# MAXFAX

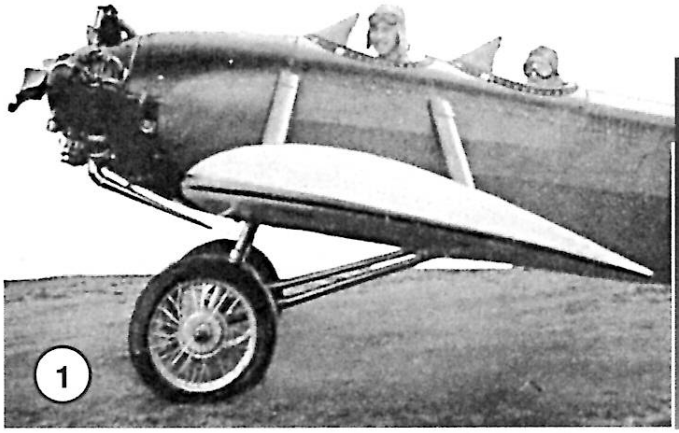
Journal of the D. C. Maxecuters

... home of the dreaded POTOMAC PURSUIT SQUADRON of the Flying Aces Club

**Editor: Allan Schanzle** **November/December 2002**


## COMING ATTRACTIONS

| | |
|---|---|
| NOV 10, 2002 | NATIONAL BUILDING MUSEUM FLYING AND CONTEST<br>SUNDAY 9 AM TO 3:30PM<br>Note change in time from previous announcement. |
| DEC 8, 2002 | ANNUAL CLUB BANQUET SUNDAY EVENING 6:00PM<br>At The French Restaurant Bistro Francais In Georgetown.<br>Contact Paul Spreiregen (202) 337-2887<br>SEE ANNOUNCEMENT INSIDE FOR MORE INFO |
| JAN 11, 2003 | THE NATIONAL BUILDING MUSEUM SATURDAY<br>10 am - 1 pm. Girl Scout Delta Dart program*<br>2:15 pm - 5 pm. Cub Scout Delta dart program* |
| JAN 12, 2003 | MECA COLLECTO REGION 11 FALLS CHURCH, VIRGINIA<br>SUNDAY NOON -5PM |
| JAN 19, 2003 | NATIONAL BUILDING MUSEUM FLYING SUNDAY 10AM TO 4:30PM |
| FEB 22, 2003 | NATIONAL BUILDING MUSEUM SATURDAY<br>10 am - 1 pm Family Delta Dart program*<br>2:15 pm - 5 pm Cub Scout Delta Dart program* |
| MAR 8, 2003 | NATIONAL BUILDING MUSEUM SATURDAY<br>2:15 pm - 5 pm, Cub Scout Delta Dart program* |
| MAR 23, 2003 | NATIONAL BUILDING MUSEUM FLYING SUNDAY 10AM TO 4:30PM |
| MAR 30, 2003 | MECA COLLECTO REGION 11 FALLS CHURCH, VIRGINIA<br>SUNDAY NOON - 5PM |



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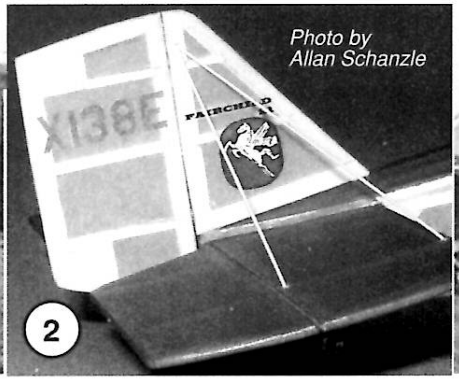


Photo by
Allan Schanzle

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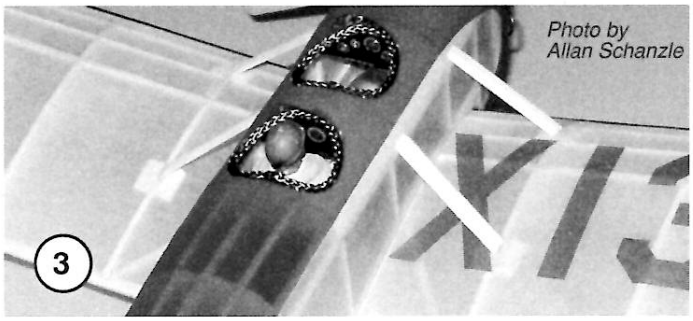

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Allan Schanzle

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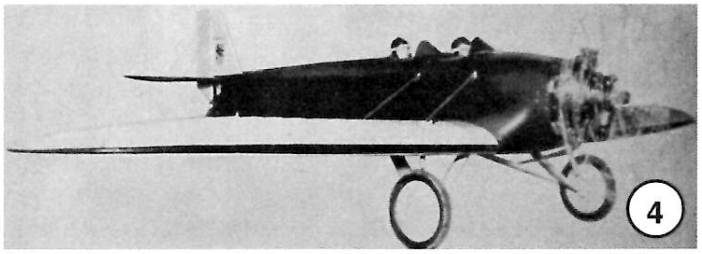

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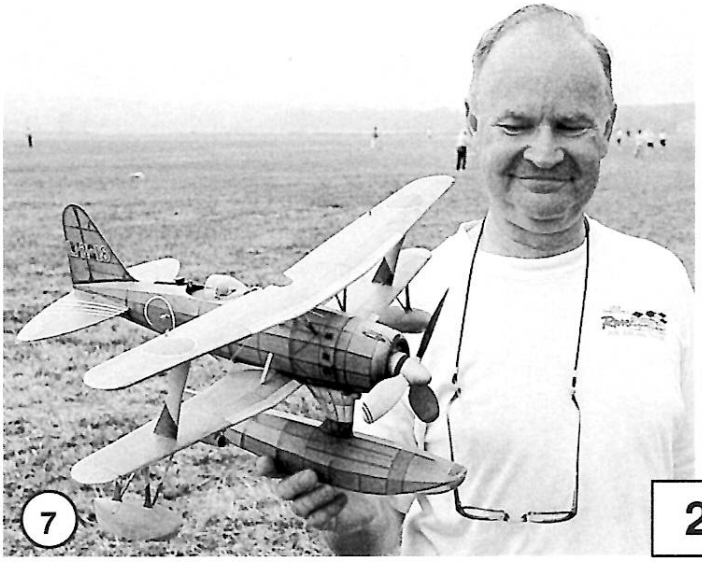

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## COLOR IN MAX-FAX!!!

This is a trial test to determine the cost for the use of color. We can thank Tom Schmitt and Don Srull for creating the necessary input to the company that prints our newsletter. Nice job, fellows. And we also need to give credit to Tom Schmitt for the vast majority of the photos in this issue.

## AN ISSUE DEVOTED TO THE FAIRCHILD 21

Allan Schanzle

Last Christmas I was given a book by Kent Michell titled *FAIRCHILD AIRCRAFT 1926-1987*. It includes 3-views and photos of just about every aircraft build by the Fairchild Corporation. Naturally, my first interest was to scan all the photos and 3-views. Two looked interesting, and to the best of my knowledge, they fell into my favorite category of seldom, or never, having been modeled for free flight scale. This issue is devoted to the Fairchild 21. Only two of these were built..

This is certainly an unusual and unknown aircraft, so I've included much of the material I found at the Smithsonian Air and Space Museum library. A substantial amount of the text is devoted to attempting to justify a reasonable color scheme, and you will find evidence in the photos and 3-view that this little bugger went through a substantial number of structural variations and, it appears, at least two color schemes. I'm convinced that some of the photos I obtained used orthochromatic film (where yellow and red appear darker, sometimes approaching black) while the others used panchromatic film, where colors are more realistic shades of gray. Dan Driscoll will discuss this in more detail in the next issue, including the effect of filters.

## MORE AVIATION HISTORY

In the last issue, I presented the first of a three-part series dealing with the development of American private aviation. It was based on the book ***"WINGS OF YESTERYEAR, The Golden Age of Private Aircraft"***, by Geza Szurovy. Part 1 was titled: 1909 Through the Early Stages of the Depression. This issue of the newsletter continues with the next installment:

Part 2: The Evolution of the Large Cabin Class Aircraft

Szurovy's book was written in chronological order, skipping from one company, or individual, to the next. But I wanted a short summary of the various companies covered in his tome. So I restructured his text into a company-by-company concept. I also noted in the previous issue that Szurovy's book is certainly not all-inclusive. Many companies we've heard about are not mentioned, or at best, only in passing, such as Great Lakes, Inland Sport, and Bellanca. Consequently, separate sections for these companies are not included.

## CORRECTIONS TO THE LAST ISSUE

Stew Meyers pointed out that the plan for the BT-13/15 did not specify the dihedral at the tip. The structural technique produces the desired result, which is 1.7 inches at each tip. An alternative measure is that a line from tip-to-tip should pass about 1/8 of an inch above the stringer at the base of the glass canopy.

My write-up for the BT-13/15 stated that my plan was, to the best of my knowledge, only the second BT-13/15 for free flight scale. Somehow, I managed to ignore Claude Powell's plan in the Jan/Feb 2000 issue of MAX FAX. Sorry 'bout that, Claude.

Finally, Bill Schmidt pointed out one of my senior moments. On page 15, column 2, I typed that Clyde Cessna married Olive Mellor. It should, of course, be Walter Beech that married Olive.

## PHOTOS ON THE PREVIOUS PAGE

1. A photo from the March 1929 *Airway Age* magazine of the featured plan of this issue, a Fairchild Model 21. See page 20 of this issue.
2. A close-up of the logo on the fin of the model, built by the editor of this issue, Allan Schanzle.
3. A bird's-eye view of the cockpit of the Fairchild 21 model, powered by a Brown peanut $CO_2$ engine.
4. Another photo of the real thing with many differences from that shown in photo No. 1. See page 21 of this issue.
5. Bob Wetherell flew this diesel powered Monocoup.
6. Chris Starleaf, Grand Champion, with his Laird Super Solution.
7. Pres Bruning with his rubber scale Mitsubishi Pete, enlarged from his peanut plan.
8. Hurst Bowers enjoying himself at the FAC NATS with his Moth Minor.

