AIRCRAFT CIRCULARS

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 58

THE FAIRCHILD "ALL-PURPOSE" CABIN MONOPLANE

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THE FAIRCHILD "ALL-PURPOSE" CABIN MONOPLANE.*

The first Fairchild design underwent constant service tests for about a year and a half before production was started.

The adaptability of the "All-Purpose" airplane is perhaps its most interesting feature. With its four comfortable seats, it makes an excellent passenger transport or aerial taxi, and there is an ample baggage compartment in the rear; with the pilot seated in the cabin just in front of his passengers. With the folding and removable seats, it is only a few minutes' work to convert it into a package or mail carrier. A removable section of the floor permits the installation of a mapping camera, and the large side windows open sufficiently to permit the taking of obliques.

The range of vision is really surprising. The stability is ample and in the air, pilots have deliberately stepped back from the control seat into the rear of the cabin, leaving the airplane to follow its own even course.

As to maintenance, steel spring and oleo gear are used instead of shock absorber rubbers; wheels and other working parts are lubricated by means of Alemite-Zerk grease gun; cowling is not in the way in filling or draining tanks; parts are accessible without tearing out patches of fabric; and many little time-saving conveniences have been worked into this airplane. Aside from the periodical overhauling, adjustments are seldom necessary.

*From a circular issued by the Fairchild Airplane Manufacturing Corporation.

The "All-Purpose" is a folding-wing monoplane, convertible for use as landplane or seaplane. It is an all around utility airplane equally adapted for passenger, package or mail service, aerial photography, surveying, timber cruising or other applications.

The power plant consists of the Wright "Whirlwind" radial air-cooled engine of the same type as used in the transoceanic flights. It is rated at 200 HP. at 1800 R.P.M., but is capable of delivering well over 220 HP. at slightly higher speeds. The Curtiss-Reed forged duralumin propeller used is a type that needs no attention and will stand up in any climate. Hand inertia starters are optional.

An all gravity feed gasoline system is used, with three wing tanks which can be conveniently filled or drained. Each side tank holds 37 gallons while the center tank holds 11, making a total capacity of 85 and providing sufficient fuel for 710 miles at a cruising speed of about 103 miles per hour. When additional range is desired, a larger center tank is provided at a slight extra charge, giving a total capacity of 105 gallons and providing fuel for a range of about 900 miles at 103 miles per hour.

The wings can be folded by two men in two minutes as demonstrated by actual test. In about the same time they can be made ready again for flight. This feature is a distinct advantage of the Fairchild "All-Purpose" airplane as it enables the operator to store his airplane in one-third to one-half of the space usu-

ally required by one of this size. If necessary, the "All-Purpose" monoplane, with wings folded, may be towed over ordinary country roads. No controls, wires or pipes are interfered with when the wings are folded. When they are set up ready for flight the hinge pins and connections perform exactly in the customary manner. The pins are held in locked position by means of the operating lever which is itself secured by means of a padlock. The locking mechanism is in plain view of the pilot while in his seat.

The wing construction is of wood of a type which has been thoroughly proven in service. Spars are of the box type built up and ribs are of "I" section constructed of plywood with side flanges. Fabric covering is used, as this facilitates inspection of the structure during periodic overhauls. This form of construction permits repair of accidental damage more readily and more economically than any other type and was selected because of its low maintenance cost.

Each unit of the tail is constructed of steel tubing welded together and the surfacing is of fabric. The horizontal stabilizer is adjustable from the pilot's seat and the longitudinal control afforded is sufficient to permit the airplane to be flown "hands off" for extended periods with either full load or with only the pilot on board. The vertical fin is offset to relieve the pilot from the necessity of holding "right rudder" in flight and the rudder is balanced to add to the ease of control.

