DUAL CONTROL SCHOOL FLYING BOAT,

TYPE N.T.2B.

(200 H.P. HISPANO SUIZA ENGINE.)

MANUFACTURERS' ORDER OF ERECTION.

1. Boat placed in Rigging Position.
2. Controls fitted and Fin attached.
3. Petrol Tanks, Cradles, and Tail Plane fitted.
4. Engine Mounting and Rudder fitted.
5. Radiator Installation fitted and Elevators attached.
6. Oil Tank fitted.
7. Centre Section erected.
8. Main Planes attached.
9. Main Planes trued up.
10. Engine Controls fitted.
11. Pipe lines for Oil, Petrol, and Water fitted.
12. Instruments fitted.
13. Tank Hatch Covers fitted.
14. Propeller attached.

DUAL CONTROL SCHOOL FLYING BOAT,
TYPE N.T.2B.
(200 H.P. HISPANO SUIZA ENGINE.)

RIGGING NOTES.

T.5.

DUAL CONTROL SCHOOL FLYING BOAT, TYPE N.T.2B.

(200 H.P. HISPANO SUIZA ENGINE.)

CONSTRUCTION OF BOAT.

The Boat is framed with the following timbers:—

The Fore and Afters are of spruce, $\frac{3}{4}$"×$\frac{5}{8}$" tapering aft to $\frac{5}{8}$"×$\frac{1}{2}$", and are faired in on the Boat. The Keelsons are of spruce and ash, and all Keelsons and Fore and Afters are thro' fastened thro' each timber with 14.G. clenched copper nails.

The Diagonal Struts to Centre Section Lower Plane are of spruce, and are jogged over timbers and thro' fastened thro' skin with clenched copper nails. The vertical Struts are of ash, and are attached in a similar manner.

The Deadwood is of oak, $\frac{3}{4}$" thick; Keel of American elm, $2\frac{1}{4}$"×$\frac{5}{8}$", tapering to $1\frac{1}{4}$"×$\frac{5}{8}$" at Stern; False Keel of American elm; Deck Beams of ash; Gunwales of American elm, 1"×$\frac{5}{8}$"; and the Deck is of $\frac{5}{32}$" three-ply.

The Skid is of ash, the Sternpost of mahogany, and the Chines are of American elm. The King Plank is of American elm, except near the Sternpost, where it is of mahogany. An American elm frame is fitted near the Stern, to take the bolts through the Tail Stays.

All timbers are $\frac{5}{16}$"×$\frac{3}{4}$" American elm spaced approximately 4" average centres, and carried over Keel and Chines in one length.

Two waterproof canvas bulkheads are fitted in the stern of the boat, and one bulkhead of $\frac{5}{32}$" three-ply is provided forward.

PLACING THE MACHINE IN RIGGING POSITION.

Before truing up the Centre Section and attaching the Main Planes it is necessary to place the Machine in Rigging Position.

To do this, block up the Machine in a cradle placed beneath the hull and directly under the Centre Section.

The Machine is in Rigging Position when the Centre Section Lower Plane Spars, which pass through the boat, are level transversely, and the Incidence of the Centre Section Lower Plane Spars is correct. The top faces of the Engine Bearers should then also be horizontal.

Level transversely by spirit level placed on the Centre Section Lower Plane Spars and longitudinally by spirit level placed on the Main Plane Incidence Template. Make any adjustments by packing blocks on the cradle under the hull.

TRUING UP THE CENTRE SECTION.

Before fitting the Upper Centre Section Plane, place it upside down on trestles, and fix and split pin all Centre Section Bracing Wires. Fit the Centre Section Struts into their Sockets on the Centre Section Lower Plane, taking care to place the shorter Struts in front.

To fit the Upper Centre Section Plane, place it in position on the Centre Section Struts, and loosely connect up the Centre Section Bracing Wires.

The Centre Section should be symmetrical about the vertical centre line of the Machine, when viewed from the front, and the Centre Section Struts should be vertical both in front and side elevation.

Adjust transversely by marking points on the Front Centre Section Struts at equal distances, say 30", down from the Upper Sockets of the Struts; and adjusting the Front Cross Bracing Wires until corresponding diagonals are equal. Similarly mark points on Rear Centre Section Struts and adjust the Rear Cross Bracing Wires until corresponding diagonals are equal. Check by trammelling the diagonals from corresponding points on the Upper Sockets to the marked points on the Front and Rear Centre Section Struts. Also check the Struts for being vertical by dropping a plumb line from the top of each Strut, so that it hangs down the front of the Strut. The Strut should be parallel to the plumb line.

Adjust longitudinally by the Side Cross Bracing Wires until the Struts are vertical when viewed from the sides. Check by dropping a plumb line from the top of each Strut so that it hangs down the side of the Strut. The Strut should be parallel to the plumb line.

The Incidence of the Centre Section Upper Plane should now be correct.

ATTACHING THE MAIN PLANES.

The Main Planes are assembled with their Leading Edges on the ground. All the Interplane Struts are fitted, and the Incidence and Outer Flying Wires are loosely connected.

The Planes are now lifted into position, and the ends of the Spars of the Lower Main Planes are inserted in the fish plates on the ends of the Spars of the Centre Section Lower Planes, and each is secured by a removable hinge pin which passes through the knuckles of the fish plates, and is split pinned near the point. The Spars of the Upper Main Planes are similarly inserted in the fish plates on the ends of the Spars of the Centre Section Upper Plane.