# THE FAIRCHILD MODEL 21

Allan Schanzle

## A LITTLE BACKGROUND

A Fairchild 21? What in the world is that? We've all heard about the company's 71, 22, 24, and perhaps some others, but a 21? Yep, there was such a plane, and to the best of my knowledge, it falls into my favorite category of seldom, or perhaps even never, previously modeled for F/F. But before giving a brief history of this aircraft, let's devote a few lines to how Fairchild designated their aviation products.

Sherman Fairchild's first aircraft was designed for aerial photography and completed in 1926. It was designated the FC-1, which stands for Fairchild Cabin No. 1. Many modifications were made to the FC-1 with corresponding minor variations in the designation. In late 1928, management decided to simplify (?) their designations by introducing "Model" numbers. The first digit denoted the number of personnel that the plane could carry, and the second digit defined the design of that configuration. For example, the Model 71 was the first 7-place aircraft produced by the company. And yes, the Model 24 was, initially, a two-place design.

In 1928, Fairchild foresaw a huge increase in the use of aviation, which would require a trainer for the new and upcoming monoplanes. The most common aircraft for this purpose in the 1920s was the Curtiss Jenny. So in 1928, Fairchild hired Otto Koppen to design a new monoplane trainer, and it was originally called the FT-1 (Fairchild Trainer 1).

The prototype flew in early 1929, was registered as NX 8018, and was powered by a 30 hp Siemens-Halske Sh-13 engine. A second aircraft, registered as X138E, was powered by the 80 hp Armstrong Siddeley Genet 5-cylinder radial air-cooled engine that Fairchild planned to build in the U.S. The main difference between the two planes, other than the engines, was the shape of the wing. The first version had a straight wing with slightly curved tips, while the second version had an elliptical shape for the outer portion of the wing. Before the FT-1 was offered for sale, it was redesignated as the Model 21, indicating the first Fairchild design with two seats.

The May 1929 issue of the company newspaper, *Fairchild Aviation News*, stated that eleven of the Model 21s had been ordered at the Second Annual All-American Aircraft Show in Detroit. But the start of the depression in October 1929 brought an end to the market for the Model 21. Consequently, only two of these aircraft were ever manufactured.

This past Christmas, Santa delivered Kent Mitchell's book *Fairchild Aircraft 1926-1987*. I liked the looks of the Model 21 as soon as I saw the 3-view of the second version. It had lots of wing area and was designed as a trainer, which usually implies a reasonable amount of inherent stability in the design. In addition to the 3-view, the book had three black and white photos: one of the prototype and two of the second version. The prototype photo was a close-up three quarter rear view. The two other photos were distant ones, and didn't show many details. I used the 3-view (hence the model is designed after the second version) and the photos from Mitchell's book to draw the plan and build the framework. Then I went to the Smithsonian Air and Space museum to look for possible data on the colors. There I found quite a few additional photos, magazine articles, and advertisements. A Fairchild brochure gave some hint of the colors, but nothing specific. Unfortunately, these additional photos presented a problem.

## Ooops!!!

Apparently the second version went through quite a few design changes. The data from the Smithsonian indicated the following variations in the second version (see photo numbers 1 and 4 on page 2 and the 3-view):

1. Wheels that had hubcaps or displayed spokes.
2. Airfoil shaped wing struts or ones that looked like wire, but were probably steel rods ultimately covered to give the airfoil shape.
3. Large or small tail wheel.
4. An enlarged rudder.
5. Tube or streamlined landing gear struts.
6. Variations in the windshield shape.
7. Floats replacing the wheels.
8. Variations in paint scheme.

The photos also suggested the possibility of variations in the shape of the turtle deck, which is the reason for the "Ooops" subtitle. The 3-view did not include any fuselage cross sections, so I had used

the front view and the distant photos as a basis for the fuselage formers. When it came time to decide on a specific aircraft, I chose to use the plane as shown in an advertisement for Fairchild that appeared on page 251 of the March 1929 issue of *Airway Age* (see page 20 and photo 1 on pg. 2). In this photo, the turtle deck has much less curvature than I had used in the design and construction, so I corrected the plan by simply extending the vertical height of the sides a short distance and reducing the curvature, keeping the overall height of the fuselage the same.

## COLORS

All photos were black and white and most were of poor quality. It appeared from the *Airway Age* photo that the wing, fin, and rudder were a light color while the fuselage and stab were darker. But the Fairchild brochure (include in this issue) says "The outside of the Fairchild 21 is finished in three colors, in any one of the stock combinations or to the customers specifications". That last part opens up a wealth of possibilities, but since there were only two of these critters ever made, that "to the customer's specification" part wouldn't hold a lot of value in front of a judge. So I tried to figure out a color combination that was at least reasonable.

The phrase "stock combination" didn't mean much until I reread the last page of the brochure where it says the exterior finish was "Fairchild standard colors". At the bottom of the same page of the brochure it lists the three Fairchild aircraft built in 1929, so I began a search through my resources to see if I could find color photos of any of these aircraft. Sure enough, I had color data for two restored Fairchild 71s, but both of them were painted only two colors, not three. (See page 61 of Mitchell's book noted above for one of these two schemes). After close examination of the photo for the 21 in the *Airway Age* advertisement, I could see a curved color demarcation line on the front side of the fuselage similar to the restored 71 shown in Mitchell's book. But the page in *Airway Age* looked like the two colors on the fuselage should be dark, while the restored 71 had dark red and white. So at this point I was not very confident about a light color on the side of the fuselage of the 21. However, it was encouraging to see a dark red stripe along the wing leading edge for the restored 71, as you can see a similar feature for the 21 in *Airway Age*.

I reviewed all the photos again, this time with a magnifying glass. The photo of the 21 on floats in Kent Mitchell's book indicates a light fuselage side with the same color curvature as shown in the *Airway Age* advertisement and very similar to that of the restored 71. I contacted Kent Mitchell but he had no definitive color data for the Model 21.

As a result, based on the photo of a restored 71 in Mitchell's book, I have used red and white colored tissue to approximate what appears as "Fairchild standard colors". If you choose to airbrush the model, the following would be better than just colored tissue.

| | |
|---|---|
| Fuselage: | Overall dark red with white on side. |
| Stab and Elevator: | Dark red. |
| Fin & Rudder: | White. |
| Wing: | White with dark red stripe on the leading edge tapering around the tip. |
| Logo on fin: | White on dark red background. Notice the absence of the "FA" in the logo in the photo, but included in the logo at the bottom of pg 20. |
| Registration: | Dark red |
| Wing struts: | White |
| Landing gear: | White |
| Exhaust: | Aluminum |

The second color photo of a different restored 71 was painted with the same color pattern as the red and white 71 (except there was no stripe on the wing leading edge). However, medium blue and Diane Cream replaced the red and white colors respectively.

## PREVIOUS MODELS AND MORE COLOR DATA

I have two references for previous models of the Fairchild 21 (and there may be others unknown to me). The first came from Dave Stott, suggesting I look at the May 1932 issue of *Model Airplane News*. Sure enough, on page 40 there is an advertisement (see page 15) with a picture of a model of the 21.

The second reference is noted in Issue 37 (March 2002) of the *KAPA* (Kits and Plans Antiquitous) *Kollector* newsletter. The lead story, written by Charles Schultz, gives a historical sketch of *Custom Scale Design* model aircraft plans by Charles Steinchak. Plan CSD-35 is noted as the

Fairchild F-21 Sport. Hurst Bowers has a copy of this plan, so we got together and I took a look at the drawing, which notes that the plan is based on a "Silver Ace model by Aero Model Airplane Co., Chicago, IL, circa 1929 to 1932". Since the advertisement noted for the first reference was printed in the May 1932 Issue of *Model Airplane News*, the picture in this advertisement is probably the Aero Model kit.

Steinchak's plan also includes the following notation about colors: "Authentic Color Scheme: Wings, tail surfaces, wheel disks International Orange. Prop natural wood (white oak or walnut stain. Exhaust pipe aluminum. Remainder of plane enamel black. Optional silver fuselage stripe. Fairchild insignia BS fin black on silver BG". I have no idea what *this* "BS" stands for (bottom side?), but "BG" is probably "background".

I found one other article about the 21 at the Smithsonian that appeared in the January 1929 issue of *Airway Age* (see page 21). If International Orange reproduces as a light color, this may be the photo used by Steinchak. As noted earlier, this plane went through a significant number of structural changes, so variations in the paint scheme could also be justified.

## MODEL CONSTRUCTION

Most of the model uses standard building methods, but as usual, I've included several features that are personal favorites. Starting with the fuselage, I've used a technique I presented in a past issue of this newsletter (July/August 1998), but it may be worth repeating. You'll notice that the wing sits in a saddle, part F1. When you cut these root ribs, cut out the saddle *and* rib in one piece and then cut the top portion of the rib to remove it from the saddle. This will give a perfect fit for this rib in this saddle and will help prevent warps when the rib is ultimately glued to the saddle.

The width of the cockpit opening shown on the 3-view scales up to a whopping 20 inches, which might allow a 10-year old to climb in for flight training. So this has intentionally been enlarged from the 3-view. Photos support this change. The exhaust pipe was made from reed soaked in hot water, bent to the desired shape around pins, allowed to dry overnight, and sanded to the outline shown.

When you put the stringers on the top of the fuselage from F7 to the rear, tack-glue a piece of 1/16 balsa at the rear of the fuselage support for the stab and glue the stringers together on top of this temporary spacer.

Now let's look at the front cowling area. The schematic shows the engine installation I use on all my $CO_2$ models, as it permits the replacement of the entire engine and tank at the field (provided I've remembered to bring another unit). The $CO_2$ cylinder was located at about the 7 o'clock location on F2 so that the copper tube from the top of the engine is as unobtrusive as possible. The filler nozzle protrudes at about the 5 o'clock position so it doesn't interfere with the exhaust pipe. The dummy cylinders were made from the smallest available from William's Brothers. The thrust line can be made adjustable by slipping small "O" rings or slices of neoprene tubing over the bolts and between the motor and F2. Tighten or loosen the bolts to make the adjustments. Finally, I built the model cowling as close to scale as the 3-view allows, but in doing so, I could only fit the narrow (approximately ½ inch diameter) tank through the opening in the balsa cowl. When I drew the inked version of the plans, I intentionally increased the width of the cowl just a tad to allow the use of a 6-cc tank, which has a diameter of about ¾ inch.