The fuselage structure is built up of steel tubing welded

together and is assembled on steel jigs so that all bodies are interchangeable. The engine cowling is of sheet aluminum, the rest of the body being fabric-covered. The non-shatterable glass windows and the doors are carried on sub-assemblies of wood secured to the steel tube frame. Ample and conveniently removable inspection windows are provided where necessary.

The conventional stick control is provided and the rudder is operated by means of swinging pedals. The wheel brakes are applied by use of levers attached to the pedals which are so arranged that the pilot can trail his heels on the floor in flight. The brakes can be operated independently or simultaneously. The stabilizer is adjusted by means of a hand-wheel located at the left side of the pilot. No pulleys are used in the aileron controls.

The landing gear is of the "divided axle" type, and floats can be interchanged with the wheels when necessary. The wheels are of liberal size to permit landing on soft ground and the wheel brakes are standard equipment. The brakes are built integral with and completely inside of the duralumin disc wheels, instead of being added afterwards as on many other airplanes. The landing gear has been designed specially for use with brakes and provision has been made for torque reaction. Instead of the customary and troublesome rubber shock absorbers, the landing gear as previously mentioned, is equipped with a steel spring and oleo gear which is most effective and requires no attention in service beyond occasional oiling. The wheels are lubricated by means of

Alemite-Zerk fittings.

The float type of landing gear interchanges with the wheel type and is furnished when required. These floats were specially designed for use with the "All-Purpose" cabin monoplane, and are of reinforced duralumin construction. The sheeting is of formed duralumin, while the internal construction is of duralumin and wood. This composite type of construction has been found to be more practical than either the all-wood or all-metal type as it embodies the advantages of each without its disadvantages. The Fairchild floats are finely streamlined in form and the bottoms are of the concave "Vee" type, which costs more to construct but performs infinitely better on the water. Each float is equipped with a built-in nose bumper to protect it in case of collision with buoys, service floats, or other obstacles. Tubular axle sockets are built in so that handling wheels can be conveniently slipped into place and the seaplane beached without special equipment.

A single cabin is provided to seat five, the pilot being located at the extreme front while the passengers are seated in pairs behind him. Just forward of the pilot's seat the fuselage has been "necked in" and ample windows are provided in sides, floor and roof, with the result that a most amazing range of vision is made available. The passengers' seats are of the folding type so that they may be conveniently folded out of the way when desired. If necessary, they can be entirely removed and carried

in the baggage compartment, leaving the cabin completely free of obstruction behind the pilot. The windows are of non-shatterable glass and the passenger windows can be lowered into the side, leaving a liberal opening for ventilation, photographic use, or other purposes. A removable section is provided in the center of the floor to make the airplane conveniently available for aerial mapping and this floor section also serves as a tool-box. The cabin can be entered by means of either of two rear doors (one on each side) and a direct entrance to the pilot's seat is provided by means of a door at the forward end.

A baggage space of 35 cubic feet capacity is provided directly behind the cabin. This compartment is provided with loop anchorages for tie-down straps and the floor and lower part of the sides are lined with corrugated duralumin to provide adequate strength. The cabin from the back of the pilot's seat to the rear wall, has a capacity of 90 cubic feet of clear space when the seats are removed. Thus the total capacity of the airplane is 125 cubic feet when used in mail or package service.

Complete navigation lights (as required by the U.S. Department of Commerce for night flying) are provided on the wing tips and on the top of the rudder. These are of the streamlined type and the wiring is built into the wings and rudder. The wings are wired for landing lights.

General Dimensions

	Landplane	Seaplane
Length over-all	30 ft. 11 in.	32 ft. 5 in.
Height over-all	9 " 0 "	11 " 4 "
Span	44 " 0 "	13 " 0 " (width folded)
Area of wings (including ailerons)	290 sq.ft.	