Loosely attach the Inner Landing Wires and all the Interplane Bracing Wires.

Dual Control, School Flying Boat, Type N.T.2b.

TRUING UP MAIN PLANES.

Adjust the Front Landing Wires until the distances XX and YY are respectively equal on the Port and Starboard sides. The distance XX is the distance between the mid point of the Leading Edge of the Upper Centre Section Plane and the Bottom Socket of the Front Outer Strut. The distance YY is the distance between a point on the Front Spar at the Root of the Lower Main Planes and the Top Socket of the Front Outer Interplane Strut.

The Leading Edges of both Upper and Lower Main Planes should be symmetrical in plan about the longitudinal centre line of Machine. Check by taking measurements from Bottom Sockets of Front Outer Struts to Rudderpost and Front Drag Wiring Plates. Corresponding measurements should be the same on both sides.

The Dihedral is 1° for both Upper and Lower Main Planes. Adjust by Front Landing Wires and check by straightedge and field clinometer or Abney level placed along the Front Spars.

The Leading Edges of the Upper and Lower Main Planes should be in the same vertical plane, as there is no *Stagger* on the Main Planes. Check by dropping plumb lines from points on the Leading Edges of the Upper Main Planes, one plumb line being in front of each Strut. Adjust by Incidence Wires until all the plumb lines just touch the Leading Edges of the Lower Main Planes.

The Incidence is 5° throughout both Upper and Lower Main Planes. Adjust by Incidence Wires, Rear Landing and Flying Wires, and check by field clinometer or Abney level and straightedge, placing the latter along the chord of a Rib.

There is no "Wash in" or "Wash out."

Stabilizers are fixed above the Outer Interplane Struts on the top surface of the Upper Main Planes. The Overhang of the Upper Main Plane is supported by four Bracing Wires running from the Front and Rear Spars to the Stabilizer, the Stabilizer being braced by four Bracing Wires connected to wiring plates which are bolted through the planes to the top sockets of the Intermediate Interplane Struts.

The Cross Bracing Wires on the top surface of the Upper Main Planes should first be adjusted until the Incidence of the Overhang is correct. Then carefully tension the Flying Wires attached to the Overhang. Great care must be taken not to adjust the wires so tight as to cause initial stress in the Spars of the Overhang or in the Outer Interplane Struts.

Dual Control, School Flying Boat, Type N.T.2b.

TRUING UP THE EMPENNAGE.

The Fin is fixed in position. It should be vertical and point directly fore and aft.

The Tail Plane is braced on the under surface by two streamlined tubular Stays, extending from the Chine to the Leading Edge Tube, and by a similar Stay extending from the Stern Post to the Rear Tube. It is also braced by two Bracing Wires extending from the Chine to the Leading Edge Tube and two Bracing Wires extending from the Chine to the Rear Tube. On the under surface it is braced on each side by a Bracing Wire extending from the apex of the Fin to the Rear Tube.

Bolt the Tail Plane and Struts in position, inserting the bolts, nuts, and split pins, and loosely attach the Bracing Wires.

The Rear Tube of the Tail Plane should be square with the longitudinal centre line of the machine. Check by taking measurements from the Bottom Sockets of the Front Outer Interplane Struts to the lateral extremities of the Rear Tube. Corresponding measurements should be the same on both sides.

The Tail Plane is of the non-lifting type, and is set in a neutral position, *i.e*,. its longitudinal centre line should be parallel to the Engine Bearers, and its Rear Tube should be parallel to the Spars of the Centre Section Lower Plane. With the Machine in Rigging Position, the centre line of the Tail Plane is thus horizontal.

Adjust the Tail Plane transversely by the two pairs of Cross Bracing Wires which pass through the Fin. Check by spirit level and straightedge placed on the Rear Tube. Adjust longitudinally by the Side Cross Bracing Wires, and check by spirit level and straightedge placed from Leading Edge to Rear Tube.

Hinge the Rudder to the Sternpost, and the Elevators to the Tail Plane Rear Tube. The Rudder should be vertical. Check by plumb line.

CONTROLS.

The Machine is fitted with Dual Control, the two Control Columns being placed side by side in the Pilot's Cabriolet.

Adjust the Controls so that when the Control Columns are inclined backwards 5° to the vertical there is no droop on either the Ailerons or Elevators. Also so that when the Rudder Bar is square in the Boat, the Trailing Edge of the Rudder is 2" to port.

DUAL CONTROL SCHOOL FLYING BOAT, TYPE N.T.2B.

(200 H.P. HISPANO SUIZA ENGINE.)

LIST OF PRINCIPAL DIMENSIONS

Span of Upper Main Planes	48′ 4¾″
Span of Lower Main Planes	37′ 6¾″
Chord of Upper Main Planes	5′ 6″
Chord of Lower Main Planes	5′ 6″
Incidence of Upper Main Planes	5°
Incidence of Lower Main Planes	5°
Stagger	Nil.
Dihedral of Upper Main Planes	1°
Dihedral of Lower Main Planes	1°
Overall Length	27′ 4½″
Height	10′ 8″
Incidence of Tail Plane (Centre Line)	Nil.
Droop of Ailerons (with Handwheel Spoke in Vertical Position)	Nil.
Droop of Elevators (with Pilot's Control Stick 5° inclined backwards to Pilot)	Nil.