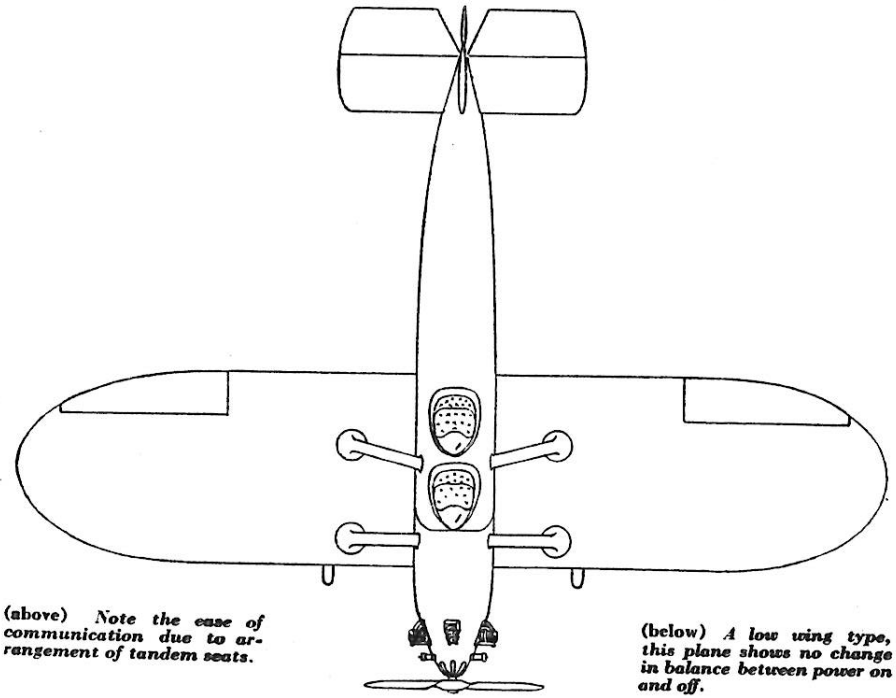
The wing is very conventional with one exception. The root ribs, W1, include the leading edge that I cut from the saddle. This gives a good visual guide to sanding the leading edge while attempting to maintain a reasonable semblance to the Clark Y airfoil.

The landing gear oleo structure is simulated by balsa dowels and wrapping the lower portion with bond paper. You can easily make these dowels by repeatedly forcing sufficiently large square balsa sticks through the holes in a wire gauge and using smaller and smaller holes until the dowel is the desired size. The 3-strut landing gear is not visible in the side or front view, but is shown in the schematic on the fuselage top view.

## FLYING

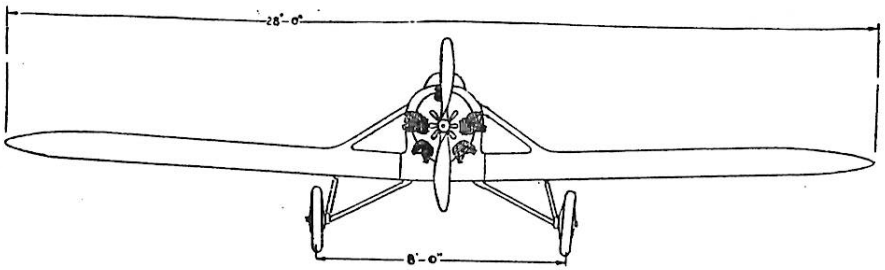
It took a whopping total of seven flights to get the model to circle and fly as steady as you could ever want. Four of those test hops were simply increases in the power setting of the Brown $CO_2$ peanut engine. The Fairchild 21 is a natural flier, and would be ideal if doubled in size and powered by an electric motor.

# The FAIRCHILD 21



(above) *Note the ease of communication due to arrangement of tandem seats.*

(below) *A low wing type, this plane shows no change in balance between power on and off.*

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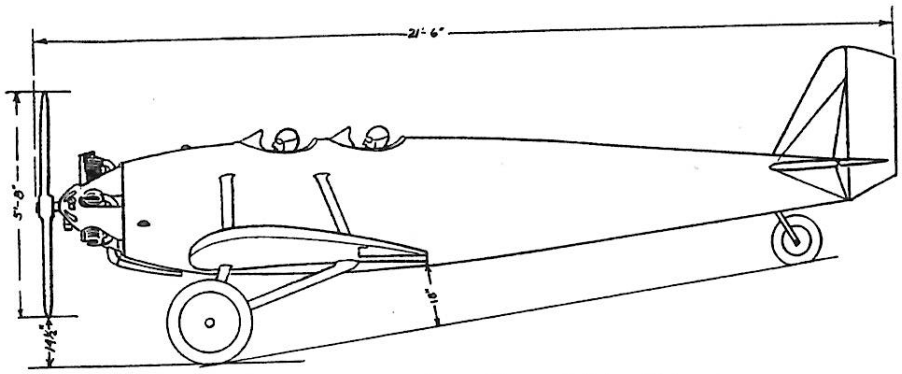


*The exceptional visibility from either cockpit is well shown.*

SINCE the pioneer days of Wright and Curtiss, thousands and thousands of pilots have been taught to fly. Yet, until now, never in the history of American aviation has there been a commercial plane specifically designed for the instruction of student flyers.

The Fairchild "21" has been built to meet this need. Every element of its design contributes to its unique suitability as a school plane.

*General Arrangement* The Fairchild "21" is a two-place low wing semi-cantilever monoplane of simple construction. The only type of airplane which exhibits no change in balance between power on and power off conditions is the low wing type.

In order to eliminate the possibilities of a tail high landing or landing in a soft field and nosing over, the landing gear wheels have been moved considerably forward of the center of gravity of the airplane. The more usual cause in nosing over is "ground looping," or making a turn while the plane is taxiing along the ground. This danger has been entirely eliminated by the wide wheel track which makes it possible to ground loop the "21" at 40 m.p.h. without any tendency to scrape a wing tip.

The two cockpits in tandem are easily accessible, and the design allows excellent range of vision from both. The cockpits are so situated that the airplane can be flown solo from either cockpit without the use of ballast. The dual controls located in each cockpit include rudder pedals, brake pedals, control sticks, throttle, mixture control, ignition switch and gasoline shut-off control. The throttle controls are so arranged as to close the







mixture control whenever the throttle is closed to preclude the possibility of dead stick landing.

*Wing Construction* The wings are of conventional construction with box spars and spruce ribs. In order to provide a smooth wing contour the rib spacing is closer than required for structural considerations. The wing tips are elliptical in plan form, which plan form is considered the most efficient aerodynamically. The drag truss is designed to keep the wing torsionally stiff under any condition of flight. The bearing surfaces of all drag bracing fittings on the wing are exceptionally large to eliminate the possibility of the drag bracing's becoming loose or being pulled into the wood.

The ailerons, extending from the rear spar to the trailing edge, are tapered in plan form and are balanced to compensate for yaw. The action of the ailerons is differential—the up movement being 30 degrees and the down movement 10 degrees. With this arrangement of the ailerons the student or pilot can maintain lateral control below stalling speed and there is no possibility of throwing the machine into a spin when the machine is stalled.

*Fuselage Construction* The fuselage is constructed entirely of welded chrome-molybdenum tubing, reinforced at the joints with chrome-molybdenum steel plates. The inside walls of the tubes are oiled with hot linseed oil and sealed to prevent corrosion. It is the careful attention to myriads of details such as this that makes a good airplane.

The entire assembly of the fuselage is on a master jig which makes possible the interchangeability of wings and landing gear with any fuselage.

*Tail Surfaces* The tail surfaces are all constructed of built-up Alclad channels riveted together and covered with cloth, forming a very stiff, light structure.

The elevators and rudder are unbalanced and are jigged for interchangeability.

The stabilizer is built up in two interchangeable sections. This design simplifies the stocking of spare parts.

The tail surfaces are externally braced by means of streamline steel wires.

The stabilizer is anchored rigidly to the fuselage in any one of the three positions. This is a very valuable feature because it means that the fin and stabilizer can be anchored rigidly to the fuselage with streamline wires, absolutely preventing tail flutter. The usual stabilizer with screw or lever adjustment, no matter how well designed or accurately made, sooner or later develops play and tail flutter sets in. The vibrating tail is a very disconcerting, not to say dangerous

condition and with the Fairchild method of construction it is absolutely prevented.

*Landing Gear* The landing gear is of the split axle type, having the unusually wide tread of 8 feet. This makes the airplane much easier to taxi than others of its size, in addition to being steadier in one wheel or cross wind landing. The shock absorbers are of the oil and spring type, having a total travel of 10½ inches. The first six inches of this travel is cushioned on oil alone. The long stroke results not only in soft landings, but in much more comfortable taxiing.

The landing angle is 11 degrees, while the stalling angle of the wing is 18 degrees; therefore, as is often the case, a perfect landing is made at considerable distance above the ground. The airplane can stall at a vertical speed of about 8 feet per second before the stalling angle is reached. There is no tendency in a high landing for the nose of the airplane to whip down—the usual result of stalling. There being no recoiling to the landing gear the rebound is eliminated in a high rough landing. On the other hand, if a student tends to make a landing below the ground, as is often the case, the easy action of the oleo struts changes the angle of attack on the wing so slowly there is no tendency to bounce. The construction of the landing gear is such as to turn poor landings into good landings.

One of the features of the Fairchild "21" is the tail wheel which replaces the conventional tail skid. The advantages of this innovation are obvious. The cushioning in the tire in addition to the travel of the whole unit at once eliminates the shocks. The tail wheel is carried in the fork which is free to travel the full 360 degrees. The swiveling is restrained by rubber shock absorber cords of sufficient strength to prevent oscillation of the wheel in taxiing, but flexible enough to allow the wheel to deflect when striking ruts or when turning. The tail wheel fork is, in turn, carried in the frame which is pivoted to the fuselage and is free to move upwards and backwards under the shock of landings. The entire unit, except for the wheel, is housed inside the fuselage where it can be inspected or removed quickly as a unit. The tail wheel tire is 14 x 3, which is the new commercial size now available. The total travel of the rear wheel on the oil and spring shock absorber is 8 inches, in addition to the cushion effect obtained from the tire in operation.

