

AEROPLANE UNDERCARRIAGES.

By G. DE HAVILLAND.

(Concluded from last week.)

Breguet Biplane.—The Breguet undercarriage is a distinct departure from the ordinary type. In this machine the designer has successfully provided a real shock-absorbing device in place of the usual rubbers or springs. The rolling wheels are only 15 in. diameter, with $3\frac{1}{2}$ in. tyres, and therefore well adapted to withstand side strains, at the same time they are comparatively light. No skid is fitted to the rear part of the machine, but the rudder is designed to perform this function should it come in contact with the ground. The weight is normally taken by the two rolling wheels, which are placed under the centre of gravity, and the propeller thrust is sufficient to pull the machine on to the single front wheel, which is steerable, and is coupled up to the hand wheel that operates the rear

uneven ground, but in this case some advantage is gained by the breaking effect given by the heavily loaded skid when pulling up after landing. When starting away, the propeller thrust is sufficient to take most of the weight off the skid, so that the speed is not seriously damped. As regards simplicity and cleanness of design, the Nieuport gear is probably ahead of any other, and from this point of view will no doubt have influence on future designs. The use of the wings themselves as lateral skids may also lead to development in further simplifying the main undercarriage.

The efficiency of its primary function as a landing gear has often been doubted, but from practical results it would seem to be better than usually supposed. I have to thank Lieut. Barrington-Kennett, of the Air Battalion, R.E., for some of the notes on this machine.

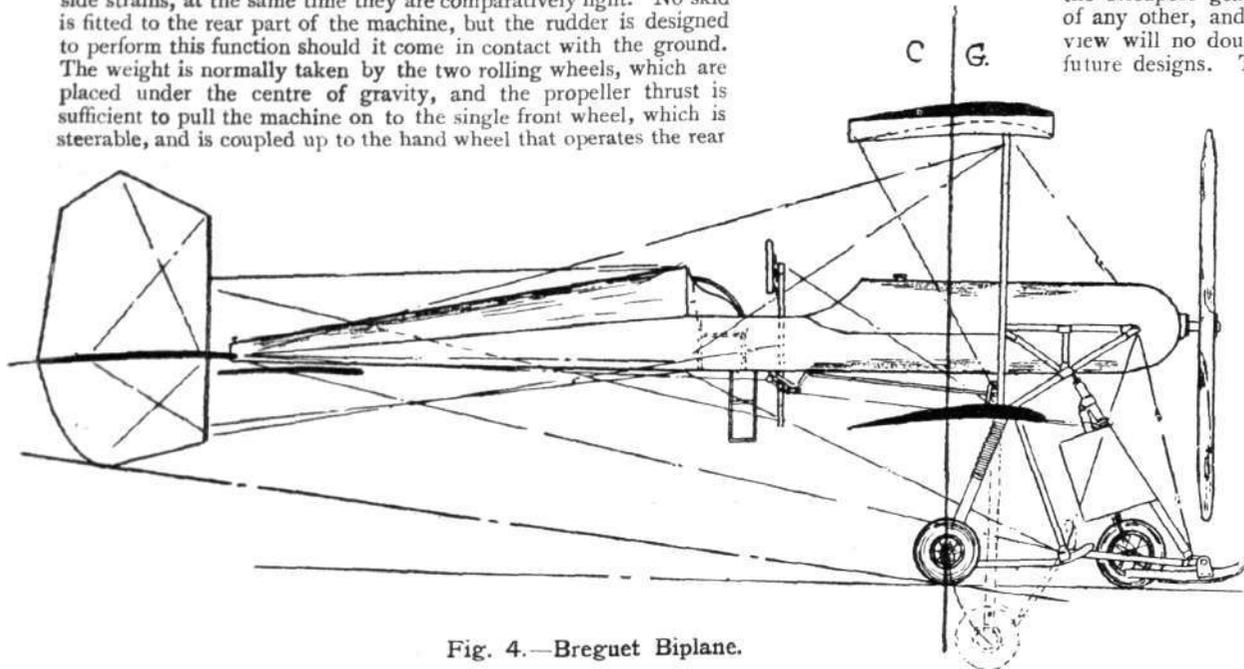


Fig. 4.—Breguet Biplane.

rudder. By this device the machine can easily be manoeuvred on the ground. This undercarriage has a very short wheel base, and, as might be expected, this does not make for easy rolling on uneven ground. Reference will be made to the Breguet shock absorber later on.