DUAL CONTROL SCHOOL FLYING BOAT, TYPE N.T.2B.

(200 H.P. HISPANO SUIZA ENGINE.)

POINTS TO OBSERVE WHEN OVERHAULING MACHINE.

See that the Main Planes are symmetrical about the centre line of Machine.

Check the Dihedral.

Check the Stagger.

Check the Incidence.

See that the Interplane Struts are straight, undamaged and streamlined in the direction of flight.

Examine all Bracing Wires for length and tautness, and see that all split pins are in position.

Examine all Controls, Pulleys and Cables, and see that they work freely, and that all Turnbuckles on Cables are locked.

Examine the Tail Plane and see that it is set correctly and is square with Machine, and that all Tail Plane Bracing Wires are correct as to length and tautness, and that all split pins are in position.

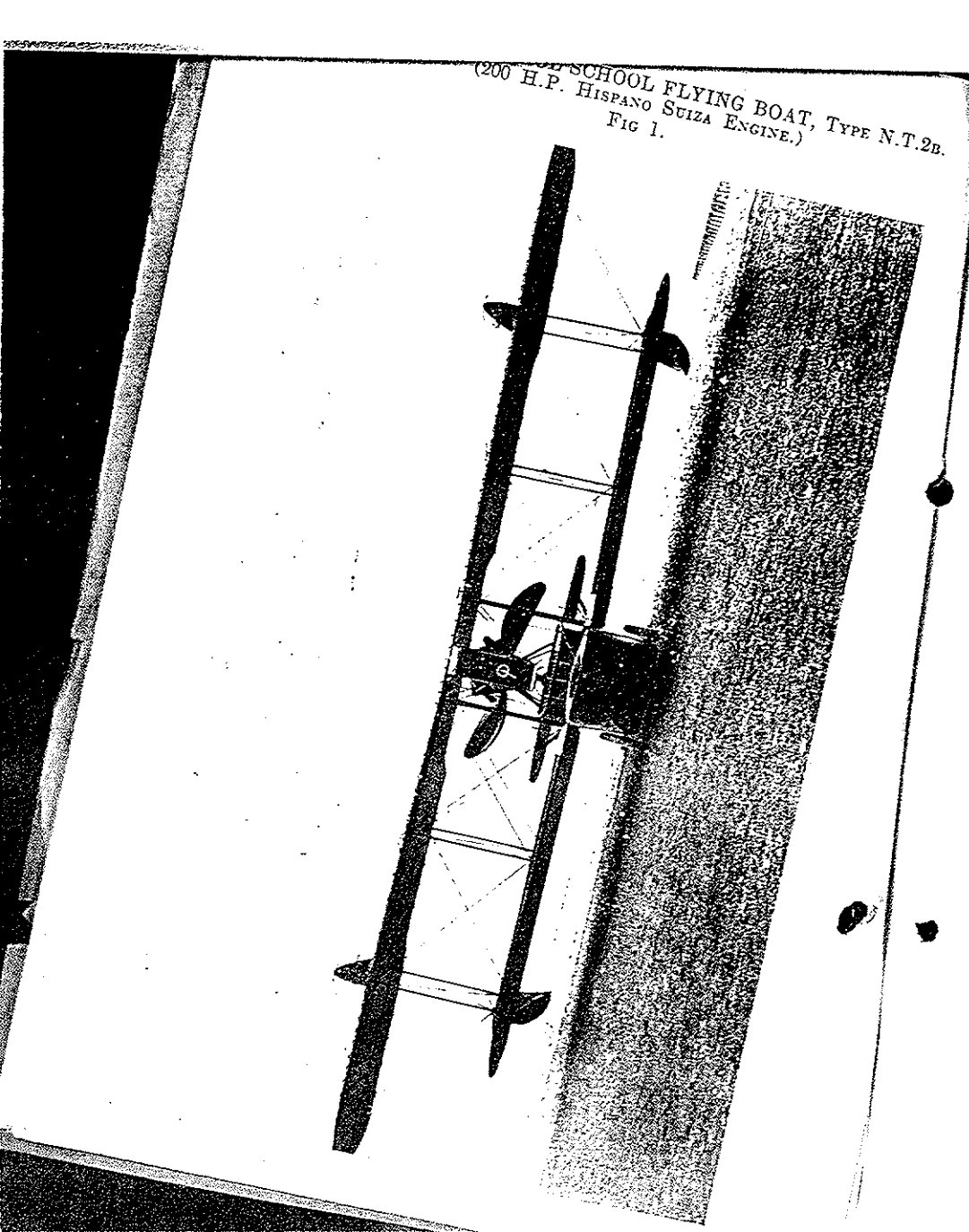
Examine Rudder and see that its Trailing Edge is 2″ to port when the Rudder Bar is square in the Boat.

Examine Tank Mountings and Connections.

Examine Engine Mountings, Engine Controls and Engine Accessories.

NOTE.—After a machine has been erected or overhauled and found to be trued up correctly, it is advisable to measure the Pin Centre Lengths of all Landing Wires. These Lengths can then be used in any subsequent erection, and the Machine quickly trued up to the required conditions.

SCHOOL FLYING BOAT, TYPE N.T.2B.
(200 H.P. HISPANO SUIZA ENGINE.)
FIG 1.