Besides the easy riding qualities, there are two genuine advantages to the tail wheel when handling the Fairchild "21" on the ground: first, either brake can be locked and the airplane swung around in less than its own length without raising the tail and without damage or danger to the tail wheel or to the rear of the fuse-







lage; second, it is never necessary to lift the rear of the fuselage when moving in or out of the hangar. One more advantage of the tail wheel is that it does not cut up the flying field. It eliminates the necessity for continual replacement of a tail skid shoe—quite an item on an airplane used for instruction and continually making landings and take-offs.

*Brakes* Brakes of simple and positive action are standard equipment on the Fairchild "21." They are an exclusive feature and unusual in a plane of this type.

*Instruments* Included as standard equipment are the following "Pioneer" instruments:

Air Speed Indicator
Altimeter
Tachometer
Oil Pressure Gauge
Oil Temperature Gauge

All instruments are located in the student's cockpit. Instruments in the front cockpit are optional. Considerable thought and study have been given to the proper location of the instruments and cowling openings that in case of a minor accident no injury can result to the occupants.

*Power Plant* The Genet engine installed in the Fairchild "21" is a five-cylinder, air cooled, radial type. It has a service record of three years. It has powered most of the planes of record flight on the continent and especially in England, and has proved itself to be the most reliable light engine of its class. The usual Fairchild service has been extended to cover stock parts and replacements.

A Hamilton wooden propeller was selected as standard equipment. This has been chosen in preference to a metal propeller because it is quieter and quietness is a primary requirement when communication is carried on in the air between instructor and student.

The cowling is very neat and convenient. The magneto cover in front of the engine is made up as a unit which may be removed in a few seconds, thereby completely exposing both of the magnetos. The oil tank is removable without disturbing the rest of the installation. The treatment of the exhaust manifold is novel in that it does not project outside of the cowl surface, but is carried in a deep recess. This results in excellent streamline and an appreciable increase in speed. The exhaust is gathered in a collector ring and is carried off in a tail pipe under the fuselage.

*Fuel System* The gasoline is carried in one 20-gallon tank located in the fuselage and it feeds by gravity to the carburetor. None of the gasoline is carried in the cockpit. The gasoline line is so attached in the gasoline tank that no gasoline can be trapped in the tanks. A valve on the fire-wall of

approved air service type controlled from the cockpits turns the gasoline on and off; from the valve it passes through a strainer in which any water is trapped.

*Exterior Finish* The outside of the Fairchild "21" is finished in three colors—in any one of the stock combinations or to the customer's specifications. The finish is Berryloid and consists of nine coats sprayed on and sanded under carefully controlled conditions—temperature control, humidity control and exhaust fans to insure an excellent finish on all airplanes.

*Strength of Materials* All Fairchild airplanes are built to the Department of Commerce specifications and carry an Approved Type Certificate. Every individual part in every Fairchild airplane is carefully inspected by a competent inspector and stamped with his approval. Every Fairchild inspector has been trained in inspection by previous work for the government.

Many refinements are incorporated in Fairchild construction which are found in no other commercial aircraft. The extensive use of cadmium plating to prevent corrosion is a good example. The annealing of all copper gasoline and oil lines is another. Oiling of the inside of the fuselage to protect the inner wall of the tube is one more. All materials used in this airplane are built in accordance with Army and Navy specifications. This includes wood, bolts and nuts, drag bracing and linen.

Control in stalled flight has been obtained through the use of Gottingen 387 airfoil, which has long been known for its anti-stall and anti-spin characteristics. This makes a more expensive wing to build but it results in far greater safety.

Every Fairchild plane receives at least an hour and a half in test flights to prove its airworthiness in all respects. When your Fairchild is delivered, you need ask no questions, it is ready to fly.

## PERFORMANCE

| | | | |
|---|---|---|---|
| Service Ceiling | 9,400 ft. | Landing Speed | 40 m.p.h. |
| Gross Weight | 1,250 lbs. | Initial Climb | 700 ft. per min. (sea level) |
| Weight, empty | 755 lbs. | Cruising Speed (1,880 r.p.m.) | 90 m.p.h. |
| Disposable Load | 495 lbs. | Cruising Range | 425 miles |
| High Speed | 105 m.p.h. | | |

*seven*

## SPECIFICATIONS

*Type*.....2-place low wing, semi-cantilever tandem cockpit monoplane designed as training plane.

*Wings*.....139 sq. ft. area. Gottingen 387 airfoil. Spruce box spars. Double drag bracing. Balanced ailerons (18.68 sq. ft.).

*Landing Gear*.....10½ in. vertical wheel travel. Oil and spring action. 8-ft. tread. Tires 25 x 3.85. Full swivel tail wheel.

*Brakes*.....Exclusive Fairchild design.

*Fuselage*.....Welded chrome-molybdenum steel tubing jigged for interchangeability.

*Tail Surfaces*.Built-up Alclad channels. Interchangeable unbalanced elevators (9 sq. ft.) and rudder (4.5 sq. ft.) Stabilizer (13 sq. ft.) anchored at 3 points.

*Pilot's Controls*.....Dual controls. Stick and rudder pedals. Heel-operated brakes. Instrument board has air speed indicator, altimeter, tachometer, oil pressure and temperature gauges.

*Power Plant*..80 h.p. Genet at 2,200 r.p.m. Hamilton wooden propeller. Impulse magneto. Starter optional.

*Fuel System*..1 tank—20 gallons. Strainer and water trap.

*Strength and Materials*.....U. S. Department of Commerce Type Certificate applied for. Air Service material specifications.

*Interior Finish*.....Leather upholstery. Marshall spring cushions. Tandem seats.

*Exterior Finish*.....Fairchild standard colors or to customer's specifications.

*Dimensions*. .Span 28 ft. 3 ins. Length 21 ft. 6 ins.

# FAIRCHILD
# *AIRPLANES*
# 1929

*The 71 seven passenger cabin.* * *The 41 four passenger cabin.* * *The 21 two passenger op*

FAIRCHILD AIRPLANE MANUFACTURING CORPORATION
FARMINGDALE, LONG ISLAND, N. Y.

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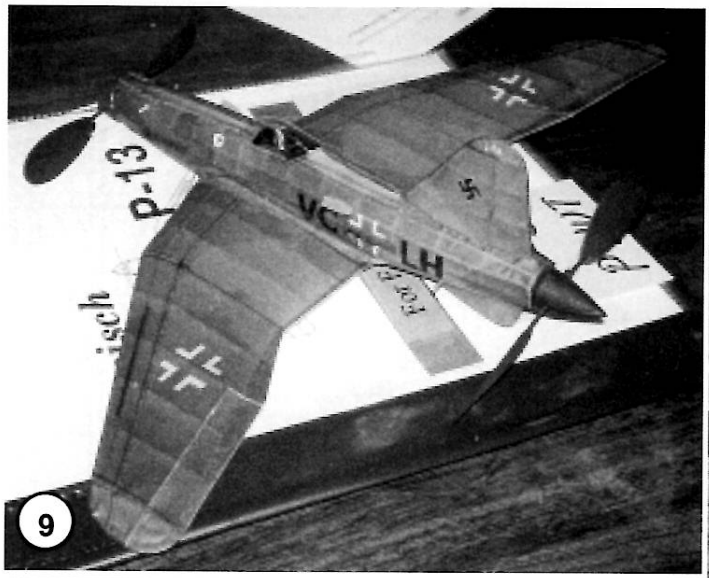
**PHOTOS ON NEXT PAGE (FAC NATS continued)**

9. A peanut Lippisch P-13 by Frank Rowsome, who won FAC Rubber Scale with a larger version.
10. Bob Marchese with his electric Horten IV. This was a former MAX-FAX plan.
11. An Aviatik Peanut by Chris Starleaf.
12. Our fearless Secretary (Bert something-or other) shows off his Erie Times Special.
13. Another Chris Starleaf entry for Rubber Scale, this one a Savoia S-71 tri-motor.
14. Fernando Ramos with his diesel powered Swordfish.



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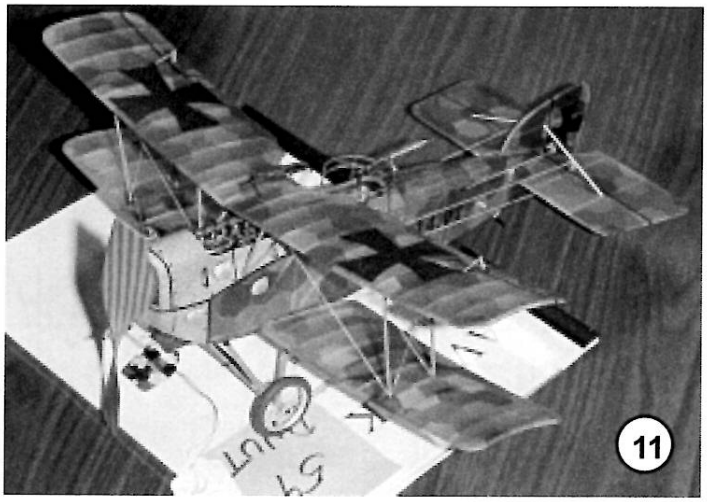
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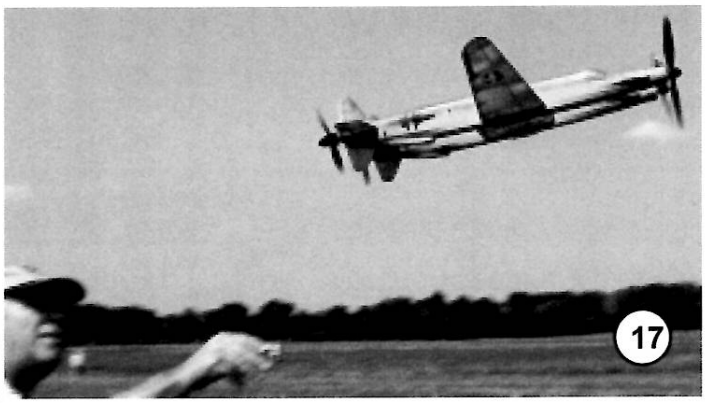
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19


20

## PHOTOS ON THE PREVIOUS PAGE (FAC NATS continued)

15. Pat Daily with his D-VII WW-I entry.
16. Jane Smith and husband Lindsey came from England to attend the affair. Here Jane is launching her P-51 Miss America Racer.
17. Tom Arnold must enjoy winding rubber. Here he is launching his Junkers experimental 635 with four motors.
18. A pretty Hall Racer by Pres Brunning.
19. Jack Moses with his rubber scale Contestor.
20. Our mentor, Earl Stahl, posses with Jack Felter and Earl's non-scale "Hurricane".

