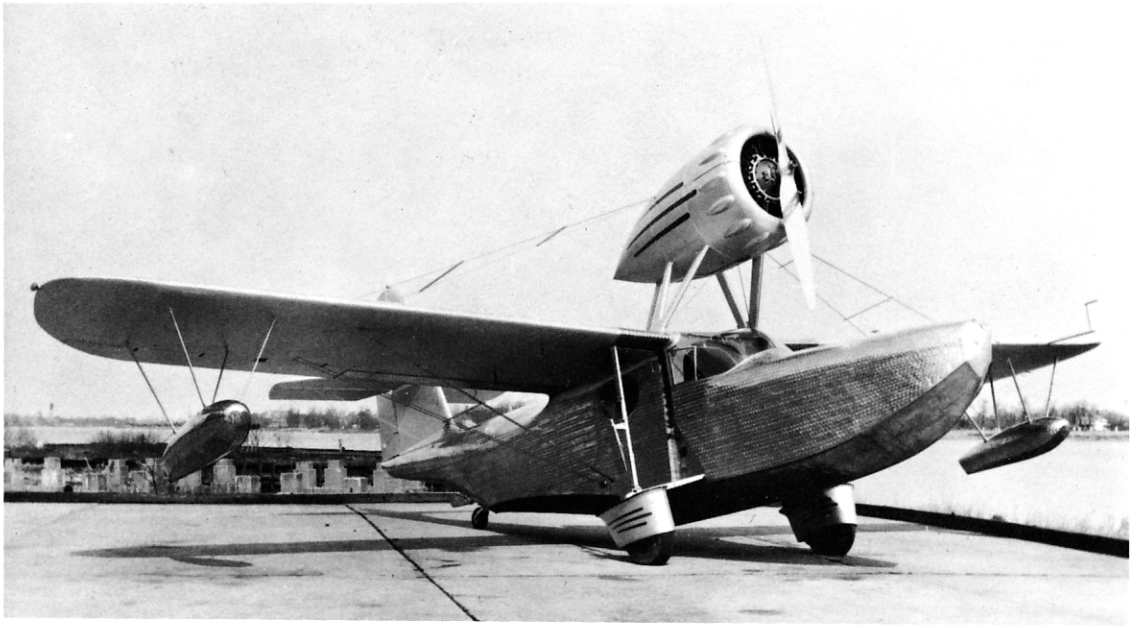
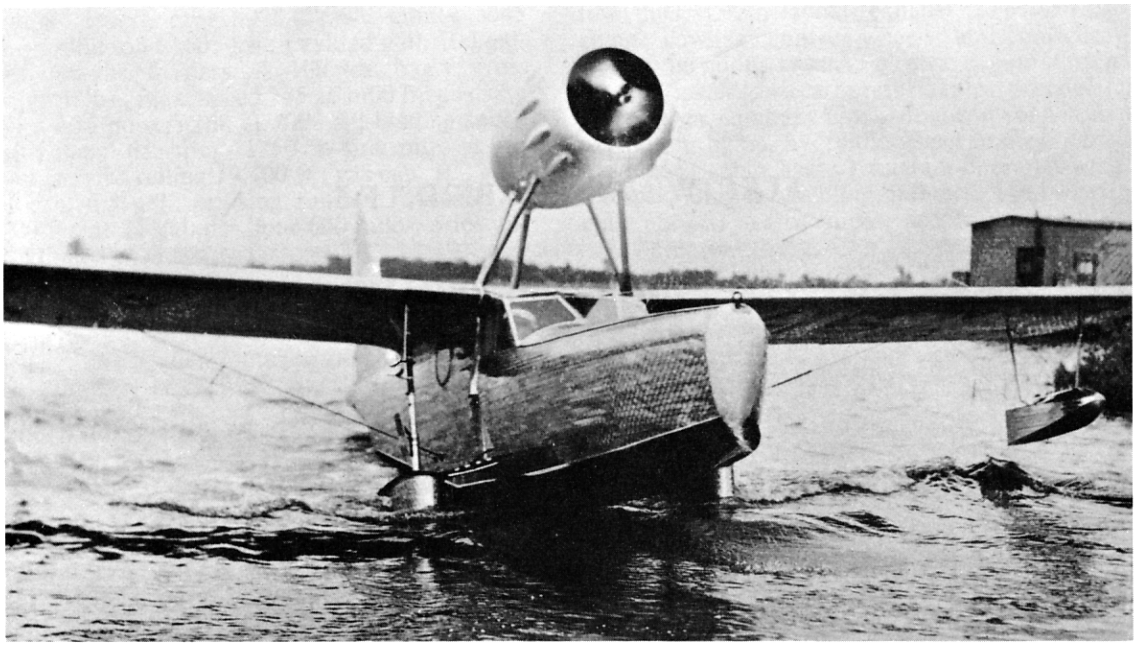
ATC # 680
(10-30-37)
FLEETWINGS "SEABIRD," F-5.