T.5. DUAL CONTROL SCHOOL FLYING BOAT. TYPE N.T.2B.
(200 H.P. HISPANO SUIZA ENGINE.)
FIG. 2.

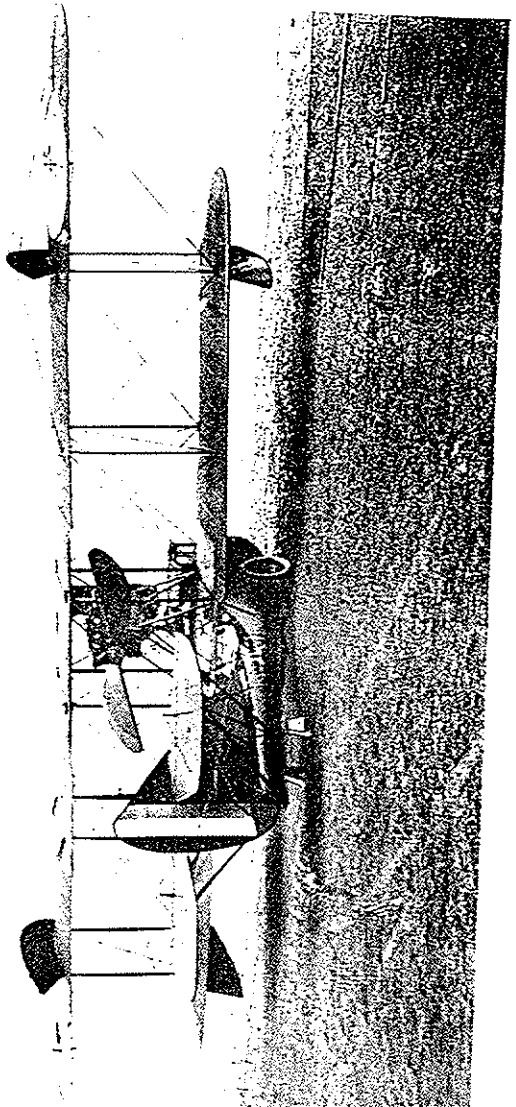
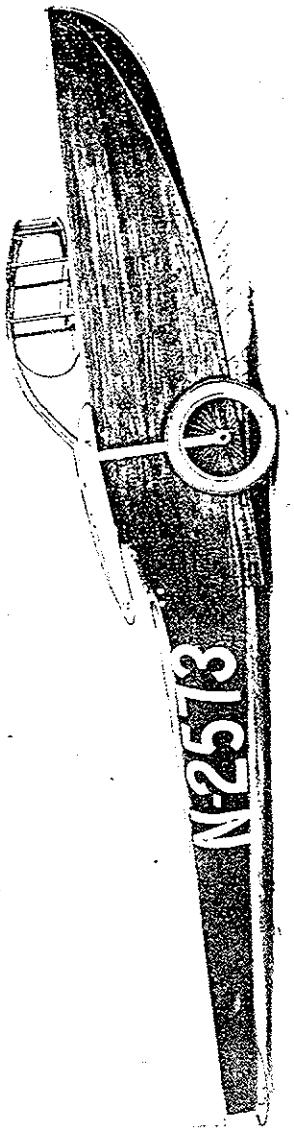


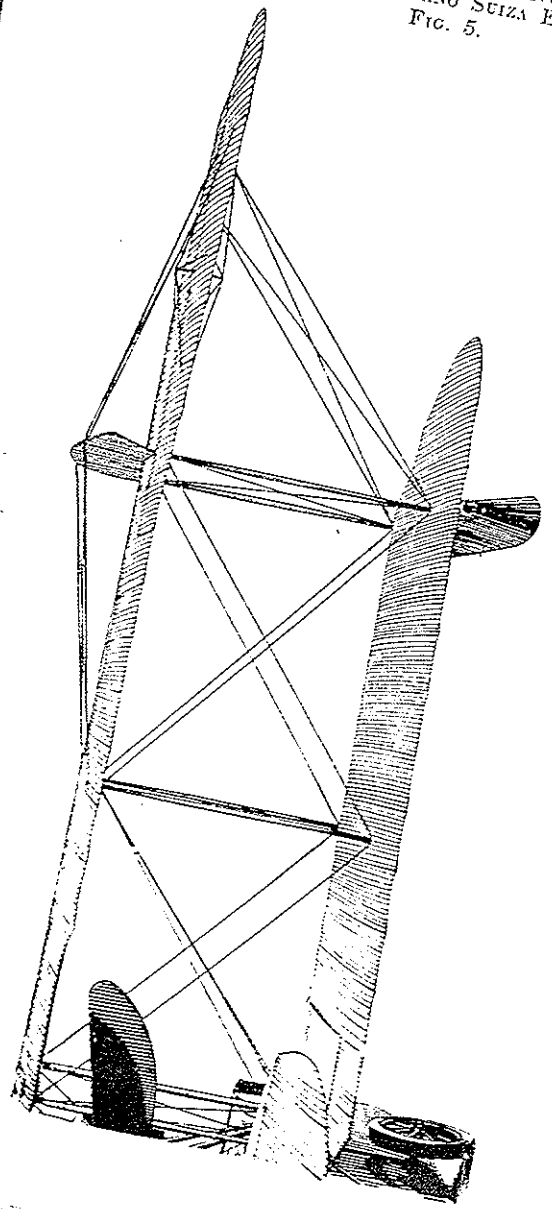
FIG. 3. ENGINE.) TYPE N.T.2B.