## RULES FOR GUILLOWS W-II EVENT AT THE NATIONAL BUILDING MUSEUM ON NOVEMBER 10, 2002

Russ Sandusky is sponsoring an event for the 18-inch span Guillow 500 series WW-II kits. Here are his rules:

1. Must use kit wood.
2. Must use decals, plastic cowls, canopy, scoops, etc. all plastic parts supplied.
3. Cowl can be modified for adjustments.
4. Colored Jap tissue may be substituted.
5. Dihedral may be increased slightly.
6. No landing gear required unless it is fixed on actual plane.
7. Rear motor mount may be relocated.
8. Stab and rear of fuselage may be opened to allow for adjustments.
9. Models will be timed, mass launched and judged by the contestants for appearance.

For additional information, contact Russ at russell.sandusky@verison.net

## THE CHRISTMAS BANQUET

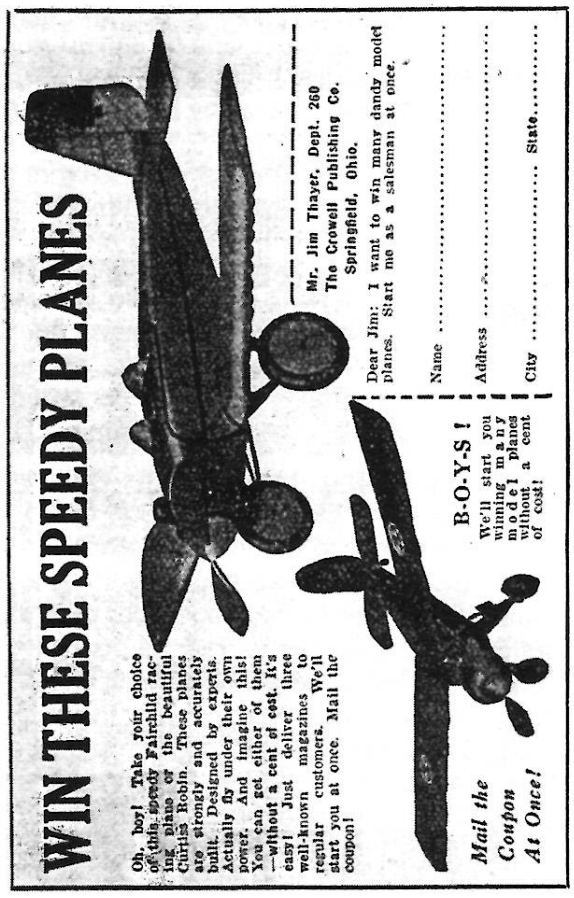
The annual club banquet will be at the French restaurant Bistro Francais in Georgetown. The date is Sunday evening Dec 8 at 6:00 PM. The cost is $26.00 per person including all taxes and tips. It also includes a glass of wine. Cash bar before dinner and coffee after dinner is extra. We have room for only 32 people, so please get reservations in to Paul early. Send checks for your reservations to Paul Spreiregen, 2215 Observatory Place NW, Washington, DC 20007, phone (202) 337-2887.

## SAM CHAPTER 10 COLLECTO
## Sunday, Jan. 12, 2003, noon to 5:00pm
## Sunday, Mar. 30, 2003, noon to 5:00pm

SAM Chapter 10 (Capital Area Antique Modelers Association) is sponsoring two Collectos in 2003. This is the 15th year that SAM Chapter 10 is sponsoring MECA Collectos. It will be held in the meeting room of the Fairfax County Tysons-Pimmit Regional Library, 7584 Leesburg Pike, Falls Church, VA.

Exit the Washington D.C. Beltway (I-495) onto State Rt. 7 (Leesburg Pike, Virginia exit 47-B East), toward the city of Falls Church. After passing the second traffic light, take the next left turn into the library parking lot. This is the same location as previous Collectos, and donations will be accepted to cover the costs of running the event.

The library has only 10 tables in the meeting room, so it is requested that attendees bring tables. Your hosts will be Jim Coffin (703 256-3865) and Marty Schindler (703 938-2975).




This advertisement showing the Fairchild Model 21 appeared in the May 1932 issue of *Model Airplane News*.

# THE DEVELOPMENT OF AMERICAN PRIVATE AVIATION

## Part 2:
## THE EVOLUTION OF THE LARGE CABIN CLASS AIRCRAFT

Allan Schanzle

### THE IMPACT OF THE DEPRESSION

The personal aircraft industry was seriously affected as the depression progressed past 1929. Between 1929 and 1934, the number of companies making aircraft dropped from 132 to 48, and engine makers declined from 21 to 10. In 1929, there were 6193 civilian airplanes manufactured. In 1932, this was reduced to 550. It appeared that the future of private aviation was very bleak. But there were still 550 aircraft built in 1932, so the industry was not dead, but definitely hurting. It certainly wouldn't have taken long to "call role" at an aircraft manufacture's convention.

As noted at the end of Part 1, 1929 saw several consolidations, such as the merger of Curtiss and Wright and their buy-out of Travel Air. The acquisition of smaller companies, such as Stinson, by the Cord automotive empire, gave the acquired companies sufficient financial clout to survive. Others, like WACO, did it by keeping low levels of debt and inventory.

But there was a special class of those that survived. Stinson, WACO, Beechcraft, Howard, and Spartan contributed to the golden age of aviation by building a new type of airplane; the large, luxurious, cabin class.

### BEECHCRAFT CORPORATION

Walter Beech became a reasonably wealthy man after selling Travel Air to Curtiss Wright, apparently from the sale of much of his Curtiss Wright stock prior to the market collapse in October 1929. During his tenure at Curtiss Wright, Beech reasoned that if he could build a four or five seat executive plane that was as fast as his Mystery Ship and as luxurious as a limousine, it would be a winner. It would double the speed of the current (1930/31) cabin class aircraft. This dream began to take form in 1931, when Beech and a young Curtiss Wright engineer, Ted Wells, began to design the aircraft on their own time. They called it the Model 17, as Model 16 was, at the time, the last Curtiss Wright designation.

The Model 17 was to be powered by the Wright R-1510 radial that put out 750 hp. According to Wells' calculations, this should produce a speed near 250 mph. The wings were set at the unusual orientation of "negative stagger" to maximize the pilots upward and lateral visibility.

Beech proposed the design to Curtiss Wright, but they rejected it because they thought it was too big a risk considering the current economy. This was all Beech needed to fulfill a long-time dream. He left Curtiss Wright to start his own company with his wife, Olive Ann, with the goal of building the ultimate executive plane. Ted Wells joined them as chief engineer and partner. Thus was formed the Beechcraft Corporation.

When Travel Air was purchased in 1929 by Curtiss Wright, they were moved to St. Louis, but now with his own company, Walter Beech choose to return to Wichita, Kansas to establish Beechcraft. By May, 1932, a small group of ex-Travel Air employees were at work on the Model 17 in the mothballed Cessna facility. The first Model 17, designated 17R, was powered by a 420 hp Wright R-975-EL engine because the R-1510 had not been approved by the Department of Commerce.

On November 5, 1932, the Model 17R, painted maroon and red (which became the standard Beechcraft color combination), was ready for the first flight. Test pilot Wilbur Hill had a perfect maiden test hop, and within a few days, the 17R had achieved 201 mph, an astonishing speed for a cabin class personal plane. An ATC for the 17R was given on December 20, 1932.

Although the 17R met all of Beech's expectations, it appeared that he might have miscalculated what businessmen were willing to pay for such performance and luxury. In the spring of 1933, there was only one 17R purchased at the $18,000.00 price tag.

Beech and Wells realized that they were well ahead of all others in performance, but also price. There was room in the design to simplify the construction and use a lower powered/cost engine, and the resulting product would still outperform any Stinson or WACO. This modified version was designated B17L, and was available for around $8,000.00. This version had retractable wheels, spruce to replace steel tube spars in the wing, and the airfoil was changed to improve low-speed han-

dling. The economic 225 hp Jacobs radial was hung on the front, and a 50 gallon tank was standard, although 70 and 90 gallon tanks were optional. Beech felt that as the economy and sales improved, they could always upgrade the engine to obtain additional performance.

The 17L took to flight for the first time in the spring of 1934, and the results were impressive - cruise speed of 162 mph and a range of 600 miles with a standard tank. With the same engine, the Stinson SR-5 poked along at 120 mph with a range of 390 miles while costing about $2,000.00 more. Buyers got in line, and the company moved back into the old Wichita Travel Air factory to have more room. Seventeen orders had been received by the end of 1934, when the plane got its ATC. The company actually showed a small profit that year, and was well positioned to regain stature as the economy began to improve.

The C17R version of the Staggerwing, using a 420 hp Wright power plant, was entered in the 1936 Bendix Race with two woman as pilots: Louise Thaden and Blanche Noyes. It competed against Howard's "Mr. Mulligan", the Weddell Williams racer, Lockheed's Electra, Northrop's Gamma and Orion, and even a DC-2. Some bad luck on the part of their competitors gave the Staggerwing the victory.

## WACO

(Continued from Part 1)

In the late 1920's, WACO saw the success of the Stinson SB and SM series, and realized they needed to develop a new cabin class aircraft to compete in the aviation personal business industry.

The first WACO cabin class airplane was the QDC, and evolved from the Model "F" open cockpit biplane, known as the RNF (see Part 1 for a reference to decode the letter system). The RNF was a surprisingly successful aircraft, with over 150 sold through 1931.

The QDC was adapted from the RNF by A. Francis Arcier, WACO's chief engineer who had just come over from the General Aircraft Company, where he had designed the Aristocrat cabin monoplane. The QDC was first shown to the public at the 1931 Detroit Air Show. To help hold down costs, the engine was a 110 hp Warner Scarab.