Fleetwings "Sea Bird" was at home on land or water.

The silver "Seabird" by Fleetwings was pretty much an unusual airplane, but unique mainly because it was built of "shot-welded" (spot-welded) stainless steel construction. It was not the first airplane to be built up in this manner, but it was the first airplane of "stainless" to be awarded an ATC approval, and the first airplane of this type to be built in any number. The Budd "Pioneer" seaplane, identical to the Savoia-Marchetti SM-56, was the first to be built of stainless steel in 1931; it was actually lighter and stronger than the airplane it duplicated. Years of severe testing proved it to be practically ageless. The initiative for this departure from normally used materials came from the steel industry. Much development money was gambled in hopes that more steel could be used in airplane structures, thereby developing a new market for steel sheet. Intrigued with the possibility of building a strong, efficient airplane of stainless steel, Fleetwings experimented for several years to perfect fabrication methods, and the design of structural members best suited for the unusual properties of stainless steel sheet. No doubt, Fleetwings, Inc. picked the "amphibian" as their first airplane to produce because a water-going airplane would certainly be the test for this type of construction, and the many innovations it promised. Jim Reddig, who had long been associated with plane builder Grover Loening, was picked to design the airplane, an airplane which was based on lines quite similar to one of the last of the "Loening" amphibians. The former "Keystone" plant in Bristol, Pa. and right on the shore of the Delaware River, was acquired for the production of these airplanes which was planned in the hundreds. That they picked a somewhat flimsy-looking, wire-braced monoplane seems a little odd, but all in all, it proved to be a tough airplane and a rather serviceable configuration. It is remarkable to note that of the six airplanes that were finally built, there are two that are flying yet.

The problem of designing airplanes in stainless steel was much more complex than a mere changing over, section for section, from other more commonly used materials; a totally new design concept was required. "Fleetwings" craftsmen headed by Cecil DeGanahl, had been studying the application of electrically-welded stainless steel to aircraft construction for over 10 years, and came to understand the capabilities of this material. But, it certainly taxed a designer's ingenuity. One of the principal advantages of stainless steel in airplanes is that it may be used in closed sections without fear of corrosion. As no heat-treat, anodizing, or protective coating is necessary, the cost of fabrication and maintenance can be greatly reduced. "Shot-welding" eliminates rivets, screws, or other fasteners and it's an easier fabrication procedure; spot-welds weigh nothing so they may be placed



"Sea Bird" shown taxiing out of water onto ramp.

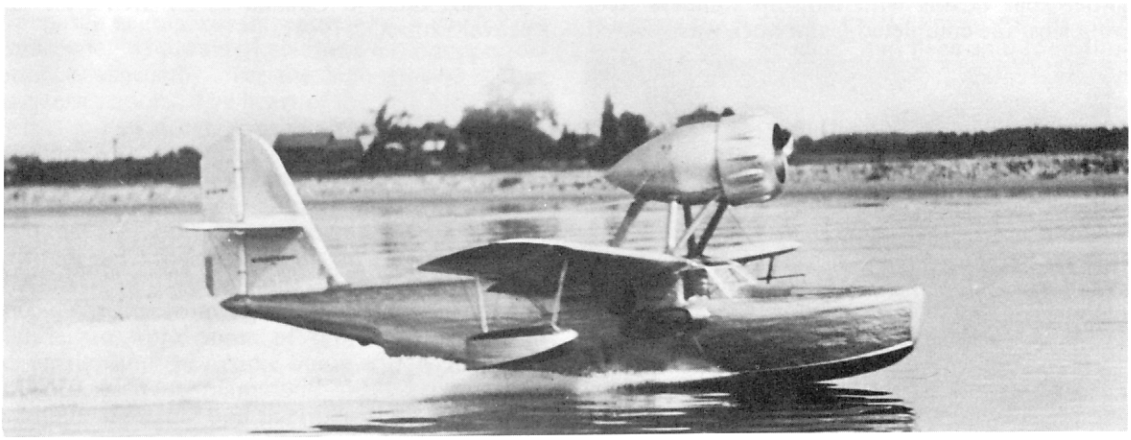
very close together if need be. Because thinner gauges are used in stainless steel sheet there is some problem with local stiffness, so the "skin" is reinforced with stringers and not called upon to carry heavy skin stresses. But, because of the novel fabrication procedure the stainless steel airplane literally becomes one strong all-metal unit. "Stainless" is also excellent material for fuel and oil tanks; beside the saving in weight, another advantage is that small leaks may be repaired in place with a hot iron and soft solder. Commercial grade stainless steel as used for aircraft was coded 18-8.

