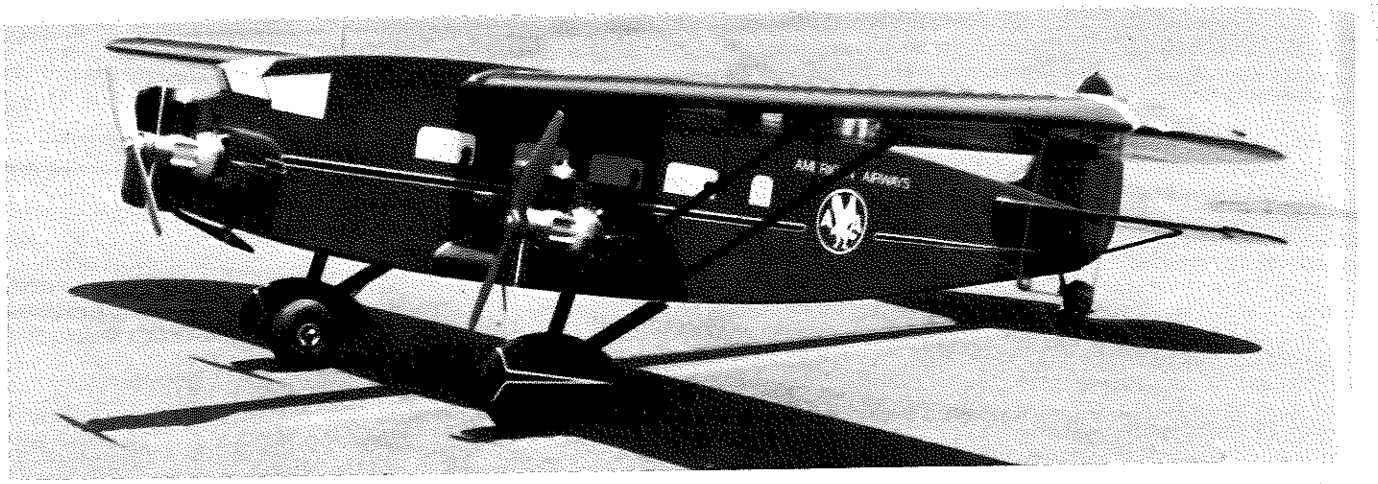


# STINSON MODEL "U"

**By MIKE KEVILLE . . . Half-A Profile Scale is an event that is rapidly gaining in popularity. Our author's three-engine 1930s airliner offers a good introduction to the event and to multi-engine C/L models in general.**

● Stinson's Model "U", produced from 1931 to 1933, was the last in their series of tri-motored, high-wing airliners. Spanning 66 feet 2 inches, and powered by three 240-hp Lycomings, the "U" featured many advanced items for its day, and sold new for $27,000 . . . about the cost of an R/C Giant Scale ship today, we'd reckon. Flown by American Airways, forerunner of today's American Airlines, most model versions seem to be trimmed in that livery, and this one's no exception.

Longtime readers may recall Don Butman's Peanut Scale version in the April '74 issue of *Model Builder*. Dave Shipton, of Delavan, Illinois, had a gorgeous C/L "U" at the '66 Glenview Nats. An .010-powered free flight rendition was once built and flown (!) by Bill Stroman. And now . . . for what it's worth, the Half-A Profile Scale version.

Several members of our club, Southern California's "Knights of the Round Circle," suggested we try to get this thing published. We immediately chose *MB* with its much-appreciated equal billing of C/L and F/F. The Editor/Publisher has been a friend through the years, offering us a sincere "welcome back" after a long absence from modeling. The guy is down-to-earth; despite being an AMA Hall-of-Famer and all-around big-timer, he's managed to maintain the same hat size, if you know what we mean.

For scale data and 3-views, we contacted Dave Shipton. To our delight, he responded by sending his 22-year-old Nats presentation booklet, containing Wylam drawings and copies from the pages of an old issue of *Popular Aviation*. We then enlarged the Wylams four times, which yielded a wingspan of 50 inches and an overall length of 33.75 inches. This works out to a scale of 3/4 inch = 1 foot, or 1/16th full size.

A word about power. You could modify things and use beam-mounted engines, such as Cox Medallions, WenMacs or OK Cubs. (If you have Cubs for sale, we need to talk.) Or, with some changes, center the Babe Bees. Being basically lazy, and in view of the vertical needle valves required, we mounted them off-center. Up close, we'll admit it looks sort of tacky—but in flight it's no big deal. Ample, but not outrageous, power is provided by 6x3 props and 25% nitro fuel.