T.5. DUAL CONTROL SCHOOL FLYING BOAT, TYPE N.T.2B.
(200 H.P. HISPANO SUIZA ENGINE.)
FIG. 4.



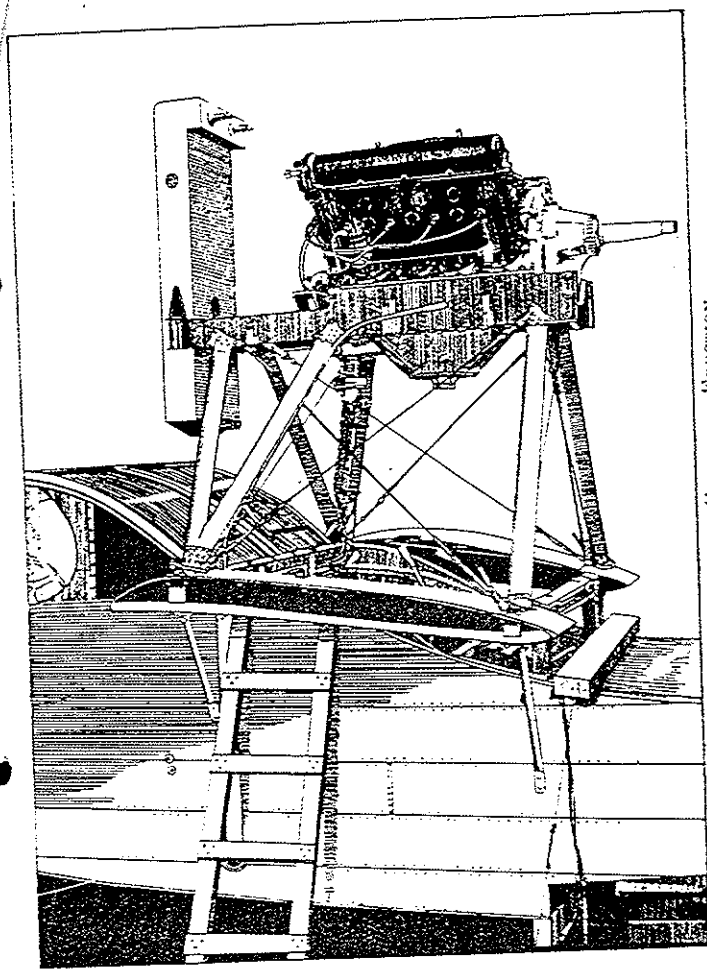
HULL COMPLETED.

CONTROL SCHOOL FLYING BOAT, TYPE N.T.2B.
(200 H.P. HISPANO SUIZA ENGINE.)
FIG. 5.



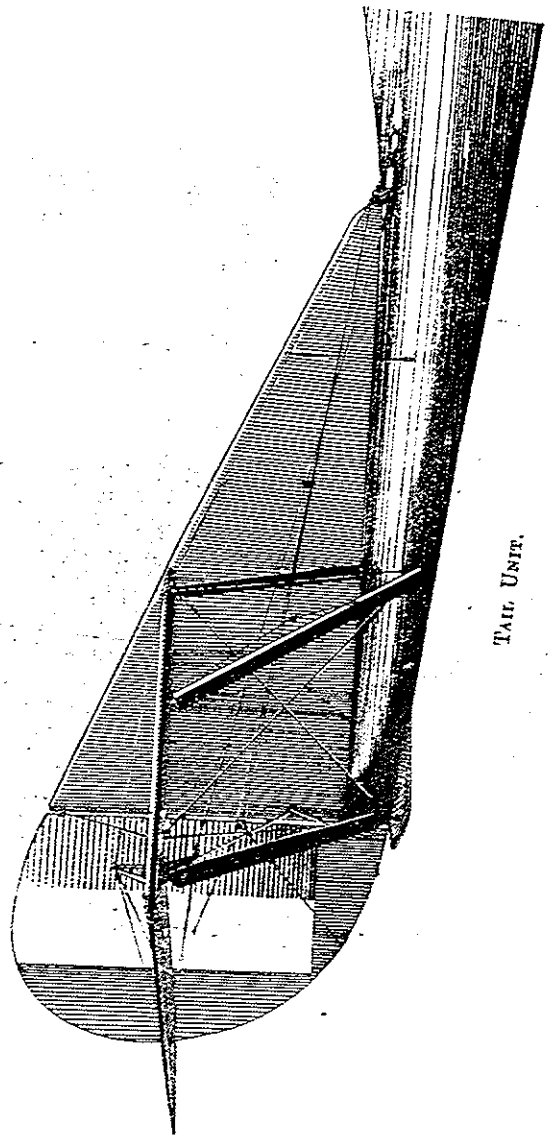
STARBOARD MAIN PLANES.

.5. DUAL CONTROL SCHOOL FLYING BOAT. TYPE N.T.2B.
(200 H.P. HISPANO SUIZA ENGINE.)
FIG. 7.