The burnished Fleetwings "Seabird" model F-5 was a wire-braced, high-winged cabin monoplane of the flying-boat type with seating arranged for 4 or 5. A novel retracting landing gear allowed it to operate as an "amphibian" off land or water. With design goals set to overcome some of the compromises inherent in an airplane that operates both from land and water, the "Seabird" got around most of these handicaps nicely, and was rolled out as quite an airplane. The obvious utility of a capable amphibian was a versatile tool for business, and a convenience for sport, so all of the "Seabird" were working in the pursuit of business, or gadding about the more famous waterholes with some wealthy sportsman. The "Seabird" amphibian practically had the market for this type of airplane all to iself, but oddly enough, "amphibians" were not selling all that well, so Fleetwings had very few names on the order-books. But, because it was an oddity and a very unusual airplane at that, its press coverage and its exposure to the trade was far beyond what it had actually earned. For Fleetwings it was nice to have all that publicity, but it did very little good. As powered with the Jacobs L-5 engine of 285 h.p. the "Seabird" turned in a whopping good performance despite the handicaps present in a design of this type; it was capable, fast, and economical. Its water behavior was excellent, but the high-mounted engine made land operations a little touchy; it was top-heavy. The airplane was docile in the air having pleasant characteristics, it was comfortably stable yet quite maneuverable. The "Seabird" did require a little special care in its handling, but it was practically ageless, and maintenance was minimal during normal operation. Two of the "Seabird" that are still flying are nearly 40 years old, and practically as good as new. The type certificate for the "Seabird" model F-5 was issued retroactive to 10-30-37 and only 5 examples of this model were manufactured by Fleetwings, Inc. on the banks of the Delaware River in Bristol, Pa. Carl DeGanahl was pres. & gen. mgr.; Wilson L. Sutton was V.P. & chf. engr.; and Kenneth B. Walton was V.P. in charge of sales. It is interesting to note that Carl, Chas. F., Chloe, Jos., and Frank DeGanahl were on the board of directors. Fleetwings, Inc. later continued in the design, engineering, and fabrication of stainless steel assemblies for other manufacturers. They later were busy in wartime production.

Listed below are specifications and performance data for the Fleetwings "Seabird" model F-5 as powered with Jacobs L-5 engine rated 285 h.p. at 2000 r.p.m. at sea level (300 h.p. at 2125 r.p.m. for takeoff); length overall 32'0"; height overall (on wheels) 12'6"; wingspan 40'6"; wing chord 72"; total wing area 235 sq. ft.; airfoil NACA-2412; wt. empty 2500 (2550) lbs.; useful load 1300 lbs.; payload with 70 gal. fuel 672 lbs. (4 pass. & no baggage, or 3 pass. & 162 lbs. baggage); gross wt. 3800 (3850) lbs.; figures in parentheses as allowed with controllable

High mounting of Jacobs engine produced top-heavy moments.

A "Sea Bird" operated by mining company in Canada.



"Sea Bird" skims over water on take-off.