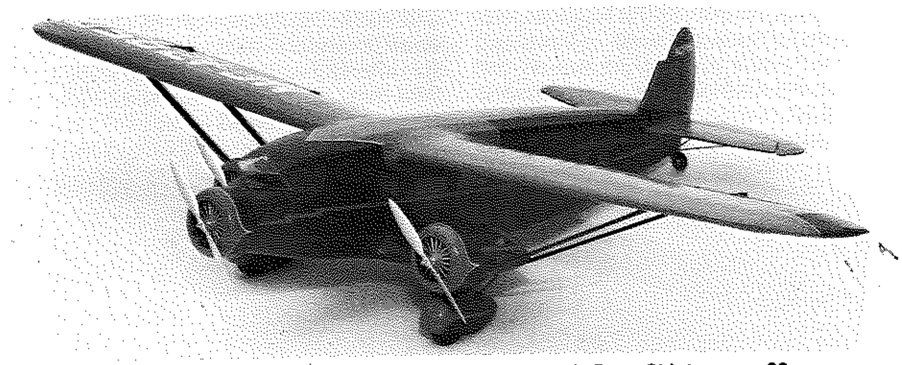
Construction of this little airliner is fairly standard, so we'll just try to highlight any unusual features. It's helpful to "kit" and prefabricate as much as possible, as this seems to speed assembly somewhat and allows plenty of time for the fun (?) of painting and decorating.

**MAIN WING**

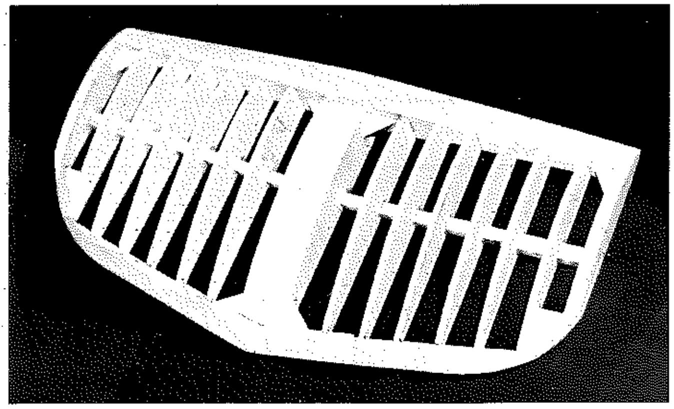
Sliced ribs (64 of 'em) were used for lightness and to avoid having to cut all those holes for the buried spars. You'll also save a bundle of bucks on balsa this way. Use a template of 1/16 ply for the top rib pieces, and go to it. Rib bottoms are lengths of 1/8 sq. stock.

If you can't readily locate any light-but-firm 3/4x1 balsa for the L.E., trim some one-inch square on a scroll saw, which will also help ensure straightness. Note the slight dihedral in the panels, and allow for

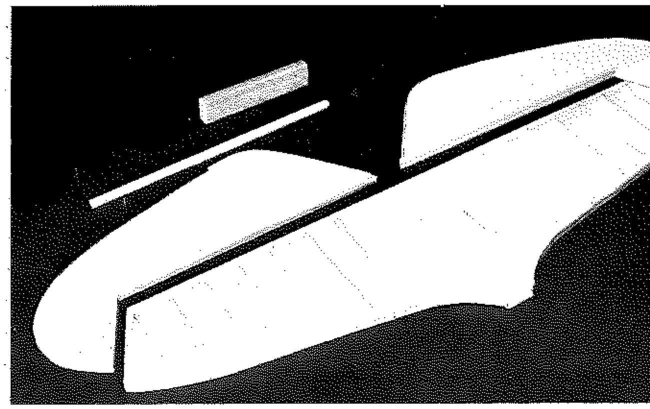
**Mike did a fine job on the model Stinson but it still looks pretty sick compared to his daughter, Michele. At 13 years of age, she is already a competent C/L flier. Mike says Michele can land a C/L model better than he can. We think so too—we've seen him fly!**