The following year, WACO produced the UEC, which used a 210 hp Continental, and in 1933, the UIC, with many small refinements, such as the NACA cowling with aerodynamic blisters over the rocker arms.

The success of Beech's Staggerwing brought WACO into the large cabin class manufacturing camp. In 1935, they divided their line into "Standard" and "Custom" models. The Standard was an extension of the 1934 cabin class, but was stripped down to achieve a rock-bottom price. These were designated as the YKC (in 1934) and the YKC-S (in 1935).

The Custom WACO had a scaled-down lower wing, elliptical wing tips, roomier cabin, and other esthetic modifications. It came with a 210 hp Continental or either a 225 or 285 hp Jacobs.

Little changed in the various models until 1939, when the WACO E came on the scene. Improvements were made in smoothing out the aerodynamics, the addition of flaps, and the use of different props and cowls. It was more streamlined and built for speed. The smallest engine was the 300 hp Jacobs on the ARE model, but the most popular version, the SRE, used a 450 hp Pratt and Whitney Wasp Jr. It cruised at 195 mph at 9,600 feet and had a range of 1000 miles. WACO called it the "Aristocrat".

The WACO N tricycle gear model appeared in 1938, but was not well received.

## STINSON AIRCRAFT CORPORATION

(Continued from Part 1)

In 1930, the Stinson company, now a subsidiary of the Cord Automotive Company, proceeded with the SM series, but it responded to the depression needs by introducing a reduced price "Junior", the SM-8A, powered by a 215 hp Lycoming radial. It included many luxury items, such as a soundproofed and heated cabin, electric starter, and brakes. An aircraft with all these goodies would normally sell for $10,000.00, but Stinson's price was a paltry $5,775.00. This pricing policy paid off in volume sales, with more than 350 SM-8As sold in 1930. Stinson definitely had the market on the large cabin class until WACO produced the QDC, the first in a series known as a WACO cabin.

Stinson responded to this challenge from WACO in 1931 by reducing the price of the SM-8A and renaming it the Model "S". At the same time, Stinson began designing a new craft with major upgrades, and this was called the Model "R", which ultimately became the SR Reliant.

Ed Stinson was always intrigued with speed, and it was his goal to improve this aspect

of the Model "S". While Stinson's test pilot and salesman Jack Kelly were on a demonstration flight, they got grounded by weather in the airport in Springfield, Massachusetts that was used by the Grandville Brothers, makers of the Gee Bees. Kelly took this opportunity to talk with Gee Bee designers Bob Hall and Bob Ayer, and convinced Ayer to come join Stinson and try to improve the performance of the "Junior", now called the Model "S". Not unsurprisingly, Bob Hall joined them the following year.

Ayer incorporated some cleanup in the aerodynamic configuration, reduced the weight, changed the cowl, and made some other refinements that increased the speed by 10 mph using the same engine. This aircraft became the prototype of the Model "R", and on January 25, 1932, it received its ATC. The same day, Stinson took it on a sales tour, stopping at Chicago's Municipal Airport for several demonstration flights. It was dark when he left with two associates and a CEO of a steel company. As they passed over the shoreline of Lake Michigan, the Lycoming sputtered and quit. Stinson chose to try an emergency landing on a golf course, but an unseen tree in the dark caused a terrific crash. All occupants appeared bruised, but OK. Ed Stinson walked into the emergency room at Illinois Central Hospital, where he collapsed. He died the next morning.

The Stinson company was now without its leader. The depression was deepening, and company sales fell to about 50 aircraft. Only significant salary cuts kept the employees on the payroll.

Slowly, Bill Mara and chief engineer Jack Irvine rallied the company, and by the fall of 1932, they had a retractable gear version of the Model "R" (the R-3). But the weight increase involved with the retracting mechanism negated the aerodynamic advantage of the retracted gear. Stinson executives concluded that a well-faired-in fixed gear was a better option for the type of aircraft they were building, and by 1933, they introduced a plane that became their best seller, the SR Reliant. This aircraft retained the 215 hp engine, but the SR-2 used a 240 hp Lycoming. More than 100 Reliants were sold in 1933, including the custom SR-1 and SR-3 (two of each of these were built) and the SR-4 (only one built). All of these had only minor variations from the original Reliant.

In the spring of 1934, Stinson brought out the SR-5, which incorporated a slightly more powerful engine (225 hp) and a sleeker NACA cowl. It was the first production plane in the large cabin class to incorporate flaps. The SR-5A used a 245 hp Lycoming. With the SR-5 series, Stinson was strongly back in business. The SR-6 was very similar to the SR-5, and came out in 1936. All of these used the Stinson "straight wing".

The company's most successful line was the SR-7, which was essentially an SR-6 with a new wing. It was introduced in 1936 and became known as the Gull Wing Stinson. It was offered with a variety of engines ranging from 225 to 260 hp.

The prototype SR-7 had some initial problems, as it would not recover from a spin test, and the pilots had to bail out. Certification was given after the installation of stall strips. A later model, the SR-9, had wing strut problems, but this was easily solved.

## HOWARD AIRCRAFT COMPANY

With the success of the Staggerwing, Benny Howard, who had designed the DGA (Damned Good Aircraft) racers, got thinking that he should be able to design an executive cabin class 4-place aircraft that would win many prestigious air races. He knew that it wouldn't keep up with the aircraft designed for racing, but for cross-country competition, his new craft would fly higher, which would avoid some weather problems, and use less fuel, requiring fewer stops. As with many before him, he concluded that winning races would result in sales.

To build such a plane, Howard once again recruited Gordon Israel, the young engineer who worked with him on his racers. In four months, the DGA-6, which became known as "Mr. Mulligan", was ready for the 1934 race season. It was aerodynamically smooth and used a massive 500 hp Wright Wasp engine which was hopped up to produce 830 hp. The engine alone cost $5,500.00, but it was all worth while. At 17,00 feet, and the plane set for "cruise", it blazed along at 290 mph.

The aircraft was entered in the 1935 Bendix race from Los Angeles to Cleveland, Ohio. It beat Weddell Williams racer by 23.5 seconds, even though the pilot of the DGA-6 unknowingly had the flaps down for 500 miles after refueling at Kansas City.

The Bendix race was followed by the Thompson Trophy, a race of 10 laps, each of which was 15 miles long. Roscoe Turner was ahead up to the last lap, but then blew a cylinder, allowing the second place Howard craft to win. Mr. Mulligan was the only plane to win the Bendix and Thompson races in the same year.

These victories created strong interest in a commercial cabin class version of Mr. Mulligan. As a result, The Howard Aircraft Company was created in 1936 in Chicago in the same factory as used previously by Laird.

The prototype production version of Mr. Mulligan was designated DGA-7. It had a 420 hp engine and a slightly larger wingspan. Only one was built, and was used to refine the first production model, the DGA-8. With a 320 hp Wright radial, it cruised at 191 mph at 12,000 feet and had a range of about 900 miles.

In essence, the DGA-8 was a custom built airplane, and other engine options became available. The DGA-9 and -12 had 285 and 300 hp Jacobs respectively. The Model 11, approved in 1938, came with a 450 hp Pratt and Whitney Wasp Jr. More than 70 cabin Howards were built for the market prior to the attack on Pearl Harbor.

## SPARTAN AIRCRAFT COMPANY

(Continued from Part 1)

The ultimate cabin class airplane may well have been the Spartan Executive. This was a modern all metal low-wing monoplane with retractable gear. Some considered it in a class with the DC-3, rather than its contemporary cabin class competition. It looked like something from the future, and had performance to match.

The Spartan took form in 1934. As the economy began to recover, so did the profits of the Skelly Oil Company, the owner of the mothballed Spartan Aircraft Company. Bill Skelly and Spartan's manager, Ed Hudlow, saw the sleek, modern, all metal airplanes like the DC-2 and thought there was a place for a smaller version of the transports for personal business.

They hired Jim Ford to create a physical example of what they saw in their mind's eye. Great secrecy was maintained until 1936, when the prototype was nearing its first flight, which occurred in March 1937. Test flights showed the plane was under powered with the 285 hp Jacobs and that the vertical stabilizer was too small. By the end of 1937, a 450 hp Pratt and Whitney Wasp Jr. was installed as well as a redesigned tail section. With these modifications, the plane was given its certification. Spartan designated the plane as the 7W, but it was called the Spartan Executive to get the attention of the business world. The primary customers were oil production and drilling companies. These were probably the only corporations that were capable of picking up the $23,000 sticker price. One was sold to King Gazi of Iraq, who called it "The Eagle of Iraq". It was confiscated by the British Royal Air Force in World War II and crashed during a landing in Scotland.

Only 34 Executives were made because Skelly couldn't foresee the need for large-scale production; hence the high price tag. But of the 34 built, approximately one third are still flying.

## LARGE CABIN CLASS AIRCRAFT AND THEIR CORPORATIONS DURING WORLD WAR II

Strangely enough, WW-II gave several of the large cabin class corporations a big last hurrah that led to large scale production numbers.

Beechcraft received orders for 412 of their D17S Staggerwing model. In peacetime, Beech made only 68 of them. The Army Air Corps designated this as the UC-43, and the Navy, the GB-3.

Stinson had shut down the manufacturing of the Reliant, but in 1942, it got a contract to manufacture 500 Reliants for the Royal Navy under the Lend/Lease program. These were designated V-77 by the factory, which was now part of Vultee. Their military code name was AT-19.

Howard hit it big with the Navy, who ordered 663 DGA-15s. WACO and Spartan didn't receive military orders for their cabin class aircraft, but WACO made 600 UPF-7 open cockpit trainers and designed the CG-4 troop carrier glider. WACO, Beech, and Cessna banded together to produce the CG-4.