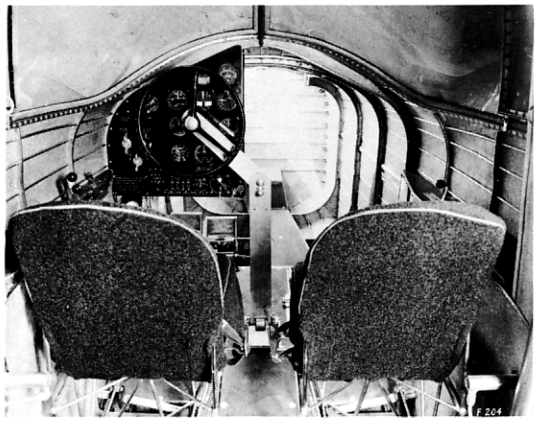
propeller; max. speed 150 at sea level; cruising speed (.75 power) 139 at 3000 ft.; landing speed (with flaps) 58; landing speed (no flaps) 64; takeoff run (fully loaded) off water 25 sec.; climb 900 (1080) ft. first min. at sea level (the higher figure with controllable prop); ser. ceiling 14,500 ft.; gas cap. 70 gal.; oil cap. 5 gal.; cruising range (.75 power) at 3000 ft. using 17.5 gal. per hour was 520 miles; price $22,500 at the factory slip.

The two-step, semi-monocoque hull was a stainless steel (18-8) framework covered with .010 in. thick stainless steel sheet; everything was fastened together by spot-welding. The hull was divided into 5 watertight compartments; the bow housed the anchor, mooring gear, tool kit, engine cover, plus baggage to an allowance of 76 lbs. The second compartment was the pilot's station which was just ahead of the wing, the third compartment was the cabin area for 2 or 3 passengers, and the fourth compartment was the baggage hold with a hatch overhead for access to the cabin. The fifth compartment formed the tail end for mounting the tail wheel, water rudder, and the empennage. A large bubble-type windshield of formed Pyralin protected the pilot's station and provided excellent visibility; a large rounded window each side provided excellent visibility for the passengers, and these windows doubled as escape hatches also. The main baggage hold with allowance for 65-150 lbs. was behind the cabin area which also contained steps to enter the cabin from the top; the main entry hatch was topside just behind the wing, and steps to this entry were in the side of the hull. A hatch in the bow opened up topside for anchoring and mooring; there was a gangway in the pilot's station for entry into the bow from within. The main cabin was soundproofed, well upholstered, the seats were comfortable, and noise was at a fairly low level. The 7 cyl. radial engine, mounted in a streamlined nacelle and encased in a NACA low-drag engine cowl, was perched high atop a steel-tube pylon mount to keep the whirling prop out of damaging water spray; the nacelle was rigged with up-thrust to overcome the nose-down tendency during bursts of power. The semi-cantilever wing framework, in 2 panels, was built up with stainless steel box-girder spar beams with built-up stainless steel wing ribs; the completed framework was covered with fabric. The wing was braced from top and bottom with heavy-gauge streamlined stainless steel wires; this was an archaic method of bracing, but it held up fairly well in service. Balanced ailerons were of the slotted Friese type, and split-type drag flaps of 15.1 sq. ft. area were hydraulically operated; a manual hand lever was provided for emergency. A 35 gal. fuel tank was mounted in the root end of each wing half; fuel flow was provided by an engine-driven fuel pump or hand operated wobble pump. A 5 gal. oil tank was in the engine nacelle. The retractable landing gear of 94 in. tread was a novel mechanism that folded flush into the hull sides with only the "panted" wheel projecting into the airstream; 7.50x10 wheels fastened to oleo-spring shock struts were fitted with hydraulic brakes. The 13 in. steerable tail wheel also retracted; both landing gear and tail wheel were extended or retracted hydraulically, or manually in emergency. A water rudder improved handling in close quarters, and tip floats kept the wing from heeling in. The tail group was a spot-welded stainless steel structure and all surfaces were fabric covered; elevators and rudder were fitted with adjustable trimming tabs. A Curtiss-Reed metal prop, electric engine starter, generator, battery, fuel pump, fuel gauges, engine & flight instruments, throw-over control wheel, exhaust collector-ring, carburetor heater, cabin heater, compass, clock, navigation lights, fire extinguisher, anchor & mooring gear, engine cover, tool kit, life belts, and first-aid kit were standard equipment. A controllable prop, bonding & shielding, landing lights, paraflares, and radio gear were optional.

Listed below are "Seabird" entries as gleaned from registration records:

NC-16793;	F-4	(# F-401)	Jacobs L-5.
-16918;	F-5	(# F-501)	"
-19191;	"	(# F-502)	"
-19192;	"	(# F-503)	"
-19193;	"	(# F-504)	"
-19194;	"	(# F-505)	"

This approval for ser. # F-501 and up; ser. # F-401 was on Group 2 approval # 2-540; ser. # F-401 later in Canada as CF-BGZ; this approval expired 2-19-41.



Cockpit view shows passageway to bow, and the swing-over wheel.