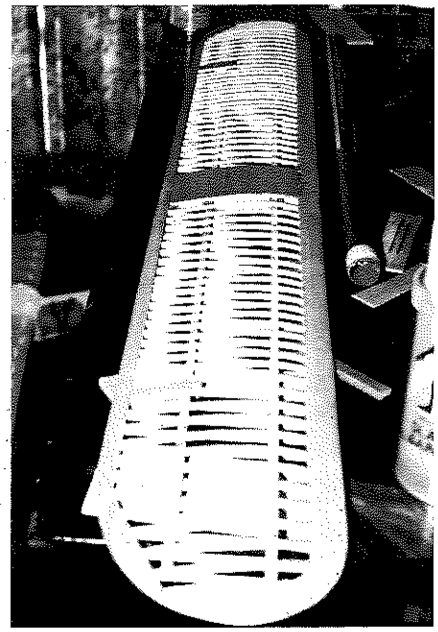
**Gorgeous full-fuselage C/L Stinson built by Hobby Hideaway's Dave Shipton over 20 years ago. Dave originally flew it with three Arden .09s, now has three dummy Lycomings for static display.**



Sesquiplane structure needs to be strong to withstand landing shocks. Leading edge is carved from a solid balsa block.



Horizontal stab is a 1/16 balsa core with 1/8 balsa outlines and ribs top and bottom. A quick and easy way to simulate a built-up structure.



Rib tops are sliced from 1/8 sheet, bottoms are 1/8 sq. Not as difficult as it looks.

that when installing the center ribs.

Spar height and locations aren't critical; just be certain they're strong enough to do the job, and that they contact every rib. Do be sure to install the ply spar joiners and balsa gussets.

Wingtips on the original were cut from 3/16 sheet as shown on the plans. While these don't look too bad, an alternate method would be to laminate them for a more realistic appearance using four thicknesses of 1/32x1/8 basswood soaked in ammonia/water and glued around a form of the inside dimension of the tip. (For more information on laminated wingtips, refer to past "F/F Scale" columns by Fernando Ramos.)

On rib spacing, note that while most ribs are 3/4-inch apart, those toward the center of each panel are spaced at only 5/8-inch. This follows the scale spacing per the Wylam drawings and allows for a somewhat stronger strut support area—probably Eddie Stinson's intent in the first place.

The four center ribs (two of 1/8, two of 1/4-inch balsa) are solid, and require spar openings to be cut, including space for the spar joiners. Note that each of these ribs is undercut by 1/16 inch, top and bottom, to accept the center-section sheeting. Dihedral is 3/8-inch at each tip. Carefully block-sand to this angle and join the panels with your favorite adhesive, then secure the previously-inserted spar doublers and slide the solid ribs into place. Install about 3/4 ounce of outboard tip weight. Fill in all the dings, carve and sand everything to final shape and cover as desired.

*(Editor's note: As shown in the photos and on the plan, Mike originally mounted all three engines on the inboard side of the nose and nacelles, in an effort to direct the thrust toward the outside of the circle. However, flight tests have since shown a very definite need for increased outboard tip weight, at least twice the 3/4 ounce specified above. Mike recommends either relocating the engines to the outboard side and sticking with the 3/4-ounce weight, or building the model as per the original and installing at least 1-1/2 ounces of outboard tip weight.)*

We found it helpful to cover and finish the wing prior to its installation. If you agree, remember to leave about 3/8-inch of bare wood at the center for adhesive penetration. You may want to reinforce the wing/fuselage junction with lengths of 1/8-inch dowel.

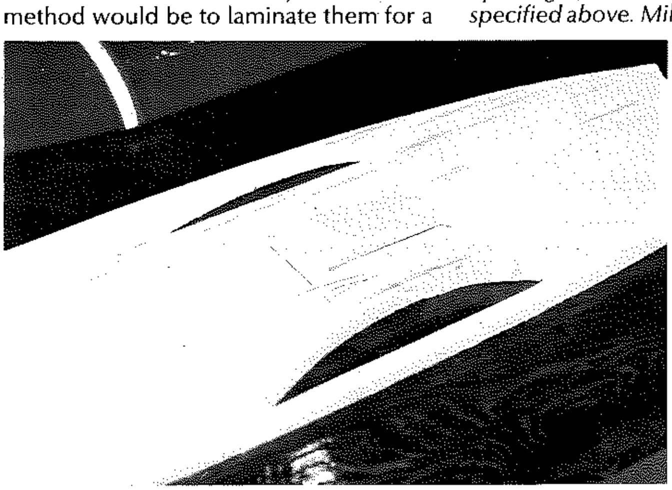
**SESQUIPLANE (Lower Wing)**

This unit absorbs a lot of stress. It supports the two outboard engines and takes the landing shock. Although light weight is important, think strength here. Don't omit the dowels, gussets or ply joiners. Select a length of firm 1x1-1/8 inch balsa, mark the center and taper it to 3/4-inch square at each tip, with the "sweep" being on both the L.E. and the bottom surface. Ribs are solid. Note the "vee" dihedral on the under surface and taper the SP-1 rib bottoms to blend in with this.