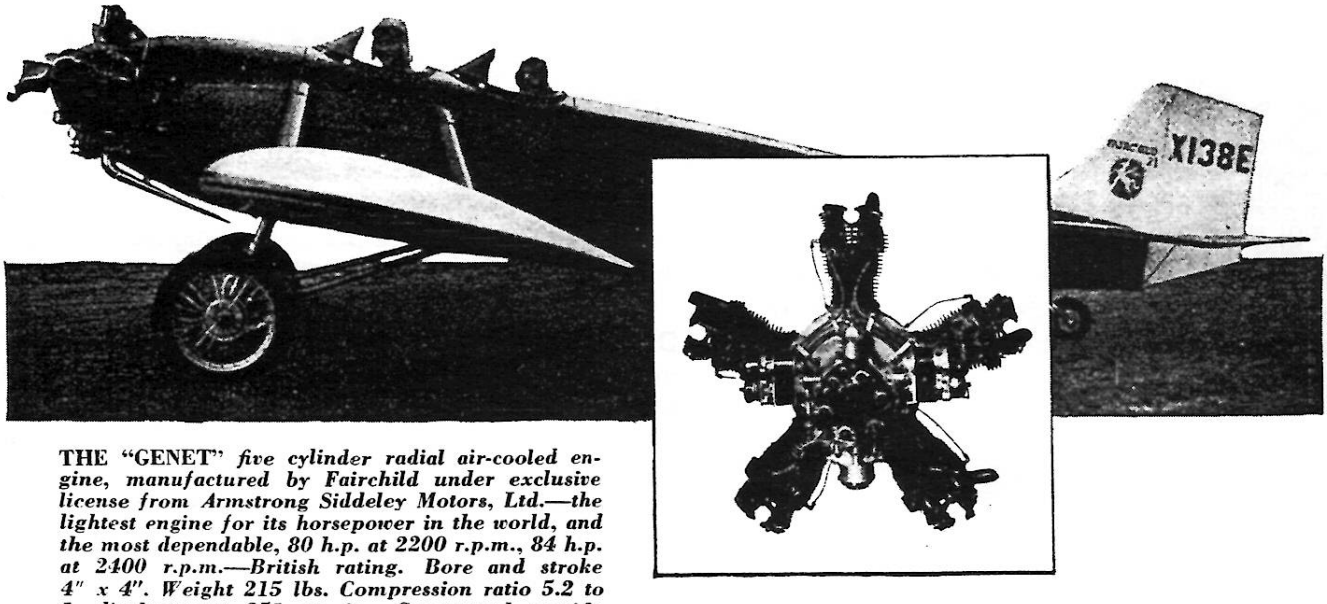
Spartan converted the Spartan School of Aeronautics into a major training center for pilots and mechanics. Eventually, J. Paul Getty purchased the Skelly Oil Company, and hence Spartan, and produced parts for the B-24.

## THE LARGE CABIN CLASS AIRCRAFT, IN RETROSPECT

By the end of the 1930s, the large cabin class airplane had reached its peak in popularity. What brought down these massive aircraft was their large gas-guzzling radial engines and the appearance of the light, horizontally opposed "flat four" engine. The initial versions of these new engines put out only 40 to 50 hp, but by the end of the 1940s, they produced nearly 300 hp at a fraction of the operating cost of the big radials. By the end of WW-II, the beautiful hand-crafted large cabin class planes were priced out of production and became collector items.

(Part 3 to follow)

# A NEW CEILING *in Training Plane Value*




**THE "GENET"** ***five cylinder radial air-cooled engine, manufactured by Fairchild under exclusive license from Armstrong Siddeley Motors, Ltd.—the lightest engine for its horsepower in the world, and the most dependable, 80 h.p. at 2200 r.p.m., 84 h.p. at 2400 r.p.m.—British rating. Bore and stroke 4" x 4". Weight 215 lbs. Compression ratio 5.2 to 1, displacement 251 cu. in. Guaranteed specific fuel consumption is .55 lbs. per horsepower hour. Guaranteed oil consumption .025 lbs. per horsepower hour.***

## *The "21"*

## with its time-tested small engine of proven dependability and performance

YOU know and we know that a training plane has to be *good.* Any other idea is the most dangerous sort of false economy.

The Fairchild "21" is the *first* commercial plane in the history of American aviation designed at every point for the instruction of student flyers. The "Genet" engine, now being produced in volume by Fairchild at Farmingdale under exclusive license from Armstrong Siddeley, Motors, Ltd., answers for the *first* time the need for an American small airplane engine of *proven* dependability.

The Fairchild "21" is not merely good. It is at least a year ahead of the field at every point of comparison. Materials and workmanship are A plus—judged even by Fairchild standards. Safety factors have been actually doubled at crucial points. It is a low wing plane. "Floating" is eliminated and full vision is provided for both instructor and student. Top speed is 105 miles per hour, and at its cruising speed of 90 miles per hour the "21" has a range of 425 miles. The landing wheels have *an eight foot spread*—30% of the wing span. Oleo shock absorbers eliminate bouncing. The plane can be ground looped at 40 miles per hour without scraping a wing tip.

If you, as a training school operator, are in business to stay and to make a profit, the "21" is the plane you want. At $4,250 flyaway Farmingdale—completely equipped and ready to fly—it will return more than a dollar's worth of service for every dollar you put into it.

P. S. As is likely to happen when a good designer starts in to do a good job regardless, the Fairchild "21" looks its quality inside and outside. Over and above its use as a training plane, a lot of the more canny and air-wise sportsmen are going to want it for personal use.

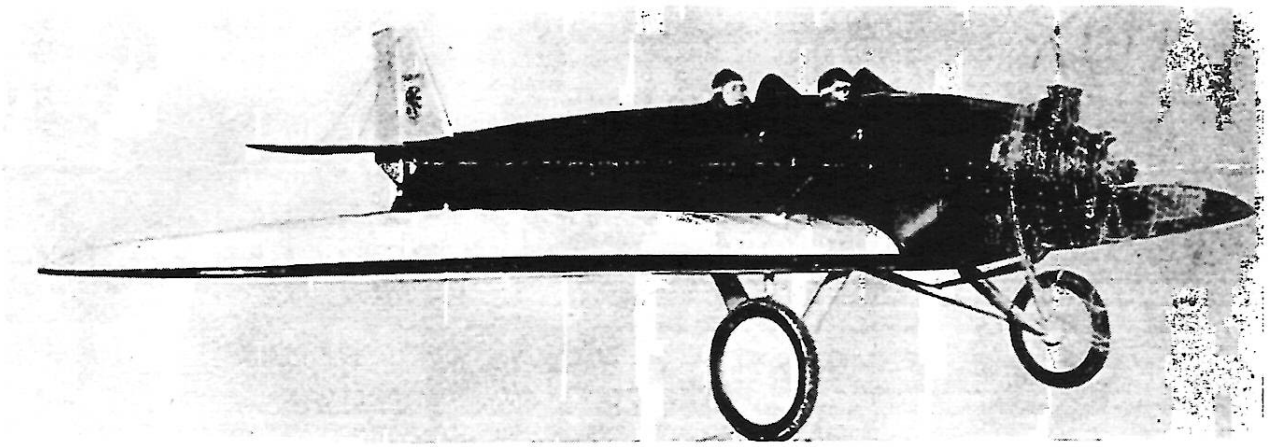
Fairchild offers a dealer proposition which will command the immediate interest and respect of your banker—and which will enable you to sell planes at a profit. Prompt deliveries in the flying season are assured to dealers who place their orders now. Write or telegraph Fairchild Airplane Manufacturing Corporation, Farmingdale, Long Island, N. Y.

# F A I R C H I L D

*AIRPLANES* 20

# Fairchild 21 Low-Wing Monoplane

ONE of the three new planes exhibited by the Fairchild Airplane Manufacturing Corporation, Farmingdale, L. I., N. Y., is the "21" model. This is a two-place low wing semi-cantilever monoplane of simple construction. In order to eliminate the possibilities of a tail-high landing or landing in a soft field and nosing over, the landing gear wheels have been moved considerably forward of the center of gravity of the airplane. The more usual cause in nosing over is "ground looping," or making a turn while the plane is taxiing along the ground. This danger has been eliminated by the wide wheel track which makes it possible to ground loop the "21" at 40 mph without any tendency to scrape a wing tip.



**The Fairchild "21" Two-place Monoplane**

The two cockpits in tandem are easily accessible and the design allows excellent range of vision from both. The cockpits are so situated that the airplane can be flown solo from either without the use of ballast. The dual controls located in each cockpit include rubber pedals, brake pedals, control sticks, throttle, mixture control, ignition switch and gasoline shut-off control. The throttle controls are so arranged as to close the mixture control whenever the throttle is closed to preclude the possibility of dead stick landing.

The wings, which have an area of 139 sq. ft., are of conventional construction with box spars and spruce ribs. In order to provide a smooth wing contour, the rib spacing is closer than required for structural considerations. The wing tips are elliptical in plan form; this is considered the most efficient aerodynamically. The drag truss is designed to keep the wing torsionally stiff under any condition of flight. The bearing surfaces of all drag bracing fittings on the wing are exceptionally large to eliminate the possibility of the drag bracing's becoming loose or being pulled into the wood.

The ailerons, extending from the rear spart to the trailing edge, are tapered in plan form and are balanced to compensate for yaw. The action of the ailerons is differential—the up-movement being 30 deg. and the down movement 10 deg. The student or pilot can thus maintain lateral control below stalling speed and there is no possibility of throwing the machine into a spin when it is stalled. The ailerons have an area of 18.68 sq. ft.

The fuselage is constructed entirely of welded chrome-molybdenum tubing, reinforced at the joints with chrome-molybdenum steel plates. The inside walls of the tubes are oiled with hot linseed oil and sealed to prevent corrosion.

The entire assembly of the fuselage is on a master jig which makes possible the interchangeability of wings and landing gear with any fuselage.

The tail surfaces are all constructed of built-up Alclad channels riveted together and covered with cloth, forming a stiff, light structure.

The elevators and rudder are unbalanced and are jigged for interchangeability. The stabilizer is built up in two interchangeable sections. This design simplifies the stocking of spare parts. The tail surfaces are externally braced by means of streamline steel wires.

The stabilizer is anchored rigidly to the fuselage in any one of the three positions. This is an important feature because it means that the fin and stabilizer can be anchored rigidly to the fuselage with streamline wires. absolutely preventing tail flutter. The usual stabilizer

with screw or lever adjustment, no matter how well designed or accurately made, sooner or later develops play and tail flutter sets in.

