulging. The cable 17 is fixed to the rear corners of the lower plane, passing over guides 18, and provided with auxiliary cables 19. In this manner is formed a rigid, yet deformable, framework.

To overcome the rotary movement of the machine about a vertical axis that would ensue from deforming the wings a vertical rudder 20 is fixed to the rear of the machine, moving on an axis mounted between arms 21; at the lower part of the axis is mounted a pulley 22 round which passes a cable 23 permitting the rudder 20 to be turned so as to obtain a pressure of air on the rudder on the side of the machine the wing of which has the smaller angle of incidence. A second vertical rudder 24 moves on an axis mounted on arms 25 in front of the machine. The crossed cable 23 passes round the pulley 26, thus turning the two rudders in opposite directions. The rudders are worked by the cable 23 passing over a drum 28 mounted on the shaft 11, and provided with a handle 29 situated close to the handle 13 so that both can be grasped with one hand. The drum 28 is provided with a friction brake consisting of a split collar 30 and a milled screw 31.

"It is known that the centre of pressure on aeroplane rudders does not maintain a fixed position for all adjustments. It is impossible, therefore, to hinge the rudder so that it will always be in balance. The pressure will sometimes assist and sometimes oppose the adjustment of the rudder by the operator, especially when passing the dead centre, and make accurate adjustments difficult. We have therefore introduced a friction between the operator and the rudder, so that the operator will be compelled to overcome resistance in making all adjustments. The amount of the friction is therefore preferably regulated to be greater than the disturbing forces produced by the pressure of the rudder, but less than that at the command of the operator for making adjustments." A vertical fixed vane 27 is mounted on a cross-bar d between the arms 25; it acts with the rudders; in case one of these is more powerful than the other, it assists the more feeble one to form a turning couple; in case one of the rudders is disabled it maintains with the remaining one a turning couple in the original direction. The horizontal rudder 32 is arranged in front; its axis carries a pulley 33 on which is wound a cable 34 passing over a drum 35 actuated by a handle 36 and fitted with a friction brake. Finally, instead of the rear portions of the wings being deformed, movements may be imparted to the anterior parts of the wings. In a general way the object of this invention is the balancing of these machines by the combination of horizontal surfaces movable at

variable angles of incidence arranged upon the right and left hand sides of the machine with vertical rudders and vertical fixed surfaces.

Following are the nine claims to the specifications, in full:

"1. In a flying machine, the combination with a single or multiple aeroplane having lateral portions capable of being adjusted while in flight to different angles of incidence on the right and left sides of the machine, of a vertical adjustable front rudder and a vertical adjustable rear rudder.

"2. In a flying machine, the combination with a single or multiple aeroplane having lateral portions capable of being adjusted while in flight to different angles of incidence, of a vertical adjustable rudder and a fixed vertical vane co-operating therewith to form a turning couple.

"3. In a flying machine, the combination with a single or double aeroplane having lateral portions capable of being adjusted while in flight to different angles of incidence, of vertical adjustable front and rear rudders and a fixed vertical vane mounted between the said rudders.

"4. In a flying machine, the combination with a single or multiple aeroplane and means for moving while in flight the right and left portions of the said aeroplane to face forward at different angles of incidence, of vertical rudders mounted in the front and rear of the said aeroplane, and means for simultaneously actuating both said rudders and said aeroplane.

"5. In a flying machine, the combination with superposed aeroplanes having a rigidly connected central portion and a guide or guides carried by said aeroplanes, of a cable secured at its opposite ends to the opposite lateral portions of the upper aeroplane and engaging the guide or guides carried by the lower aeroplane, and a second cable secured at its ends to the opposite lateral portions of the said lower aeroplane and engaging the guide or guides on said upper aeroplane, whereby one of the said cables is actuated to move one of said lateral portions of one of said aeroplanes downward, the opposite lateral portion is moved upward and vice versa.

"6. In a flying machine, the combination with superposed connected aeroplanes, of a cable secured at its opposite ends to the opposite lateral portions of one of said aeroplanes, a guide carried by the other of said aeroplanes and adapted to engage said cable, an auxiliary cable connected at one end to said cable intermediate said guide and the point of connection of said cable with said aeroplane, and at its other end to said first-mentioned aeroplane at a point removed from the point of connection of the main cable to said aeroplane.

"7. In a flying machine, having tips adjustable to the aeroplanes and adjustable rudders, with means for operating the same,

the application of friction-creating or holding devices for the purpose of holding the parts in the positions in which they are set, until moved out of such positions by means of the operating lever or levers substantially as set forth.

"8. In a flying machine, having aeroplanes with adjustable portions operated by a cable, and vertical rudders operated by a further cable or cables, connecting the said cables to drums mounted on a common axis, handles or other means for operating

said drums together or separately as desired, substantially as set forth.

"9. A flying machine having superposed aeroplanes with the tips of same adjustable, said tips connected together by cables, so as to work in unison in opposite directions in combination with front and rear vertical adjustable rudders, or one or both of them and a fixed vertical vane, substantially as described and illustrated in the accompanying drawings."

The U. S. patents are Nos. 821,393 and 908,920.