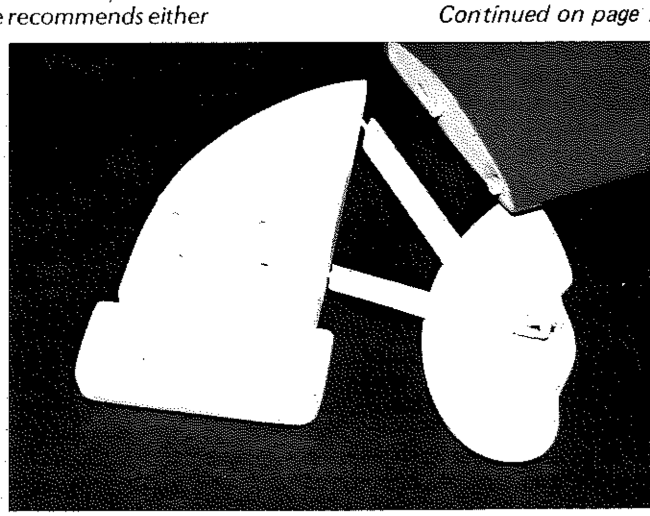
Among other things this author can't do is plot rib patterns. Ribs SP-2 through SP-8 were eyeballed and trimmed to shape as things went along—based on SP-1. As such, the sesquiplane ribs on the plan are approximate shapes; you'll have to judge as you go along .... or perhaps you know how to plot tapered ribs properly?

The 1/4-inch tip ribs (SP-8) are added after the L.E. and T.E. are carved and sanded