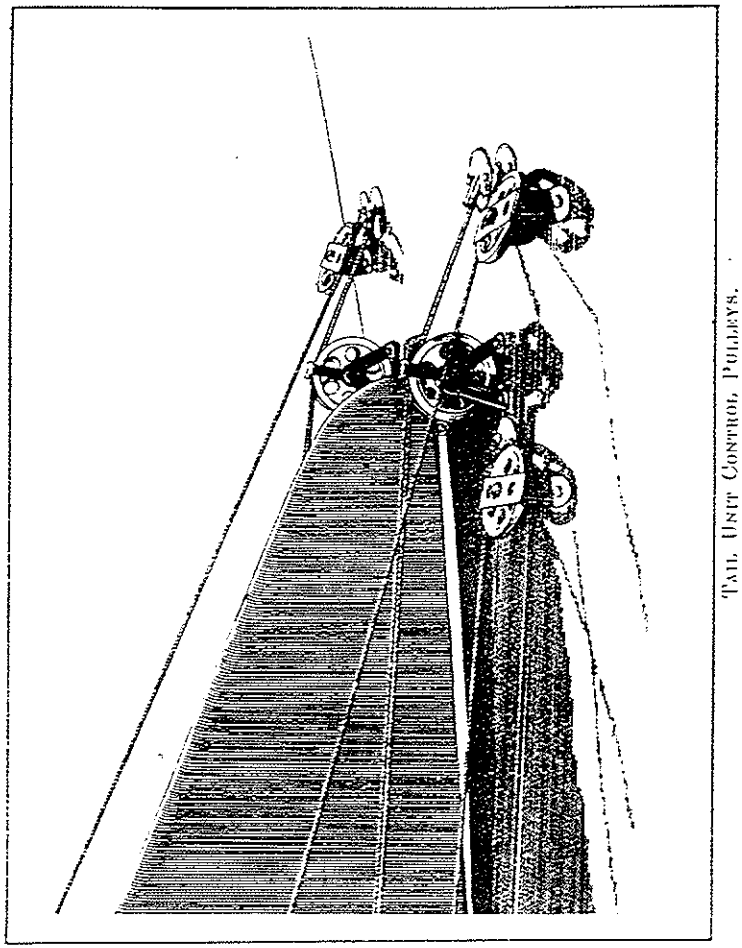
POWER UNIT IN COURSE OF ERECTION.

...ROL SCHOOL FLYING BOAT, TYPE N.T.2B.
(200 H.P. HISPANO SUIZA ENGINE.)
FIG. 10.



TAIL UNIT.

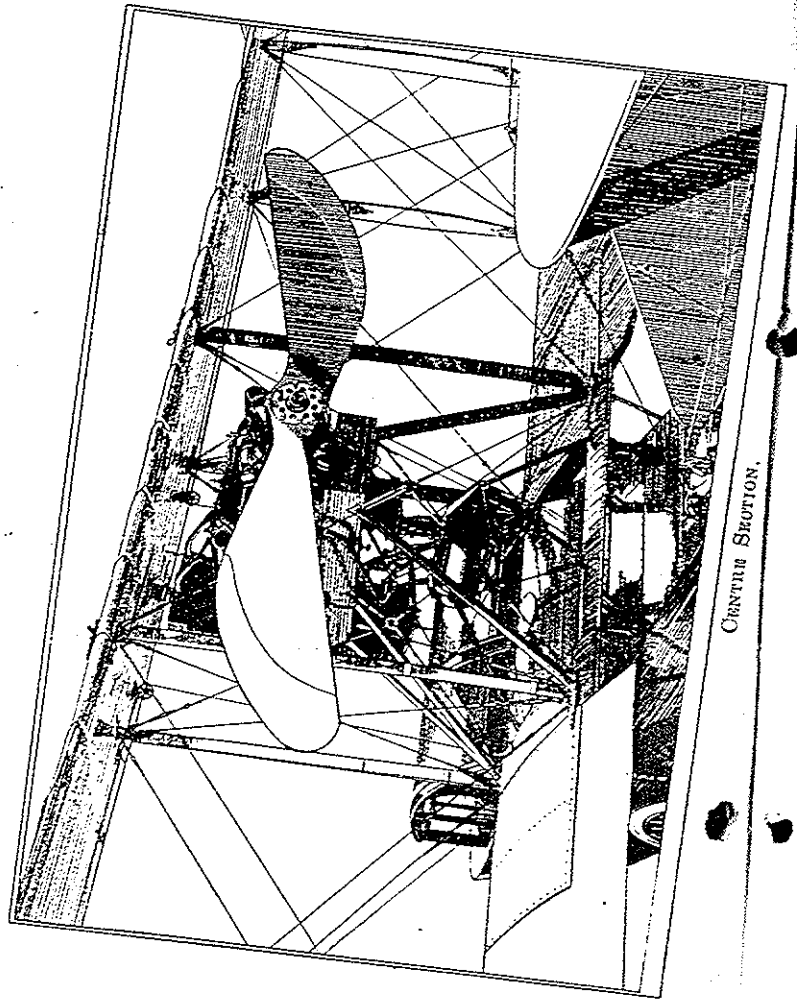
T.5. DUAL CONTROL SCHOOL FLYING BOAT, TYPE N.T.2B.
(200 H.P. HISPANO SUIZA ENGINE.)
FIG. 11.



TAIL UNIT CONTROL PULLEYS.

(200 H.P. Hispano Suiza Engine.)

Fig. 8.

