

THE CONSTRUCTION of the EMPIRE BOATS

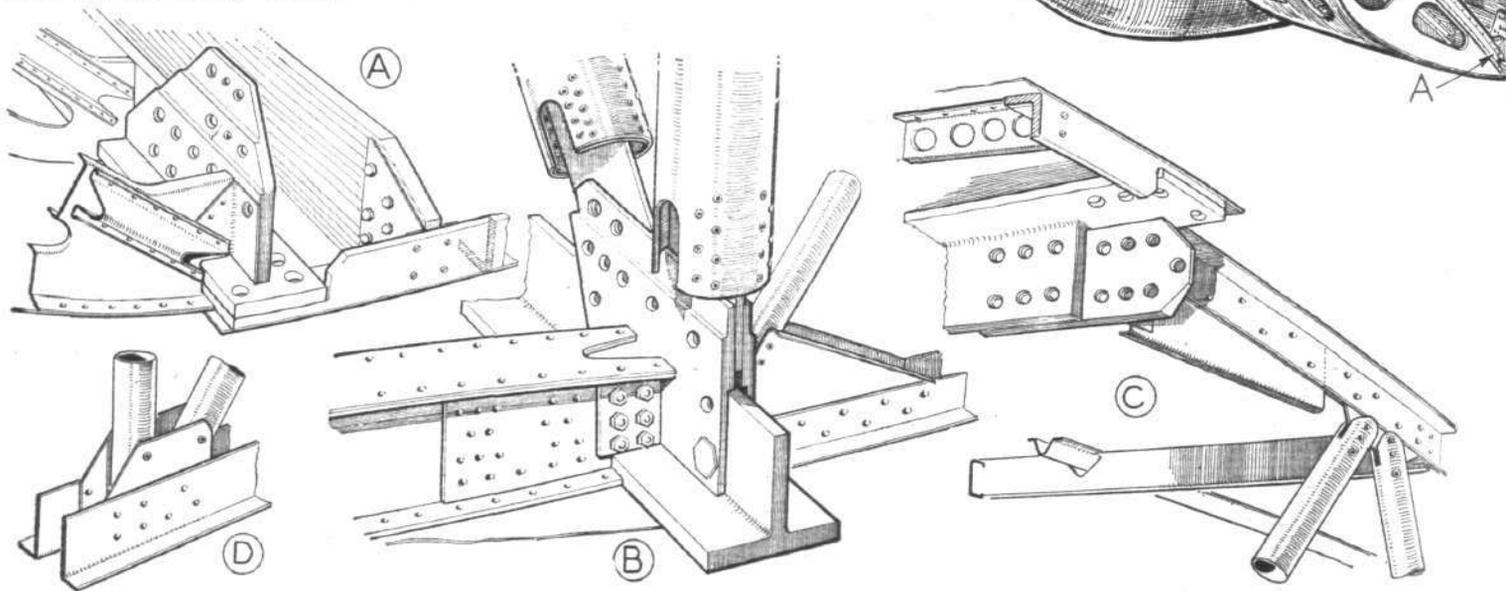
First Detailed Description and Sketches of the Structure : Clever Types of Construction Used in Wings and Hull : Light Metal Employed Throughout, with a Few Stainless Steel Fittings

A CONSIDERABLE amount of information has been published about the passenger accommodation and general layout of the new Empire flying boats which Short Brothers, of Rochester, are building for Imperial Airways, Ltd., and some further important details appear elsewhere in this issue. The boats are intended, in the main, for the England-South Africa and England-Australia routes, although a few will be modified slightly in the matter of fuel tankage in order to give them sufficient range for making the flight across the Atlantic, both *via* Bermuda and *via* Newfoundland. Hitherto the details of the construction have been kept secret, but now that the first two boats, *Canopus* and *Caledonia*, have carried out their test flights and have been found to fulfil all the expectations of the designers, it has become possible to describe the constructional details, which *Flight* is placing before its readers for the first time this week.

Some surprise has been expressed at the fact that a large batch of these machines is not already in service. By the time the reader has perused the sketches which illustrate this article, and has studied the numerous details of the construction, he will realise the magnitude of the task with which Mr. Bibby, Short's works manager, was confronted. Let it be remembered that the original order was for a total of 29 of these large, four-engined flying boats, and that at the time the works were only normally busy, so that a very large expansion was needed. For example, apart from questions of jiggging and tooling, the number of workers had to be nearly trebled, and with every firm in the aircraft industry competing for skilled workers, this was no easy matter. Ultimately the solution was found in getting hold of as many skilled workers as possible, completing the number with unskilled or semi-skilled workers who had to be taught the intricacies of flying boat work before they could become really useful.

The Short Empire flying boat is an all-metal four-engined cantilever monoplane, with the usual two-stepped hull. The lines of the hull differ, however, somewhat from those of earlier Short flying boats, and the wing structure is entirely new as far as flying boats are concerned, although it has been thoroughly tested-out on the small Short Scion landplanes.

Earlier Short flying boats, such as the Calcutta and Kent class, were characterised by a reduction in beam above the chines, the sides being faired into the chines by a planking of double or "S" curvature. That form of construction was comparatively difficult, and a certain amount of "panel beating" was inevitable. In the Empire boat the double curve has disappeared and there is but a slight hollow curve sweeping the sides into the chine. This shape was chosen partly because it is a good deal simpler to construct, but chiefly because the space was wanted inside for cabins. In order to utilise the space to the best advantage, it was also decided to keep the beam of the hull relatively narrow and to arrange the quarters of passengers and crew on two "decks." A result of these various considerations was that the hull of the Short Empire boats has a much smaller beam-height



Details of the construction of the centre-section of the wing. The locations of the different joints are shown in the general sketch. Attachment of the leading edge to the spar is shown at A; a typical joint between the extruded spar flange and the N-girder of the spar at B; the wing spar joint is illustrated in C, and a rib joint at D.