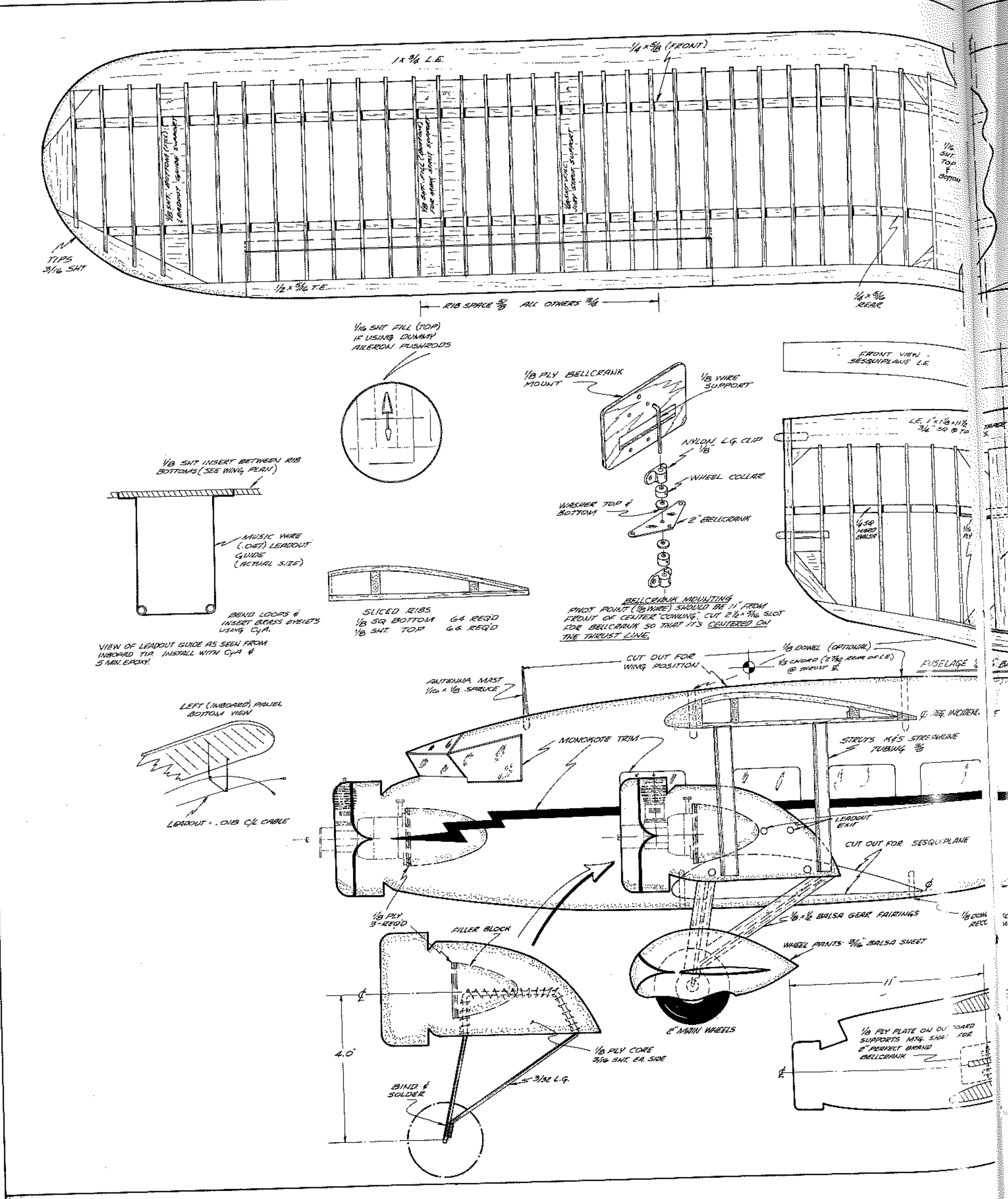
*Continued on page 79*

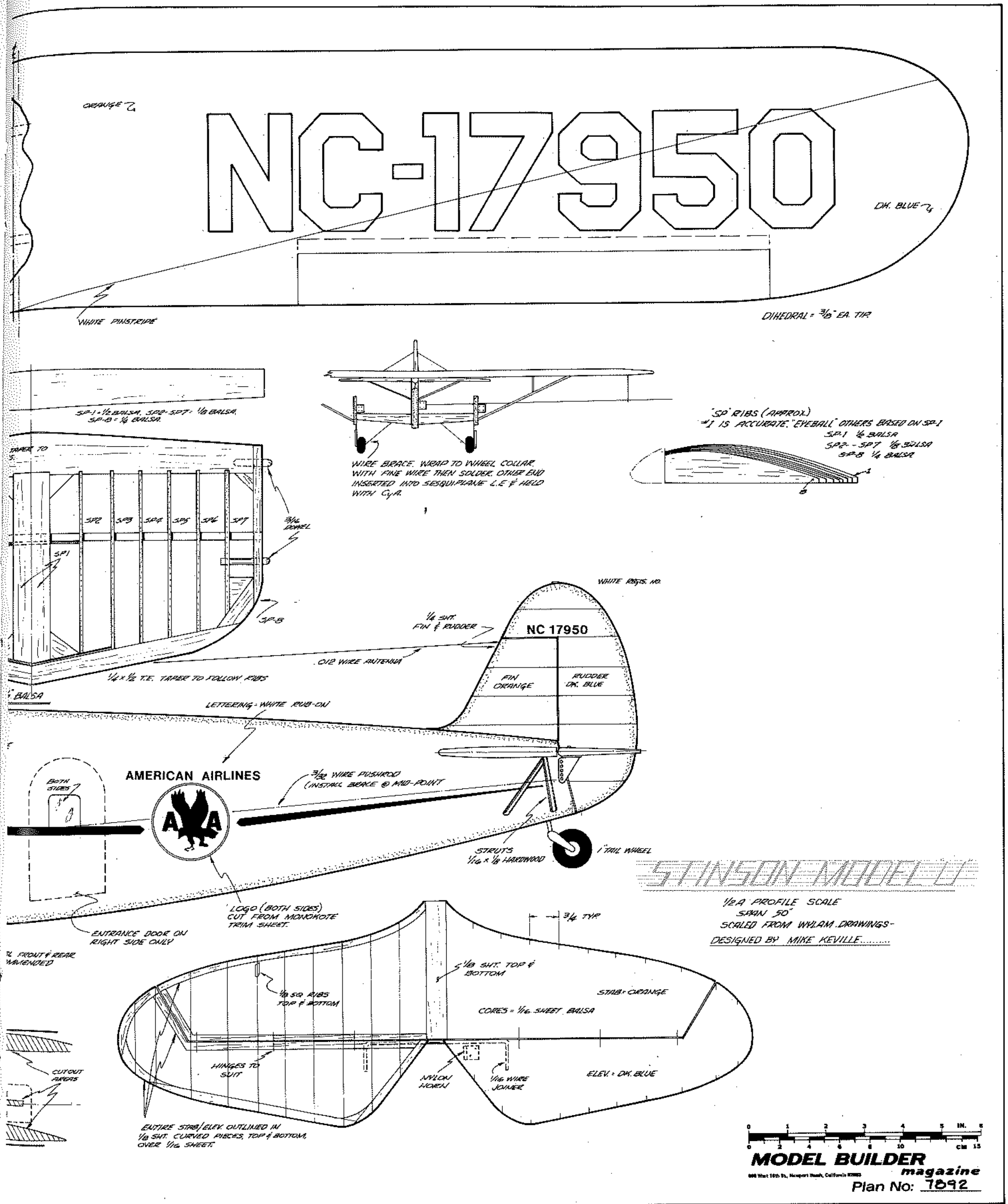


Outboard side of the fuselage shows the 1/8 ply bellcrank mounting plate. Fuselage is completely painted and trimmed before final assembly—makes things a lot easier all around.



The outboard nacelle, engine mount, landing gear strut, and wheel pant, all ready for painting.


1/4 × 5/8 (FRONT)
1 × 3/4 L.E.
1/8 SHT. BOTTOM (T.E.) LEADOUT GUIDE SUPPORT
1/8 SHT. FILL (BOTTOM) FOR MAIN STRUT SUPPORT
1/16 SHT. FILL JURY STRUT SUPPORT
1/16 SHT. TOP & BOTTOM
TIPS 3/16 SHT
1/2 × 5/16 T.E.
RIB SPACE 5/8 ALL OTHERS 3/4
1/4 × 5/16 REAR
1/16 SHT FILL (TOP) IF USING DUMMY AILERON PUSHRODS
FRONT VIEW SESQUIPLANE L.E.
1/8 PLY BELLCRANK MOUNT
1/8 WIRE SUPPORT
NYLON L.G. CLIP 1/8
WHEEL COLLAR
WASHER TOP & BOTTOM
2" BELLCRANK
1/8 SHT INSERT BETWEEN RIB BOTTOMS (SEE WING PLAN)
MUSIC WIRE (.047) LEADOUT GUIDE (ACTUAL SIZE)
BEND LOOPS & INSERT BRASS EYELETS USING CyA.
SLICED RIBS
1/8 SQ BOTTOM 64 REQ'D
1/8 SHT. TOP 64 REQ'D
BELLCRANK MOUNTING