Weights and Performance

	Landplane	Seaplane
Weight of airplane light	2,050 lb.	2,340 lb.
Pay load (with 85 gal. gas)	825 "	800 "
Pay load (with 3 hr. fuel)	1,100 "	1,100 "
Total useful load	1,550 "	1,560 "
Weight of airplane loaded	3,600 "	3,900 "
Loading, per square foot	12.4 lb.	13.5 lb.
Loading, per HP. (220 HP.)	16.4 "	17.7 "
Maximum speed, M.P.H.	120	116
Cruising speed, M.P.H., about	100	96
Climb at ground (full load) Feet per minute	580	420
Climb at ground (medium load) Feet per minute	920	710
Service ceiling (full load)	13,000 ft.	10,500 ft.
Miles range at cruising speed (with 85 gal. gas)	710	650

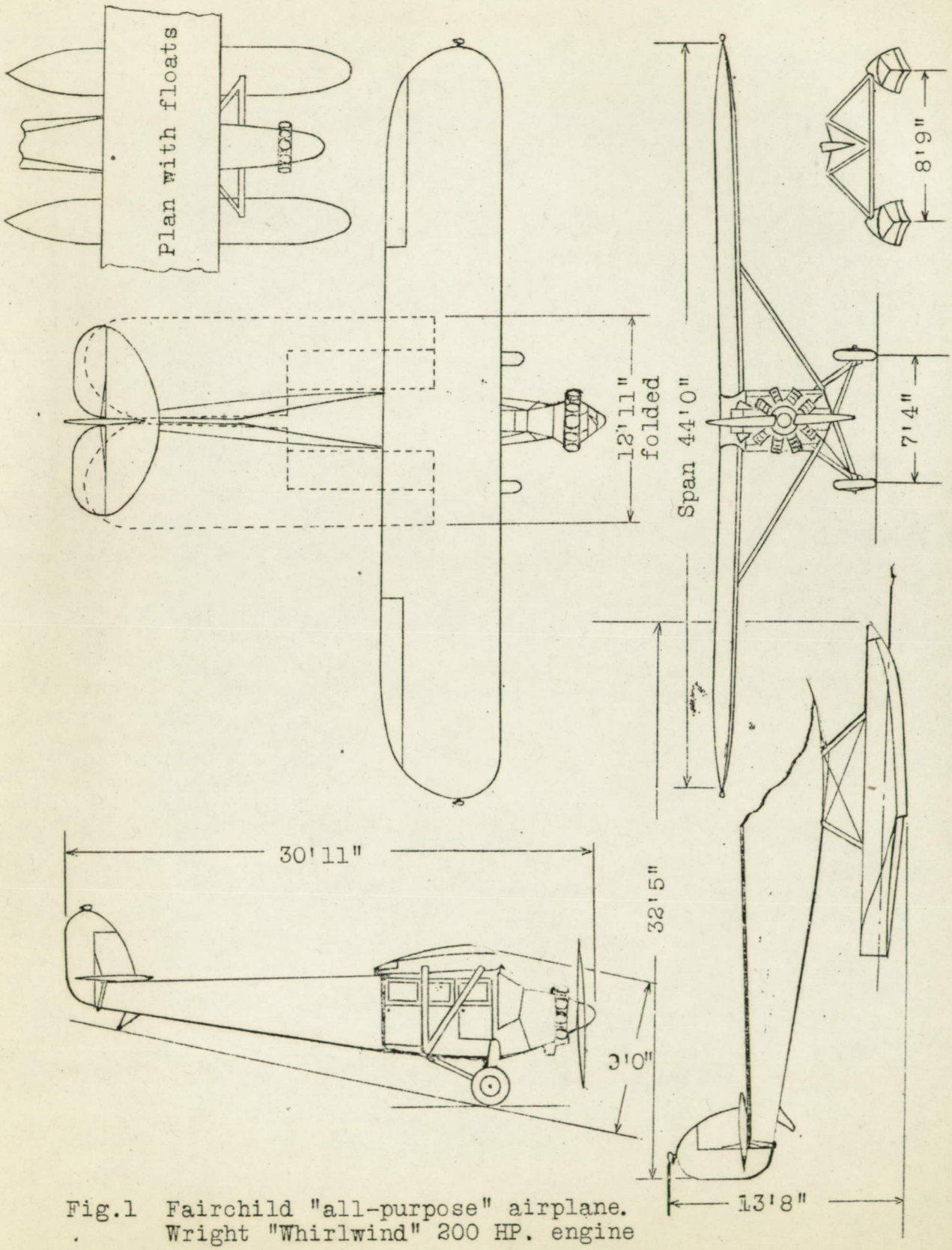

Fig.1 Fairchild "all-purpose" airplane.
Wright "Whirlwind" 200 HP. engine

Fig.2 The Fairchild "All-purpose" cabin monoplane.
The cabin provides seats for five, the pilot being located at the extreme front with the passengers seated in pairs back of him.

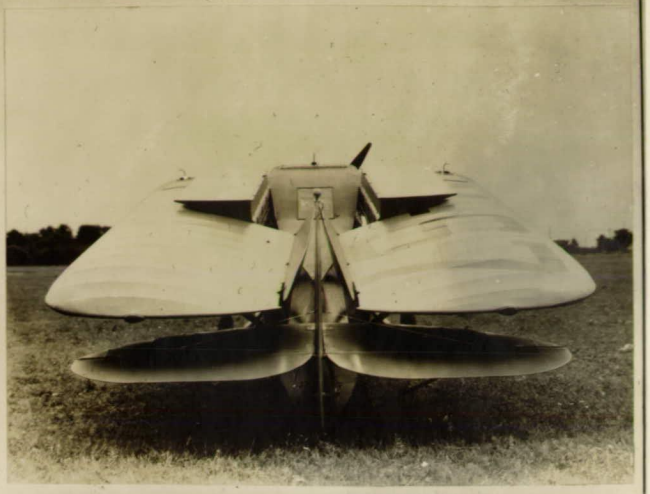

Fig.3 The easily folded wings make it possible to house two or even three airplanes in the space usually required for one.