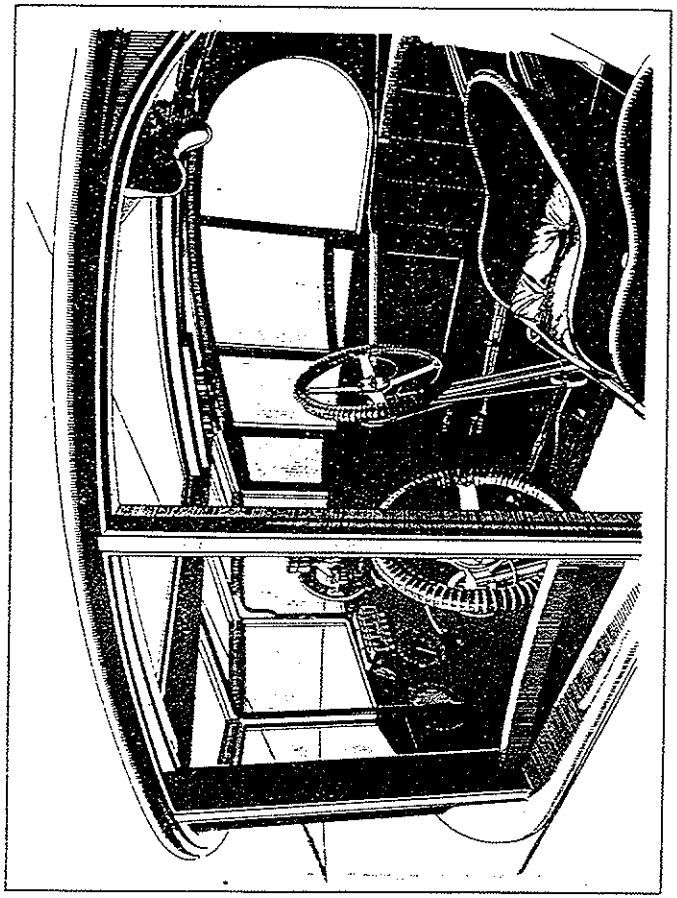


Centre Section.

T.5. DUAL CONTROL SCHOOL FLYING BOAT, Type N.T.2B.

(200 H.P. Hispano Suiza Engine.)

Fig. 9



Control Cabin.

DUAL CONTROL SCHOOL FLYING BOAT.

TYPE N.T.2B.

(200 H.P. HISPANO SUIZA.)

RIGGING DIAGRAMS.

T.5.

DUAL CONTROL SCHOOL FLYING BOAT, N.T.2.B.

(200 H.P. Hispano Suiza.)

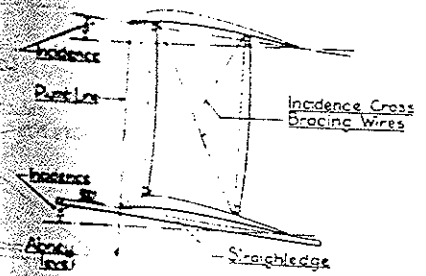


FIG. 3.

FIG. 4.

T.5.

DUAL CONTROL SCHOOL FLYING BOAT, N.T.2.B.

(200 H.P. HISPANO SUIZA.)

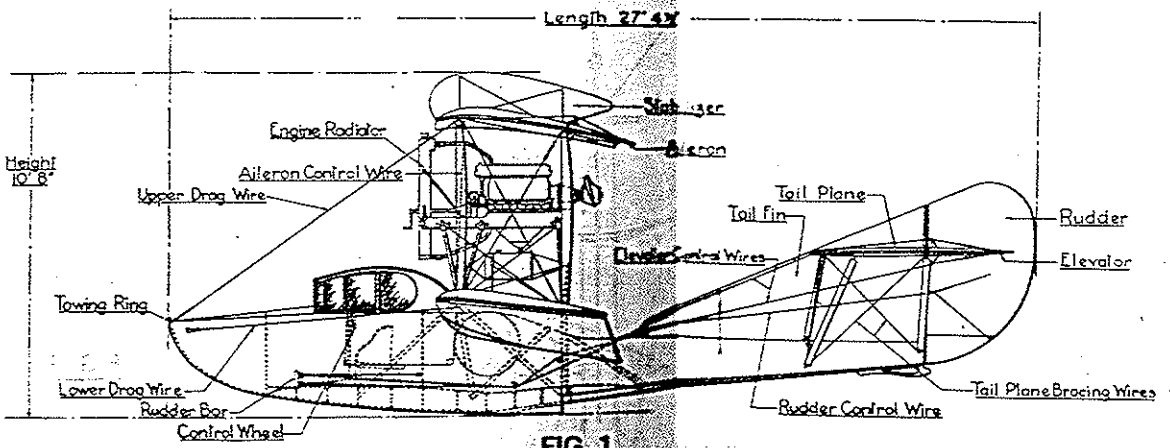


FIG. 1.