PIVOT POINT (1/8 WIRE) SHOULD BE 11" FROM FRONT OF CENTER "COWLING". CUT 2 1/8 × 3/16 SLOT FOR BELLCRANK SO THAT IT'S CENTERED ON THE THRUST LINE.
VIEW OF LEADOUT GUIDE AS SEEN FROM INBOARD TIP. INSTALL WITH CyA & 5 MIN. EPOXY.
1/8 DOWEL (OPTIONAL)
CUT OUT FOR WING POSITION
FUSELAGE
ANTENNA MAST 1/16 × 1/8 SPRUCE
LEFT (INBOARD) PANEL BOTTOM VIEW
0 DEG. INCIDENCE
MONOKOTE TRIM
STRUTS K&S STREAMLINE TUBING 3/8
LEADOUT - .018 C/L CABLE
LEADOUT EXIT
CUT OUT FOR SESQUIPLANE
1/8 PLY 3-REQ'D
FILLER BLOCK
1/8 × 1/2 BALSA GEAR FAIRINGS
WHEEL PANTS 3/16 BALSA SHEET
2" MAIN WHEELS
4.0"
1/8 PLY CORE 3/16 SHT. EA. SIDE
3/32 L.G.
BIND & SOLDER
11"
1/8 PLY PLATE ON OUTBOARD SUPPORTS MTG. SHAFT FOR 2" PERFECT BRAND BELLCRANK






FULL-SIZE PLANS AVAILABLE — SEE PAGE 106

peal as before to many modelers. But when the need arises to fly silent models, electric power is now a viable alternative and many discover that it is, also, most enjoyable. •

**Stinson** . . . . . . *Continued from page 47*

to shape. Reinforcing dowels help secure the two nacelles to this assembly after it's been installed in the fuselage.