Nieuport Monoplane.—As the keynote of this machine is high aerodynamic efficiency, the design of the undercarriage has naturally been governed by the same principle, therefore head resistance has been reduced to a minimum. This is accomplished by the use of oval steel struts rigidly fixed to a centre steel tube skid, while the wheels are mounted at the end of a transverse laminated spring, which is attached to the skid in a position well forward of the centre of gravity. The result is a very rigid construction, while tie wires are almost entirely dispensed with, and the various parts likely to be damaged can easily be replaced. The wheels are fairly small in diameter, and have a comparatively narrow track, and this sometimes causes the machine to cant over laterally until the wing tip comes into contact with the ground. The ends of the wings, however, are constructed to withstand these strains, and therefore, materially assist the duty of the undercarriage, without adding extra head resistance or weight. The after end of the central skid takes the place of the more usual tail skid, but carries a large proportion of the total weight. A short base of support is generally to be discouraged, as it does not make for good fore and aft stability on

Cody Biplane.—The undercarriage of this machine is chiefly constructed of wood, and has a central-skid between the main rolling-wheels; on the front end of this skid are fixed two smaller

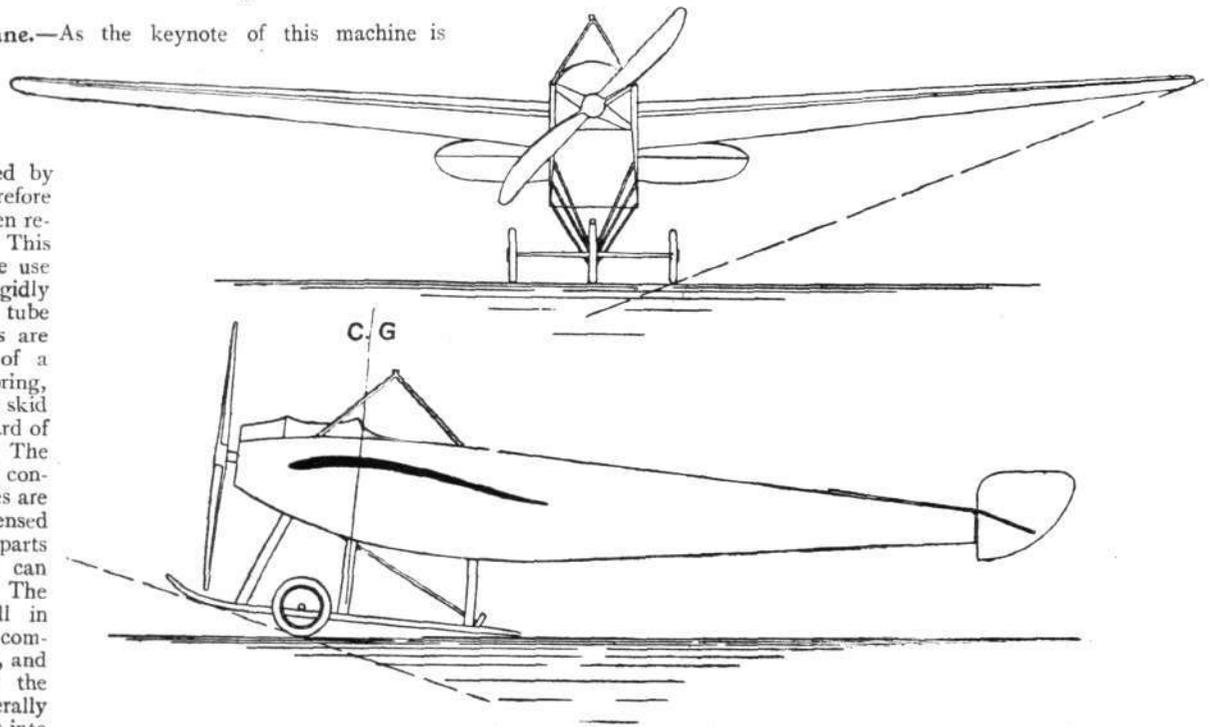


Fig. 5.—Nieuport Monoplane.

wheels. The rear-skid is a comparatively short distance behind the main-wheels, thus giving the machine a short base of support; but, owing to the high centre of thrust, the rear-skid carries little or no weight after the first few yards. The main-wheels have a track of about 3 feet, and support the machine through two spiral springs, which give a maximum travel of about 10 inches. The propeller