

MODERN WHEEL BRAKES

Advantages of the Differential Systems of To-day : Leading Designs Reviewed and Explained

DUE to the comparatively high landing speed of the majority of modern aeroplanes, it is obvious that some means whereby the run on the ground may be reduced at will is of great advantage. Almost equally desirable, especially in single-engined aircraft, is the ability to manoeuvre into any required position without the manual aid of a ground crew. Both these requirements can be met by brakes applied—independently in the latter case—to the wheels of the aeroplane.

Other uses of brakes quickly suggest themselves. Chocks are rendered unnecessary for the "running up" of an engine, and, consequently, mechanics are not required to dodge beneath wings and round airscrews.

The extent to which brakes can be safely used in shortening a landing run is surprisingly great; in an emergency, with certain types of machine, the wheels can be locked without too great a risk of nosing-over, provided the tail is down and the surface is a fairly smooth grass one.

As has been demonstrated with certain military aircraft it is possible to open up the engine fully with the brakes on and to shorten the take-off run considerably by suddenly releasing them. It is obvious, too, that brakes may be used to great advantage by deck-landing aircraft. After a machine has touched down on the deck of an aircraft carrier, and rudder control is no longer available, it is possible to keep it on a straight course by judicious use of the brakes.

The Two-shoe Type

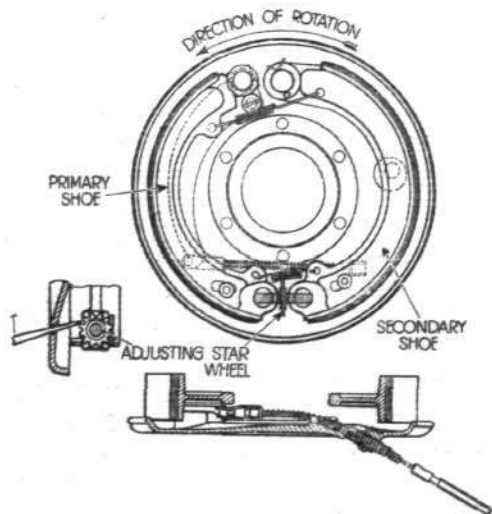
The advantages of brakes have been apparent since the early days of flying, but for many years attainment of efficiency in design eluded even the best brains concentrating on their development. Only in the last few years have systems capable of everyday employment made their appearance. Four well-known arrangements are described in the following pages.

Similar in action to the well-known Bendix motor car brake, the Bendix aircraft brake, known as the "two-shoe servo" type, is so constructed that it utilises the forward rotation of the wheel to assist its application. Basically, the operation is as follows: A rocking lever is provided with a square cam block bearing on the toe of a primary shoe, which it forces against the brake drum. Friction causes this drum to rotate the primary shoe in



the direction of the rotation of the wheel, an articulating link conveying the pressure from the primary shoe to the secondary shoe. The latter pivots on an anchor pin, through which the braking torque is transmitted to the back plate. As the pedal pressure is expended entirely on the primary shoe, the action of the secondary shoe does not increase the pressure required, thus making for ease of control. All the braking torque is transmitted to the landing gear through the back plate, which is bolted to the flange of the axle.

The Bendix brake is operated mechanically by a cable and conduit system. Provided that bends are not too acute, this system can be used throughout between the pedals (or hand lever) and the brakes; but if it is necessary that the cable should pass round an acute bend, a pulley must be employed. Usually, the cables can be arranged so that there is practically a straight run from the brake to the rudder-bar pedals. The flexibility of the conduit



(Left) Details of the Bendix drum, showing the method of adjustment.

(Right) Simplicity is the keynote of the Bendix cable-operated system.