**INBOARD/OUTBOARD NACELLES**

Cut the cores from 1/8 ply, bend the landing gear struts to shape and lash them to the cores with copper wire. The cores are faced on both sides with 3/16 balsa sheet for a total thickness of 1/2 inch. Drill recesses for the joiner dowels, then make and add the firewall/fairing units if you choose the off-center engine mounting. Add the L.G. strut fairings and profile wheel pants.

**FUSELAGE**

Trace the pattern and cut from a plank of 1/2-inch medium balsa. The bellcrank installation is about the only item here that isn't straightforward. The method isn't original, and for that reason works very well. It's easier to refer you to the drawing than to try explaining the assembly.

As with the wing, personal preference was to apply the finish prior to assembly. Yes, there's some touch-up required after installing the flying surfaces, but try to imagine applying those "windows" and all that striping while reaching through, over, and around everything else.

**TAIL SURFACES**

The fin/rudder is 1/4-inch balsa sheet, with simulated ribs from thin strips of MonoKote under the paint. The stab and elevators are built up, using a core of 1/16 sheet cut to outline and faced on both sides with 1/8 squares and 1/8 sheet curved outlines. These surfaces were purposely built to 5/16-inch thickness so that after sanding they'd be 1/4-inch thick at the hinge line. Block-sand to final shape; tapered at the tips and a slight symmetrical airfoil. The horizontal tail surfaces were covered with Japanese tissue and lightly shrunk with a fine mist of rubbing alcohol. Thin (50/50) dope is applied until the surfaces are sealed and shiny. We used ten coats of Sig nitrate. Why nitrate? With epoxy as a final finish (ours is), the base must be nitrate. We're not sure what happens if you use butyrate under epoxy . . . although we've heard that the appearance will resemble a soggy pizza. Stab struts are 1/16x1/8 spruce, bass, pine, or whatever.

The main wing struts are 3/8-inch K&S streamlined aluminum tubing. Cut these to length, insert plugs of balsa/wire for attachments and apply the finish before installing. Jury struts are 1/16-inch aluminum tubing.

**FINISHING**

We nearly went with a 1930s era cream and green scheme for a fictitious "Fubar Airlines," but wound up following the herd and applied the AA scheme. Colors are dark blue and international orange with white pinstriping. The original's wing and sesquiplane were covered with Black Baron film. These were then sprayed with Black Baron epoxy, as were the tissue covered tail surfaces. Fuselage and nacelles received three coats of Sig nitrate, followed by two sprayed coats of Black Baron primer and two coats of color. Fuselage decorations are from MonoKote trim: windows are light blue, while the stripes were masked off on a white trim sheet (sticky-back), sprayed with orange epoxy, then cut out leaving about a 1/32-inch border all around. The same method was used on the nacelles and wheel pants. The front end of all three "cowlings" are painted and outlined with striping tape; only the horizontal stripes are MonoKote.

The AA logos were made by carefully cutting them from MonoKote. This is sort of tedious, but rewarding. Use a new #11 blade for this. Dry transfer (rub-on) white letters were used for the wording above the logos and for the registration numbers on the rudder. We used Letratype 30 pt. Helvetica Fine. These should be available at any good art supply house. Wing registration numbers and AA markings are 3-inch press-ons from Major Decals.

Following assembly of all components, small fillets of 5-min. epoxy were added and touched-up with paint and brush, then the entire model received a brushed-on coat of clear gloss polyurethane. Install controls, remembering to add a pushrod guide/support. Add details as desired. We installed dummy nav lights, aileron pushrods, exhaust pipes, antenna wire and stab brace wires. It's easy to get carried away here, but it's well worth it.

**FLYING**

As C/L Scale judges are seldom impressed by Hammerhead Stalls on takeoff, be sure to balance the model where shown. The original was flown on 40 feet of .010 solid wires. Engine starting sequence is: outboard, inboard, center. For reasons that should be obvious, you don't want the outboard engine running in flight when the others have stopped. This isn't a three-engine Mouse Racer, so let it have a long takeoff roll to gain flying speed, then ease it off. The sound of multi-engines is like music. On landing, don't let it balloon, but do allow it to glide down to a tail-high touchdown—gently. We think you'll be hooked on Multi-Engine Profile Scalers.