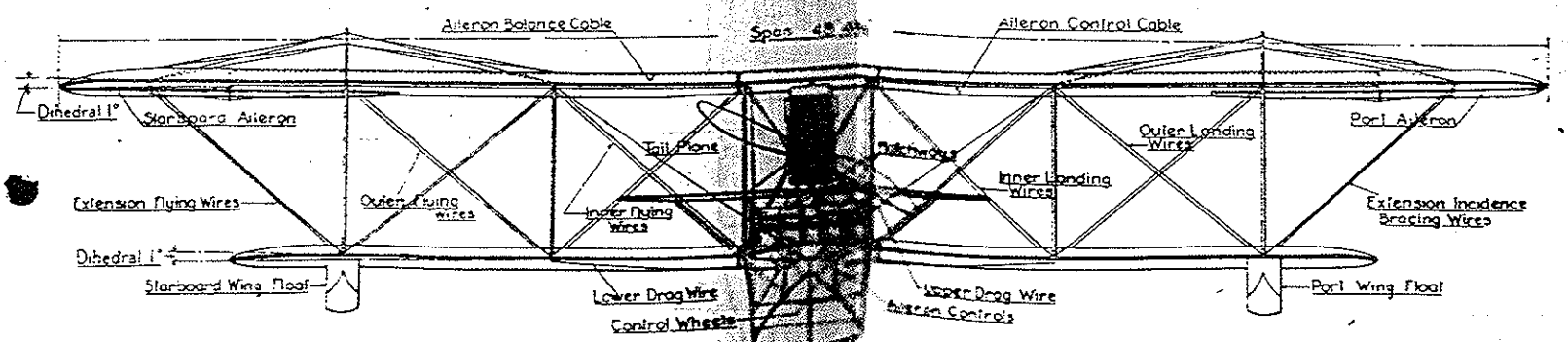


FIG. 2.

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T.5.

DUAL CONTROL SCHOOL FLYING BOAT, N.T.2.B.

(200 H.P. Hispano Suiza.)

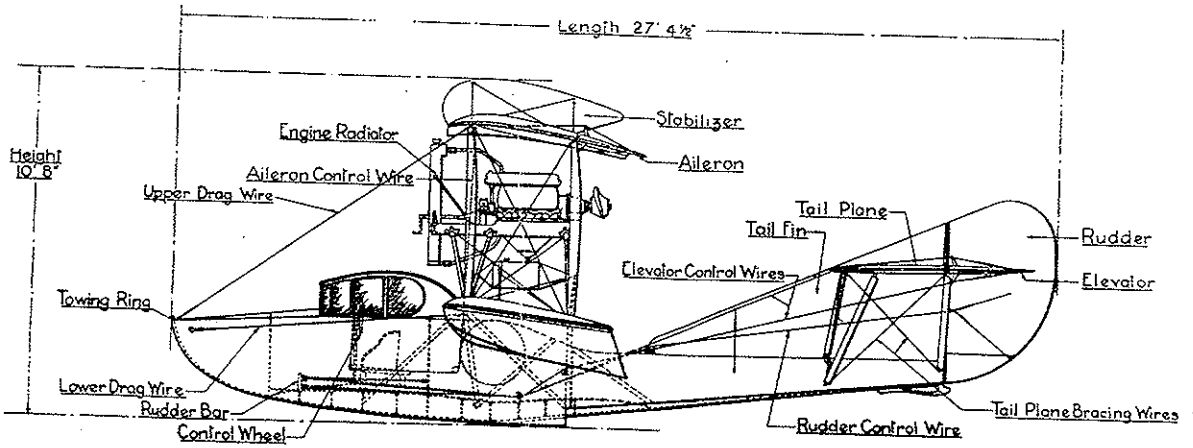

FIG. 1.

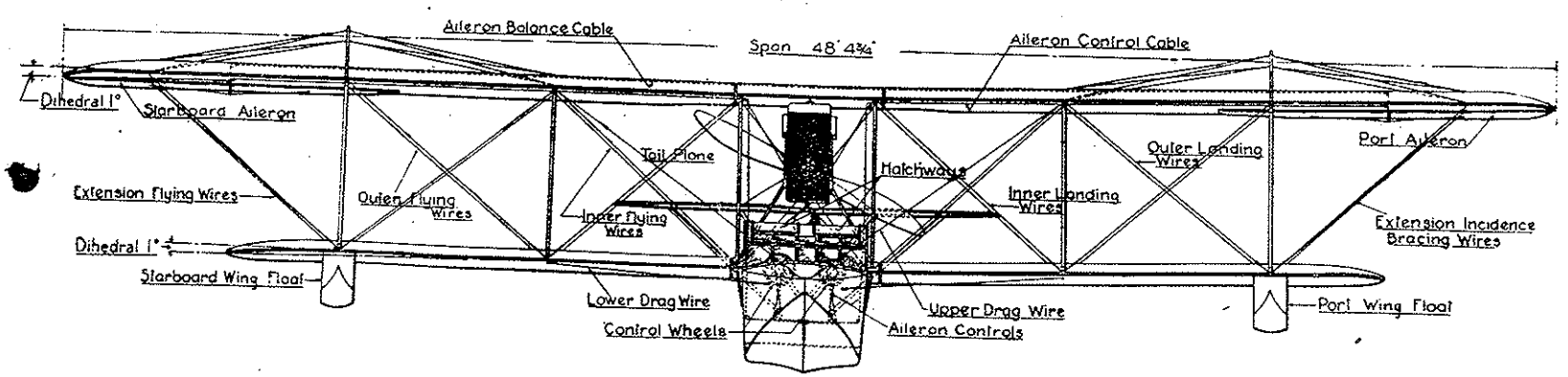

FIG. 2.