The landing gear is of the split-axle type, having the unusually wide tread of 8 ft. This makes the airplane much easier to taxi than others of its size, in addition to being steadier in one wheel or cross-wind landing. The shock absorbers are of the oil and spring type, having a total travel of 10½ in. The first six inches of this is cushioned on oil alone. The long stroke results not only in soft landings, but in much more comfortable taxiing.

The landing angle is 11 deg. while the stalling angle of the wing is 18 deg.; therefore, as is often the case, a perfect landing is made at considerable distance above the ground. The airplane can stall at a vertical speed of about 8 ft. per second before the stalling angle is reached.

One of the features of the Fairchild "21" is the tail wheel which replaces the conventional type. The advantages of this are obvious. The cushioning in the tire, in addition to the travel of the whole unit at once, eliminates the shocks. The tail wheel is carried in the fork, which is free to travel the full 360 deg. The swiveling is restrained by rubber shock absorber cords of sufficient strength to prevent oscillation of the wheel in taxiing, but flexible enough to allow the wheel to deflect when striking ruts or when turning. The tail wheel fork is, in turn, carried in the frame, which is pivoted to the fuselage and is free to move upwards and backwards under the shock of landings. The entire unit, except for the wheel, is housed inside the fuselage where it can be inspected or removed quickly as a unit. The tail wheel tire is 14 in. by 3 in. which is the new commercial size now available. The total travel of the rear wheel on the oil and spring shock absorber is 8 in., in addition to the cushion effect obtained from the tire in operation.

Included as standard equipment are the following *Pioneer* instruments: Air speed indicator, altimeter, tachometer, oil pressure gage and oil temperature gage.

All instruments are located in the student's cockpit. Instruments in the front cockpit are optional. Considerable thought and study have been given to the proper location of the instruments and cowling openings that, in case of a minor accident, no injury can result to the occupants.

The Genet 80-hp. engine installed in the Fairchild "21" is a five-cylinder, air-cooled, radial type. It has a service record of three years. It has powered most of the planes of record flight on the continent and especially in England, and has proved itself to be a reliable light engine.

A Hamilton wooden propeller was selected as standard equipment. This has been chosen in preference to a metal propeller because it is quieter and quietness is a primary requirement when communication is carried on in the air between instructor and student.

The cowling is neat and convenient. The magneto cover in front of the engine is made up as a unit which may be removed in a few seconds, thereby completely exposing both of the magnetos. The oil tank is removable without disturbing the rest of the installation. The treatment of the exhaust manifold is novel in that it does not project outside of the cowl surface, but is carried in a deep recess. This results in excellent streamline and an appreciable increase in speed. The exhaust is gathered in a collector ring and is carried off in a tail pipe under the fuselage.

**Performance Data for Fairchild 21**

| | |
|---|---|
| Service Ceiling | 9,400 ft. |
| Gross Weight | 1,250 lb. |
| Weight, empty | 755 lb. |
| Disposable Load | 495 lb. |
| High Speed | 105 m.p.h. |
| Landing Speed | 40 m.p.h. |
| Initial Climb (sea level) | 700 ft. per min. |
| Cruising Speed (1,880 r.p.m.) | 90 m. p. h. |
| Cruising Range | 425 m. |

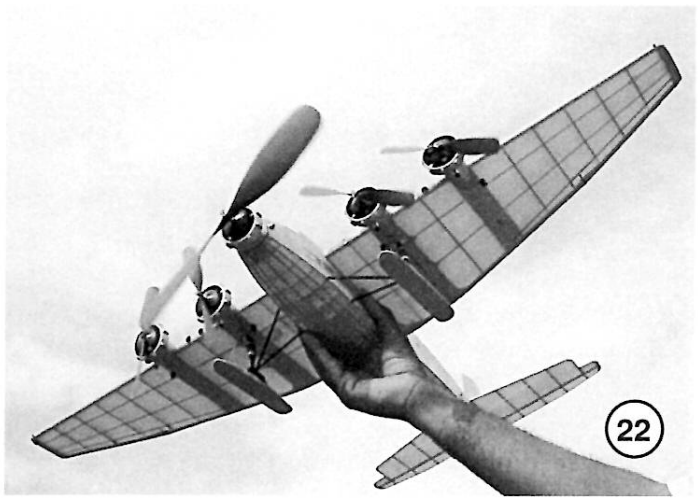
The gasoline is carried in one 20-gallon tank located in the fuselage and it feeds by gravity to the carburetor. None of the gasoline is carried in the cockpit. The gasoline line is so attached in the gasoline tank that no gasoline can be trapped in the tanks. A valve on the firewall of approved air service type controlled from the cockpits turns the gasoline on and off; from the valve it passes through a strainer in which any water is trapped.

The outside of the Fairchild "21" is finished in Berryloid and consists of nine coats sprayed on and sanded under carefully controlled conditions—temperature control, humidity control and exhaust fans to insure an excellent finish.

**PHOTOS ON NEXT PAGE (FAC NATS continued)**

21. The winner of WW-I and the Cole Palen Award, Claude Powell, holding his Curtiss Hawk.
22. Vance Gilbert made a quest for bonus points with his ANT-14 and *FIVE* motors.
23. A p-51 Mustang in experimental camouflage by Jack Moses.
24. Bob McLellon with his Hawker Hurricane WW-II entry.
25. Lindsey Smith with his colorful Focke Wulf WW-II Me 262 airbase defender.
26. An Albatros D-II by Jack Kacian, who won the Earl Stahl award with his Wright Flyer.
27. John Hutchinson, a member of the Scale Staffel, placed fourth in WW-II with his Me 109E.


21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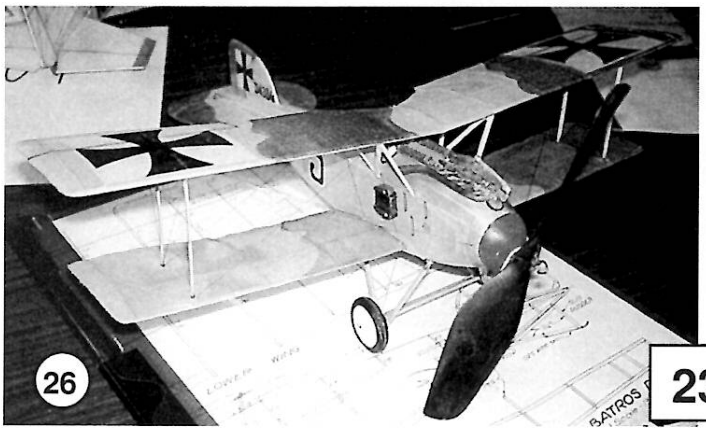
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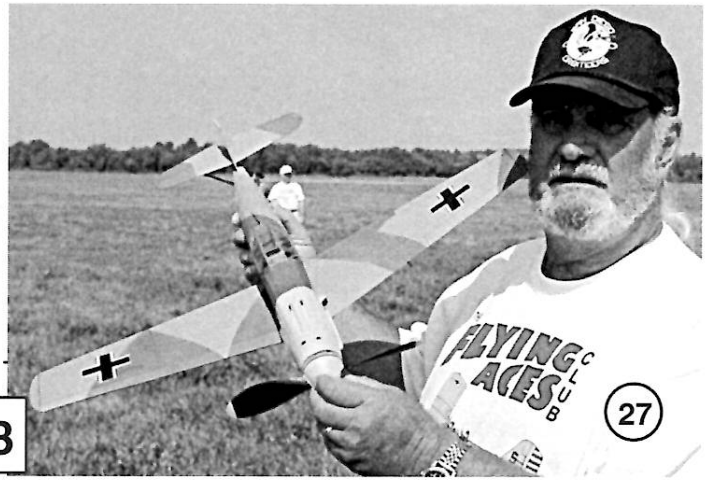

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**MAX-FAX, Nov./Dec. 2002**

Some Maxecuter winners! Clockwise from the top: Tom Hallman's immaculate FAC NATs power winning DH-2; repeat FAC NATs winner in multi-power is Terry Pittman's Farman; Claude Powell's terrific Halberstadt, published in MAX-FAX, flew to a WWI FAC NATs victory; Terry Pittman placed in power scale with his Besson MB-411 from a MAX-FAX Don Srull plan ; another MAX-FAX plan by Hurst Bowers, was used for Don's giant Lincoln All Purpose that won at Raeford last year: and finally, Frank Rowsome showed 'em how to fly and took first in rubber scale at the FAC NATs with his Lippisch P-13. Great going guys!

COLOR DEMARCATION LINE, TOP & BOTTOM (TAPER TO POINT AT TIP) RED WHITE

¼ x 5/16 L. E.

1/32 x 1/16

1/16 DOUBLER

1/64 PLY DOUBLER

W4 W3 W2 W2 W2 W1

BALSA FOR L.G. STRUT ANCHOR

WING STRUTS

BLACK WING WALK

REGISTRATION TOP RIGHT, BOTTOM LEFT

2 LAMINATIONS 1/16 SQ.

F2 1/32 PLY

$CO_2$ CYLINDER LOCATION

NOTCHES ON F7 ONLY

F3 F4 F5, F6, F7 F8 F9

F10

F11

RIGGING ANCHOR LOCATION

COPPER WIRE HINGE

1/8 X 1/16 TYPICAL

WING STRUTS

3-STRUT L.G. LAYOUT

NOTE: ALL WOOD 1/16 BALSA EXCEPT AS NOTED

LAMINATE 2 PIECES ¼" AND 1 PIECE 1/8"

1/32 BALSA SHEET

COLOR DEMARCATION LINE RED WHITE

F2 F3 F4 F5 F6 F7 F8 F9 F10 F11

RIGGING

XI38E

FIN LOGO

STAB

WINDSHIELD

CYLINDER TUBE SLOT

FILLER TUBE SLOT

SCREWS HOLD F2 TO COWL

F1

W1

HOLLOW OUT FOR INSERTION OF TANK

CARVE FROM SOFT BALSA

BALANCE POINT

BRACE ON BOTTOM TO HOLD L.G. STRUT

1/16 O.D. ALUM. TUBING

L.G. WIRE SIDE VIEW

BOTTOM OF RIB

L.G. WIRE FRONT VIEW

1.5"

# FAIRCHILD MODEL 21

Designed and Drawn by Allan Schanzle
April 2002
Wing Span = 16 inches
Powered by a Brown $CO_2$ Peanut