Much thanks to Dave Shipton for his

help and advice on this project. For anyone wanting to discuss this design further, we're at 6618 Dashwood St., Lakewood, California 90713. •

**Inside Engines** . . . . *Cont. from page 39*

tually made the car fun to drive!) Yamada has cleverly engineered a way to slightly increase (about a third of an atmosphere) the pressure of air going past this engine's intake valve and they want to call it "supercharging." I think we should accept their term.

I described fuel injection earlier. The YS-120 doesn't have fuel injection in the normal sense. The pressurized fuel system does deliver fuel to the carburetor under pressure above atmospheric due to the positive air pressure inside the fuel tank. The needle valve sets the rate of fuel flow. The throttle servo operates a dual vane or blade that passes through the dual carburetor throats. Like true fuel injection, there is no venturi in the fuel feed system. The dual blade sets the engine's speed; idle mixture is set by minor turning of the slotted brass adjuster which varies compression on the spring in the regulator. The needle valve sets the mixture above idle and is very insensitive. This isn't fuel injection, but the system works flawlessly, so if Yamada wants to call it "fuel injection," again I think we should accept their term.

The dual throats in the carburetor are a whopping big .430-inch diameter and the intake pipe necks down to .390-inch probably to accelerate the mixture a bit. Such large I.D.s would never satisfactorily draw fuel from the tank by normal venturi action. The variable pressurization system allows steady engine running regardless of the dynamics and flight attitude of the model. Raising and lowering the fuel tank a foot from center does *not* affect the engine performance! Our models can now have working tip tanks for R/C scale!

I doubt this engine design will ever have premature failure of the shaft's ball bearings due to nitrous oxide from combustion joining with moisture to form nitric acid which just loves to eat steel. With all the intake fuel/air passing through the crankcase (just like a rear intake two-cycle engine) that section runs both cleaner and cooler than any other four-stroke model engine. This feature alone virtually nullifies the price differential between the YS-120 and other four-cycle engines.

Since I'm a firm believer in castor oil's superior lubricating properties, I chose to break in and run the YS-120 on Don Nix's Powermaster Plus commercial fuel (whose oil is 30% castor and 70% synthetic) with 15% nitro. Powermaster Plus meets the YS specs nicely. Steve Helms at Futaba suggests staying away from "four-cycle fuels," since they normally have lower total oil contents.

YS recommends either an O.S. "F" glow plug or an Enya #3 plug, but neither is supplied. Although this engine comes with four Allen wrenches, two prop wrenches, and a tappet adjusting wrench, I do feel it should come with a proper glow plug. The Fox Miracle plug worked just fine through break-in and all testing. When I later decided to purposely run the engine too lean on the 16x8 prop (lean runs advance timing) to see if the prop would kick off, the prop did kick off and the plug also failed—as expected.

The complete fuel flow sequence is:

1. Fuel flows from the tank, past a filter, to the regulator.

2. Fuel enters the regulator's lower chamber, below the soft silicone diaphragm.

3. Fuel collects at/around the spring, plunger, and the internal one-way check valve that the plunger operates.

4. As the crankshaft turns, it momentarily releases timed crankcase pressure (maybe as much as 8 to 10 pounds per square inch at peak rpm) into the regulator's upper chamber and onto the top surface of the diaphragm.

5. This pressure escapes by a one-way check valve into the fuel tank where it rises above atmospheric to force out fuel. Before the pressure escapes it pushes down on the diaphragm and on the plunger below the diaphragm. The plunger releases fuel from the bottom of the regulator by opening an internal one-way check valve. The fuel flows to the needle valve for metering.

6. The fuel is fed under pressure past the restriction caused by the needle valve's setting and into a tiny hole in the carb casting, into a bathtub shaped milled entry on the surface of the rotating blade/vane, and simply dumps into the incoming airstream at full throttle. There is no spray bar, no venturi, and no injector nozzle—fuel just dumps into the incoming airstream.

7. At less than full throttle the fuel flows into a continually narrowing width/depth metering channel so that less fuel flows at lower rpm. There's even an auxiliary fuel flow path leading to the throat nearest the needle valve.

I'm sure that a massive volume of Oriental patience, some trial and error, and much clever and ingenious engineering was required to perfect the fuel feed system.

This YS-120 uses a nickel plated brass cylinder. The aluminum piston has one compression ring. The intake valve (14mm) is slightly larger than the exhaust valve (12mm) and the glow plug is offset towards the hotter exhaust side of the combustion chamber. The one-piece valve guide and seat is phosphor bronze. Mechanically