Fig.4 The tail unit is sturdy and clean. Here again, every thought has been given to lowering of maintenance costs. Control horns are in protected positions and such parts as the tail skids are quickly replaceable and accessible at all times.

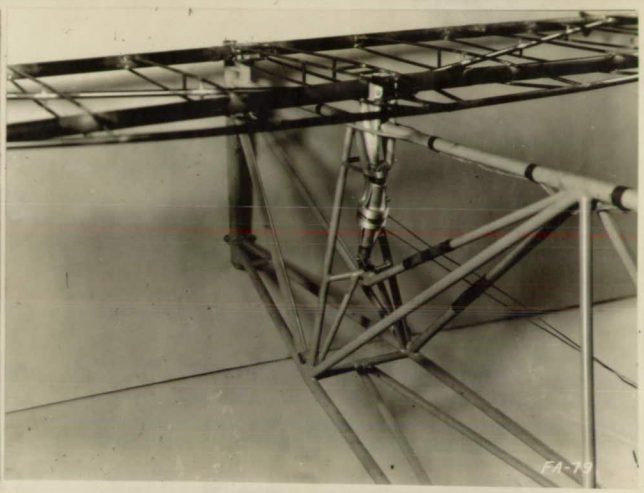

Fig.5 All of the tail surfaces, as well as the entire fuselage, are of extra heavy seamless steel tubing construction, acetylene welded, all joints reinforced. The rugged construction of the stabilizer adjustment unit is clearly shown in this view.

Fig.6 Aileron controls are entirely inside of the wings. Note the bell-crank mechanism that makes it possible to run wires straight and thus eliminate all pulleys. Control cables last indefinately, eliminating the necessity of replacing them from time to time.

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Fig.7 The rugged wing construction is built to withstand hard usage. With its substantially constructed spars, well proportioned ribs and carefully designed fittings this claim is reasonably substantiated.