

Rolls-Royce, h.p.	45.00	50.00	56.66	60.00	66.00	70.25	75.00	80.00	85.00	90.00	95.00	100.00	105.00	110.00	115.00	120.00	125.00	130.00	135.00	140.00	145.00	150.00	155.00	160.00	165.00	170.00	175.00	180.00	185.00	190.00	195.00	200.00				
17	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
18	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
19	1,875	h.p.	60.00	10.84	6.00	27.25	12.60	6.00	9.25	17.2	9.5	1.230	2.036	lbs.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.
20	4,600	R.R.	64.00	8.5	9.25	17.2	9.5	1.230	2.036	lbs.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.	2.25	ins.

§ Indicates weight without gun mounting and side-ports.

† Indicates weight without fabric.

* F. or A. indicates fore or aft of main step.

All these boats were weighed and balanced in the writer's presence, the weighing machines being carefully calibrated both before and after use.

It has proved very difficult to obtain accurate weights and C.G.s of other types of flying boats, but considerable variation in weight occurred in the case of the F. type boats built by various firms, nearly all of them being well over the weights given for the original boat of the type built at Felix-stowe.

The table of data gives the dimensions, weights, etc., so far as ascertainable, of most of the boats in use from the commencement of the War, with the exception of the "Donnet-Leveque" and the "Sopwith Bat-Boat," which were the pioneers of flying boats in this country. Unfortunately particulars of these two were unobtainable by the writer in time to be included in this paper.

Estimation of Weights and Proportions

Flexible Type Construction.—In ordinary boat-building it is necessary to carefully calculate the weight of each detail of the construction separately, and with the early examples of flexible construction the weights were estimated in this very laborious manner.

As subsequent experience proved the variation to be very small between estimated and actual weights, it was found possible to estimate the weight of the bare hull with sufficient accuracy for preliminary calculations by means of ascertained weights of the whole structure per square foot of surface for any given thickness of skin. The proportion of stringers, ribs, hoops, and other parts of the frame always bear the same relation to the thickness of skin, regardless of size, unless a proportionate increase or decrease of strength is desired for special purposes.

The simplest method of ascertaining these weights is to take length, breadth, depth, and thickness of skin in 32nds of an inch.

The length (L), in the following table of weights of seaplane floats, is the mean of length over all and that of the planing bottom, while diameter (D) is the mean of breadth and depth, and (C) is a constant (=1.08 for seaplane floats), then:—
Weight = LDSC.

Example.	L.	D.	S.	LDSC.	Actual Wt.
	ft.	ft.	ins.	lbs.	lbs.
No. 1 ..	11.00	1.79	3/32	64	64.75
" 2 ..	13.18	2.28	3/32	97.6	97.00
" 3 ..	17.77	2.80	4/32	214.0	208.00
" 4 ..	18.90	2.88	4/32	235.5	242.00

A similar method to the above can be employed for boats and for other types of construction, provided the same proportionate weight of the various parts of the structure remain the same with regard to the thickness of skin; the constant, C, will have to be ascertained from existing floats or boats of each type. For stepless floats it is only necessary to take the length over-all as L. In estimating the weight of flying boats, the area of the thicker planing bottom should be treated as a separate item, as in the table of data, unless all the boats have exactly the same proportion of this planing bottom to

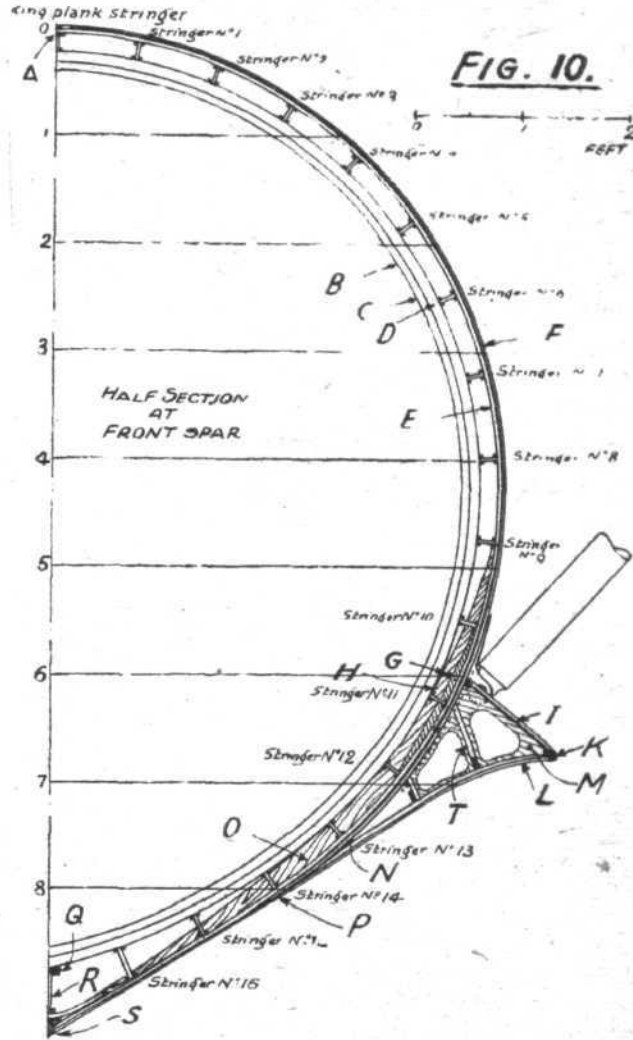


Fig. 10.—Some constructional details of N. 4.—
Timbers: Am. elm, 5/8 in. x 3/8 in. sided, spaced 2 ins. (main hull, planing bottom, and fin top). Stringers: 5/16 in. x 2 1/4 in. spruce (except Nos. 14, 15, 16). All fillets 5/16 in. x 1/8 in. at hoops, 3/8 in. x 3/8 in. at skin (spruce). A, King plank 2 ins. x 3/8 in. spruce, joggled over timbers. B, 2 double hoops, spaced width of spars apart. C, Inner hoop 1 1/4 in. x 3/8 in. D, Outer hoop 1 1/4 in. x 1 in. E, Am. elm strap 5/8 in. thick x 14 ins. wide. F, Planking F. and A. 3/8 in. mahogany, diag. 3/8 in. mahogany. G, Fin top false stringer 1 1/2 in. x 3/8 in. spruce. H, Doubling Eng. elm 3/8 in. thick at No. 11, tapering to 3/8 in. at Nos. 10 and 12 stringers. Length 30 ins. Taper to 6 ins. wide (C.L. of No. 11 stringer) x 3/8 in. thick at F. and A. ends. I, Fin top planking F. and A. 3/8 in. mahogany. Diag. 3/8 in. mahogany. K, Chine 1 1/2 in. x 1 1/2 in. L, Planking F. and A., 3/8 in. mahogany diag. 3/8 in. ditto (carried down to main planking). M, 1/2 in. 3-ply. N, Solid spruce filling, joggled over timbers. O, Spruce filling, from stringers Nos. 9 to 13. Total width 6 1/2 ins. From stringer No. 13 to keel, filling 1 1/2 ins. wide under hoops. P, Diagonal planking on planing bottom finishes here. Q, Top rail 2 1/2 ins. x 3/8 in. spruce. R, Keelson 3/8 in. spruce. S, Keel 3 in. sided x 1 1/2 in. R. elm