



The visitor to the works of Rotol Aircrafts Ltd., at Gloucester, is greeted by this striking frontage of offices.

FOR some time prior to 1936 the research departments of the Bristol Aeroplane Co., Ltd., and Rolls-Royce, Ltd., had been conducting experiments in connection with the developments of constant-speed and other types of controlled-pitch airscrews. In many respects the research work of the two companies was running in similar channels, therefore it was not surprising that in June, 1937, a decision was reached whereby the resources and knowledge of the two departments could be pooled. Rotol Aircrafts, Ltd., had come into being, linking both in name and fact the airscrew development departments of the two famous companies from Bristol and Derby.

Within six months a large factory, with an arresting frontage of administrative offices, had been erected in the heart of the Cotswolds alongside the main Cheltenham-Gloucester road and opposite the municipal airport of those two towns.

Serious production of Rotol constant-speed airscrews had started. At the helm, as general manager, was—and is—Mr. R. Stammers, who was for many years a member of Mr. A. H. R. Fedden's staff at Bristol.

To-day production is concentrated on constant-speed airscrews of different sizes. The Rotol airscrew which is being produced at this factory is of the three-bladed type, with the hydraulic actuating mechanism located in the hub, the blades being controlled by a combined pump and governor unit situated on the engine.

The Airscrew Hub

Three short barrels in the hub accommodate the blades, which are carried in stacks of thrust-bearing races that serve the dual purpose of retaining the blades against the action of centrifugal force and at the same time allow them to be rotated in the barrel of the hub for pitch-changing. The hub is mounted on the airscrew shaft by means of a splined sleeve. It is so designed that it is able to counteract the centrifugal force acting on the blades, and at the same time is able to transmit direct to them the engine torque. The forward section of the hub driving centre is of a reduced diameter, and on this neck a stationary piston is fixed. Around the piston is fitted a free cylinder, which is sealed at both ends and is free to slide under oil pressure introduced by the pump unit on one or other side of the piston.

The oil is conducted from the combined pump and governor unit by two pipes which are connected to the airscrew by means of an oil transfer or muff housing at the rear end of the hub driving centre. This housing allows the oil to pass through annular grooves in its bore to ducts in the hub driving centre, which revolves in a floating bush.

THE ROTOL AIRSCREW

A Detailed Description of a Notable Design Now in Large-scale Production : Manufacturing Methods

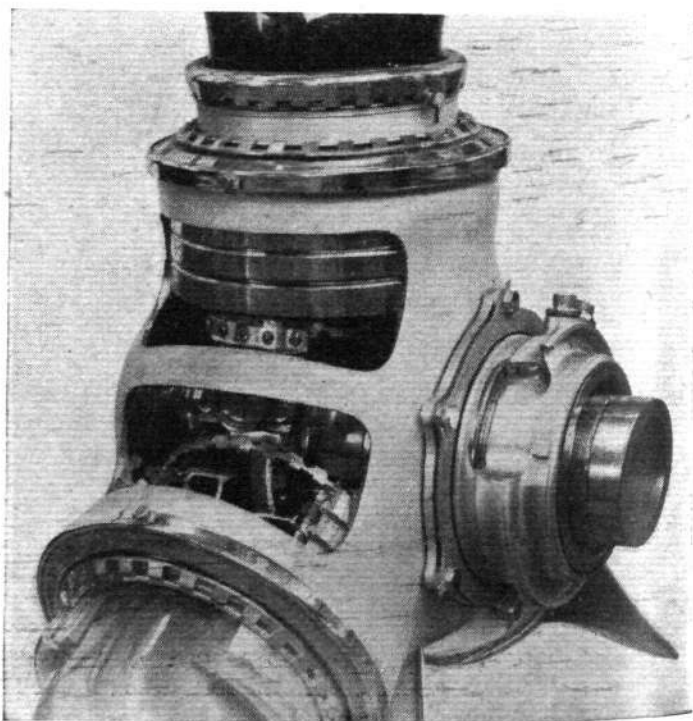
(Illustrated with "Flight" Photographs and Drawings)

The oil then passes along these ducts, which lead into the cylinder either in front of or behind the piston. In this way oil pressure applied through one pipe from the governor unit is transmitted through one set of ducts to a particular side of the piston, the oil on the other side of the piston returning through the other set of ducts back to the governing unit. As the oil pressure is applied to one side or the other of the piston so the cylinder is forced to slide forwards or backwards along the hub driving centre.

Bolted to the outside circumference of the cylinder are three lugs, into each of which is fitted a sliding bush of Tufnol. It is into this bush that the steel pin attached to each blade root housing is fitted. By this method the longitudinal motion of the cylinder is transformed into a partial rotary movement of the blades.

Fretting Prevented

The blades are of forged magnesium alloy, prepared by High Duty Alloys, Ltd., of Slough. These blades are screwed into steel sockets and locked in position by dowel pins. To prevent the magnesium fretting against the steel at the upper end of the socket, a wedge-shaped section ring of Tufnol is fitted into the mouth of the socket and secured by a locking ring and set screw. Incidentally, the removal of this Tufnol ring in service would be a difficult proposition but for the presence of a wedge-sectioned groove round its circumference. The groove coincides with the position of the set screw of the locking ring. After first slacking off the locking ring, the set screw is replaced with a grease gun nipple, and, with the aid of a grease gun, pressure is



A sectioned Rotol airscrew hub was shown at the recent Paris Show to help visitors to understand the intricacies of the operating mechanism.